Self Study Report for Accreditation

2019



Punjab Agricultural University Ludhiana

Self Study Report for Accreditation

2013-14 to 2017-18

PUNJAB AGRICULTURAL UNIVERSITY
Ludhiana-141004

March, 2019

FOREWORD

Punjab having just 1.53% geographical area of India, produces about 22% wheat, 11% rice and 4% cotton of the country. Punjab Agricultural University (PAU), since its inception has contributed immensely in farm and food sector not only in the state but also at national level. In view of the immense impact of new technologies and high yielding varieties during 1960s and 70s on agricultural productivity in Punjab and the national food security, PAU played a motherly role in "Green Revolution" in India. Now, PAU is the leading institution in India for the development of technologies for sustainable agriculture.

In recognition of its outstanding contributions to the nation, PAU was the first agricultural university to be conferred with the "Best Institution Award" by the Indian Council of Agricultural Research in the year 1995 and a second time in 2017. It is also the first institution to get a special grant as high as Rs. 100 crore from the Government of India in 2007. Carrying forward the journey of professional excellence, PAU feels proud of being identified as an "Institution of Excellence" under the "Institution of Eminence" scheme by the Ministry of Human Resource Development (MHRD), Government of India in 2018.

The university is committed to continue and strengthen the strategy of integrating agricultural research, education and outreach activities with its highly qualified and experienced faculty, infrastructural resources, networking with global institutions and strong alumni linkages at national and international levels. Research outcomes during the last five years have resulted in successful agro-technological packages including improved crop varieties, production and protection technologies, farm mechanization, post-harvest handling, and food processing and value addition. Further, the pursuit of productivity has been combined with natural resource conservation and integrated pest management to develop sustainable and eco-friendly practices for better environment.

Keeping in view the dynamics of global challenges in agriculture and allied sector, PAU has always been in the forefront to reorient its research, education and outreach programmes in consultation with all the stakeholders, especially the farmers. Innovative initiatives have been taken at PAU to work in the emerging areas of marker assisted selection (MAS) in crop improvement, sensor-based precision agriculture, advanced farming system, climate-resilient agriculture etc. Special emphasis is also being laid on entrepreneurial development and skill oriented programmes for the rural youth.

Every emerging challenge represents an opportunity for achieving professional excellence and delivering solution. The compilation of Self Study Report for the purpose of accreditation is to be considered as an insight to the landmarks we have achieved and milestones ahead. I am sure, the efforts put in by the PAU team under the Institutional Coordinator, Dr (Mrs.) G K Sangha, Dean, Postgraduate Studies has resulted in the development of a document as per the guidelines. The contributions made by the Deans, Directors, Registrar, Officers, faculty and staff members of PAU are highly appreciated. I hope that apart from being a document for accreditation it would also serve as a source of useful information for the academicians, administrators and policy makers.

B S Dhillon
Vice Chancellor

Ludhiana
March 08, 2019

PREFACE

The Punjab Agricultural University (PAU), Ludhiana since its inception in 1962 is committed to impart teaching, research and extension education in agriculture and its allied fields. Its immense contribution to overall growth in agriculture and human resource development has given it the status of the biggest engine of development in Punjab and one of the highly acclaimed agricultural universities at national and international level. PAU has exemplary relationship with the farmers and all the stakeholders to align its academic, research and outreach programmes to achieve several accolades in India and abroad. The awards and honours won by the University, bore a testimony to the university's research accomplishments coupled with academic excellence and strong mechanism of transfer of technology. PAU holds an enviable record of producing outstanding alumni as eminent scientists, academicians, administrations, sports persons and artists.

The university has 4 colleges, 35 departments (including three schools), 7 undergraduate, 43 M.Sc. and 29 Ph. D programmes, besides two diploma courses. The total student strength is about 4000 with an excellent student teacher ratio of about 5:1 and an ideal gender balance of about 1:1. Presently, 779 faculty members are in position, out of which, 54%, 23% and 23% have research, teaching and extension as their main mandate (though all faculty members perform duties pertaining to all three domains). The governing mechanisms at various levels make university to upgrade and align its research, teaching and extension programmes regularly. PAU has implemented the recommendations of ICAR V Deans' Committee in all its undergraduate programmes since 2016-17.

The PAU was accredited by ICAR for a period of five years in 2014. Now, the Self Study Report of the university on university's activities and accomplishments is compiled for the last five years i.e 2013-14 to 2017-18 as per the guidelines. It gives comprehensive information in the last five years. The detailed information (where ever required) has also been annexed.

I as convenor of the Self Study Report for the accreditation of the university, express my gratitude to the hon'ble Vice Chancellor of PAU, Dr B S Dhillon for his valuable inputs and guidance to prepare this quality document. For the compilation of this report, a lot of information and inputs have been received from the colleges, directorates and various sections/units of the university. It is my pleasure to place on record the valuable cooperation and support extended by the university Deans, Directors, Registrar and Officers of PAU for the preparation of this report. I am thankful to all the Heads of departments, section incharges, faculty and staff for responding to every request made to supply desired information. My special acknowledgements are due to the members of the Task Force constituted for the compilation of this report. I hope the efforts made by PAU team for preparing this document would facilitate the prestigious process of accreditation.

G K Sangha
Dean, Postgraduate Studies

Ludhiana
March 8, 2019

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Chapter 1
University Governance

6.6.1 University Governance

Punjab Agricultural University (PAU) was established in 1962 on the pattern of the U.S. Land Grant System. It has its origin in the Punjab Agriculture College and Research Institute, Lyallpur (now Faisalabad) in Pakistan, which was established in 1906. After partition of the country in August, 1947, the college was re-established in a building belonging to Khalsa College, Amritsar. In March 1949, the Government Agricultural College (Affiliated to Punjab University) was shifted to Malwa Khalsa High School at Ludhiana. This college was later on shifted to its present site in 1957 and upgraded as a university in 1962 through the Punjab Agricultural University Act passed by the Punjab Legislature on 17 October 1961. Originally, the university had three campuses, one each at Ludhiana, Hisar and Palampur. On the re-organization of Punjab State in November, 1966. The PAU was bifurcated by an Act of Parliament on 2nd February, 1970 to establish the Punjab Agricultural University at Ludhiana and the Haryana Agricultural University (now CCS Haryana Agricultural University) at Hisar. In July 1970, the Himachal Pradesh Agricultural University (now CSK Himachal Pradesh Krishi Vishav Vidyalaya) was formed at Palampur. In the year 2006, a new university i.e. Guru Angad Dev Veterinary and Animal Sciences University (GADVASU) was carved out of the PAU (Fig. 1).

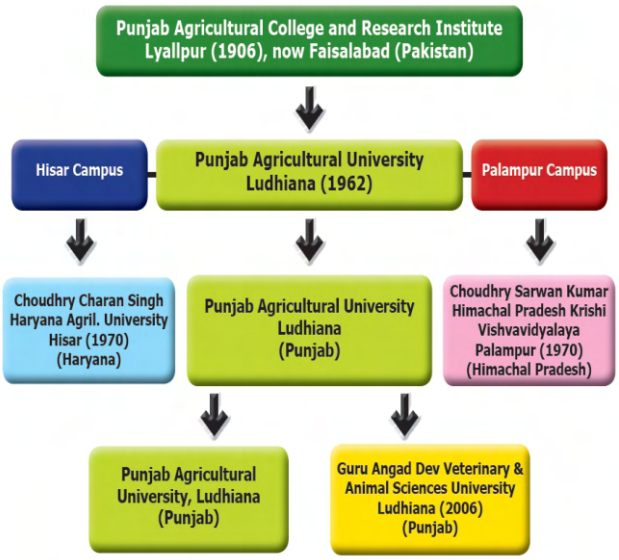


Fig. 1: Genesis and evolution of Punjab Agricultural University

At present the Punjab Agricultural University has four constituent Colleges with 32 departments and three schools (Fig 2). The University is spread over an area of 1221 acres at Ludhiana and about

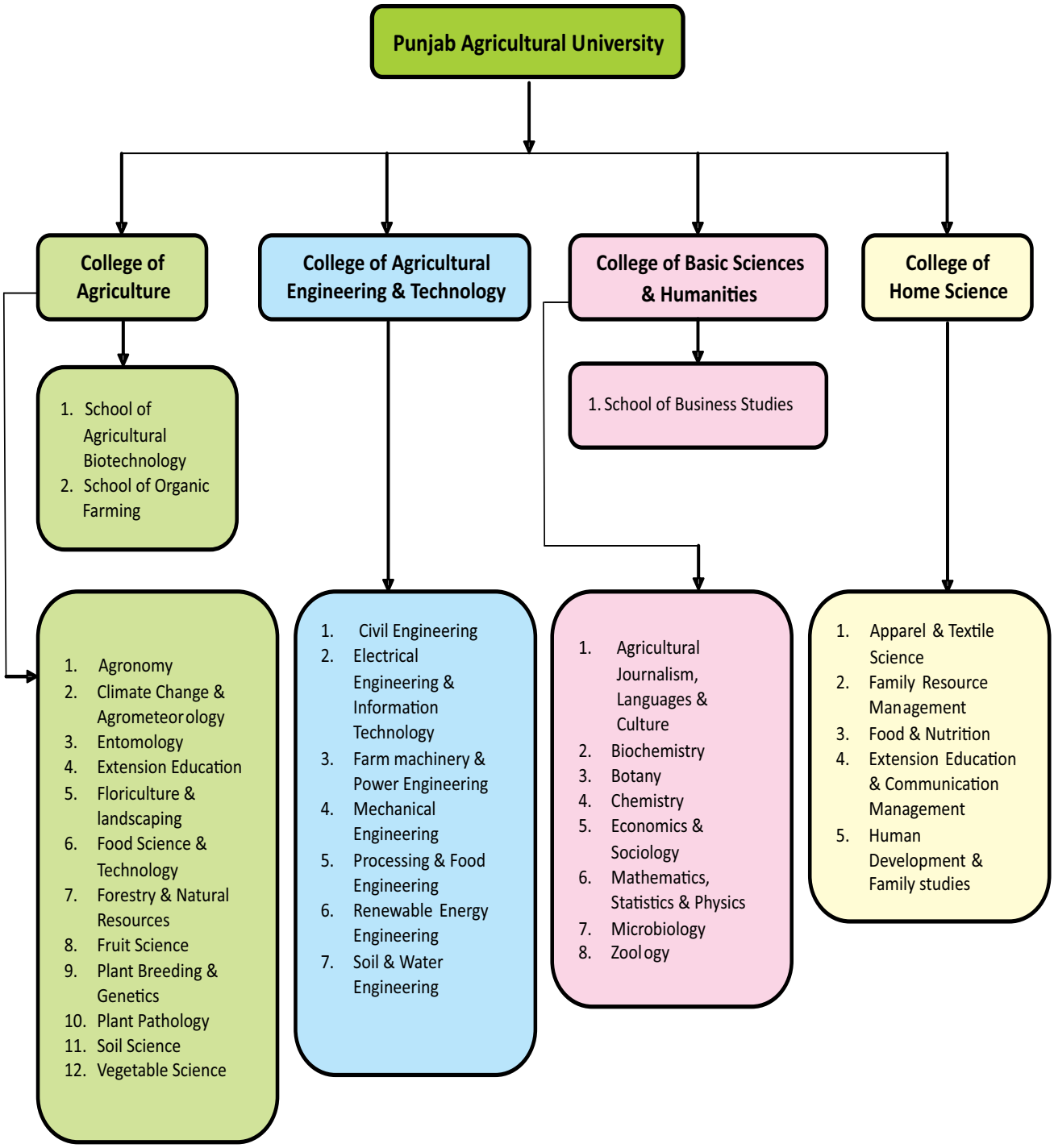


Fig. 2: Colleges, departments and schools of PAU

5557 acre at various Regional Research Stations (7), Fruit Research Stations (3), Krishi Vigyan Kendra (KVK) (18) and Seed Farms (5) located in different agro-climatic zones of the state.

6.6.1.1 Vision, Mission and Goals

The University was established in the year 1962 to make provisions for imparting education, conducting research and providing extension services in agriculture, agricultural engineering, home science and other allied sciences.

Vision

PAU visualizes the teaching, research and extension concepts to develop and promote innovative and need- based scientific technological approaches which is expected to be helpful to the scientists, policy makers and other stakeholders in addressing the future needs for growth and development of agriculture in the state and sustaining national food security. Pursuing a dynamic path leading to institutional vision, PAU has

published "Vision 2040" document in the year 2012 to execute the envisioned programmes.

The university has re-oriented its programmes to focus on the challenges that have emerged over time. Its initial thrust was on crop productivity enhancement, whereas, the current focus is on sustainable development of agriculture i.e. productivity enhancement, input use efficiency, natural resource conservation, agro-processing, mechanization and allied enterprises. The university has expanded its teaching programmes and has revised the curricula in tune with the emerging educational needs. It has exemplary strong linkages with farmers and line departments which are being continuously nurtured to meet the new challenges in transfer of technology.

Mission

Punjab Agricultural University aspires to become a premier agricultural university with teaching, research and extension programmes that serve the people, the state, the nation and the world. It is committed to continuous improvement in agricultural and allied fields by developing quality manpower, providing relevant technological solutions piloting their field use and supporting other related activities.

Goals and Objectives

Goals: For achieving the stated mission of the University, the goals are:

I. To provide quality education in the areas of agriculture, agricultural engineering, home science and allied fields.

ii. To undertake basic, applied and adaptive research to seek appropriate solutions to emerging problems in agriculture and develop relevant technologies to improve socio-economic conditions of the farming community.

iii. To develop effective mechanisms for the transfer of technology to the farmers and agricultural organizations through different extension programmes with a view to improve agricultural productivity and economic condition of rural population.

iv. To develop appropriate technology for supporting the growth of agro-based industries and generate self employment opportunities for the educated youth.

With its high standards of academic performance, creditable research achievements and efficient system of agricultural technology transfer, the Punjab Agricultural University has aimed to provide leadership at state, national and international level for the development of agriculture. Since 1962, the University with its effective coordination with the state, development departments and enterprising farmers coupled with appropriate government policies, has played a pivotal role in making Punjab state a bread basket of the Country. Now that the country has become self sufficient in food grains, the University has consistently expanded the focus of its efforts to address the issues of:

- Sustainability of agriculture
- Conservation agriculture
- Environmental conservation
- Social responsibility
- Human resource development in emerging areas

To ensure acceptable quality institutional products or services, the university has been maintaining its quality management system as per the requirements of International standards ISO 9001: 2015 standard.

Objectives: The objectives of the university in consonance with its mandate/mission for quality teaching, research and extension are described below:

Teaching

- To provide quality education in the areas of agriculture, agricultural engineering, home science and allied fields
- To develop globally competitive human resource to address emerging challenges in agriculture
- To modify the agricultural education according to changing scenario and needs.
- To provide better counselling services and extra-curricular facilities for overall personality development of students.
- To assist students in their right placement.

The university has four constituent colleges. College of Agriculture has 12 departments and 2 schools, College of Agricultural Engineering and Technology has 7 departments, College of Basic Sciences & Humanities has 8 departments and 1 school and College of Home Science has 5 departments.



At present, the university offers 7 under graduate programmes, 43 Masters programmes and 29 Doctoral programmes in the 4 colleges. In addition 5 certificate/diploma courses are also offered by the university (Table 1.1).

Research

- To undertake basic and applied research in agriculture and allied sciences.
- To develop appropriate agricultural production

Table 1.1: Teaching programmes presently offered by the University

Undergraduate programmes

(07 degree programmes + 5 Diploma/Certificate courses)

College of Agriculture	College of Agricultural Engineering & Technology	College of Basic Sciences & Humanities	College of Home Science
1. B.Sc. Agri (Hons.) 4 -year programme 2. B.Sc. Agri (Hons.) 6 -year programme 3. B. Tech. Food Tech. (Hons.) 4. B. Tech. Biotechnology (Hons.) 5. Diploma course in Hybrid Seed Production Technology 6. Diploma in Agriculture at PAU, Ludhiana and Ballowal Saunkhri	1. B. Tech. (Agril. Engg.)	1. Diploma in French 2. Certificate course in French 3. Certificate course in Interactive Skills & Personality Enhancement	1. B.Sc. (Hons.) Community Science 4-year programme 2. B.Sc. (Hons.) Nutrition & Dietetics

Postgraduate programmes

College of Agriculture	College of Agricultural Engineering & Technology	College of Basic Sciences & Humanities	College of Home Science
Masters (13): 1. Agronomy 2. Agrometeorology 3. Biotechnology 4. Entomology 5. Extension Education 6. Food Technology 7. Forestry 8. Horticulture (Floriculture & Landscaping) 9. Horticulture (Fruit Science) 10. Horticulture (Vegetable Science) 11. Plant Breeding & Genetics 12. Plant Pathology 13. Soil Science	**Masters (7):** 1. Farm Machinery & Power Engineering 2. Soil & Water Engineering 3. Processing & Food Engineering 4. Civil Engineering 5. Computer Application 6. Computer Science & Engineering 7. Remote Sensing & GIS	**Masters (17):** 1. Agribusiness 2. Agri. Economics 3. Biochemistry 4. Botany 5. Business Administration 6. Chemistry 7. Journalism and Mass Communication 8. Microbiology 9. Physics 10. Sociology 11. Statistics 12. Zoology **Integrated M.Sc.-** 13. Biochemistry 14. Botany 15. Chemistry 16. Microbiology 17. Zoology	**Masters (6):** 1. Apparel & Textile Science 2. Family Resource Management 3. Fashion Designing 4. Food & Nutrition 5. Extension Education & Communication Management 6. Human Development & Family Studies

Ph.D (12):	Ph.D (4):	Ph.D (8):	Ph.D (5):
1. Agronomy	1. Energy Science & Technology	1. Agri. Economics	1. Apparel & Textile Science
2. Agrometeorology	2. Farm Machinery & Power Engineering	2. Biochemistry	2. Family Resource Management
3. Biotechnology	3. Processing & Food Engineering	3. Botany	3. Food & Nutrition
4. Entomology	4. Soil & Water Engineering	4. Business Administration	4. Extension Education & Communication Management
5. Extension Education		5. Chemistry	5. Human Development & Family Studies
6. Food Technology		6. Microbiology	
7. Horticulture (Floriculture & Landscaping		7. Sociology	
8. Horticulture (Fruit Science)		8. Zoology	
9. Horticulture (Vegetable Science)			
10. Plant Breeding & Genetics			
11. Plant Pathology			
12. Soil Science			

technologies relevant to the agro-climatic and socio economic conditions in the Punjab.

- To develop sustainable cropping and farming systems for providing livelihood security and better living standards to the farmers and rural population in different agro-ecological regions of the Punjab.
- To develop technologies for supporting the growth of subsidiary occupations, agro-based industries and generating self-employment opportunities to rural people.
- To develop technologies for emergent challenges such as climate change and natural resource depletion.

Research efforts during the last five years have resulted in successful agro-technological packages including crop varieties, production and protection technologies and also technologies related to post harvest handling, processing and value addition. Further, the pursuit of productivity is being combined with the natural resource conservation and integrated disease and pest management to generate sustainable and eco-friendly practices.

Extension Education

- To develop and conduct appropriate programmes for transfer of technologies for agricultural and rural development in the region.
- To provide consultancy services to farmers, livestock producers, agricultural inputs suppliers, agro-industry and all those engaged in production, processing, marketing and management in the wider profession of agriculture and allied activities.
- To test new technologies and popularize the recommended one.

The extension education programmes of PAU play a key role in dissemination of latest recommendations of research to the farmers so as to enhance the production quality and post-harvest management of various field and horticultural crops in the state. The training units, 18 Krishi Vigyan Kendra, 15 centres of Farm Advisory Service Centres in different districts of the State are entrusted with responsibility of implementing various extension education programmes for unemployed youth, farmers, farm women and field extension functionaries of the state.

6.6.1.2 Statutes and Regulations

The Statutes and Regulations implemented by the University are notified within the University for its Administration and Planning. PAU Act and Statutes is available on the official web portal of the university. The various chapters (Table 1.2) along with the sections and sub-sections are annexed (Annexure I)

6.6.1.3 University Statutory Officers and their selection process

The activities of PAU are broadly categorised into teaching, research and extension programmes.

Table 1.2: List of Statues and Regulations

Chapter	Title
I	The Haryana and Punjab Agricultural Universities Act, 1970
II	Powers and Duties of the Authorities of the University
III	The Designation, the Manner of Appointment, powers and duties of the Officers of the University
IV	Classification, the Manner of Appointments, Powers and Duties of the Teachers of the University
IV-A	Appointment of Teachers by promotion Based on Merit
IV-B	Career Advancement of Teachers
IV-C	Career Advancement of Teachers w.e.f. 27-7-1998VAppointments of Employees of The University other than Officers and Teachers
VI	Number, Qualifications, Emoluments and Other Conditions of Service of Officers and Other Employees of The University Not Being Teachers and The Preparation and Maintenance of Record of their Service and Activities. (Part-A)
VII	Number, Qualifications, Emoluments and other Conditions of Service of Teachers of the University and the Preparation and Maintenance of Record of their Service and Activities (Part-B)
VIII	Pension and Provident Funds
IX	Institution of Degrees and Diplomas and Conferment of Honorary Degrees
X	The Courses of Study to be Laid Down for Degrees and Diplomas of University
XI	The Institution of Fellowships, Scholarships, Medals and Prizes
XII	The Conditions for The Award of Fellowships, Scholarships, Medals and Prizes, Stipends and Fee Concessions
XIII	The Admission of Students to The University and Their Enrolment and Continuance as such
XIV	The Conditions Under Which Students Shall be Admitted to The Degree, Diploma or Other Courses and The Manner in Which the Examinations Are to be Held and The Eligibility for The Award of The Degrees and Diplomas
XV	The Conditions of Residence of The Students of The University and The Levying of Fees for Residence in Hostels Maintained by The University
XVI	The Establishment and The Abolition of Hostels Maintained by The University
XVII	The Recognition and Supervision of Hostels Not Maintained by The University
XVIII	The Establishment, Amalgamation, Sub-Division and Abolition of Departments
XIX	Levying of Fees by The University for Any Purpose Excluding Hostel Fees Governed by The Statutes (Chapter XV)
XX	Remuneration and Allowances, Including Travelling and Daily Allowances to be Paid to Persons Employed on The Business of The University
XXI	Persons Who Are Declared as Officers of The University
XXII	The Exercise of Financial and Administrative Powers by The Officers, Teachers and Other Employees of The University
XXIII	Administrative and Financial Powers by The Board of Management to The Officers/Employees of The University
XXIV	Statement showing delegation of administrative and financial powers by the Vice-Chancellor in exercise of powers conferred on him vide clause 4 of the Statues issued under section 31(u) of the Haryana and Punjab Agricultural Universities Act, 1970 and relating to the delegation of administrative and financial powers by the Board of Management to the officers/employees of the University (Issued vide Notification No. Acad-II (AU)-66-9333 dated 29 March, 1966 and amended from time to time).
XXV	The Conferment of Emeritus Professorship, Payment of Honorarium to Emeritus Professors and Other Conditions of Appointment
XXVI	The Grant of Travelling and Daily Allowances to Members of The Board of Management

The dedicated positions of statutory Officers/Deans/ Directors have been established in the organisation reporting to the Vice Chancellor. Academic affairs are taken care of by the respective Deans of the constituent colleges of PAU. However, the Dean, Postgraduate Studies at University level coordinates the postgraduate (Master and Ph.D) programmes. The research and extension projects/programmes are executed by the Director of Research and Director of Extension, respectively. The Director Students Welfare works for conducting sports, cultural and other welfare activities for the students. The present status and details of these statutory officers in PAU are mentioned below (Table 1.3; Fig 3).

by the Vice-Chancellor. The Screening Committee after screening the qualifications of the applicants and excluding those not falling in the eligibility criteria shall prepare a list of candidates recommended to be called for interview or considered in absentia and place it before the Vice-Chancellor for his approval. The Vice-Chancellor while according such approval shall have the power to include in such a list name(s) or person(s) who may not have applied, provided they must fulfill the requisite qualifications on the last date prescribed for receipt of applications.

c. After interviewing the candidates or considering them in absentia, as the case may be, the

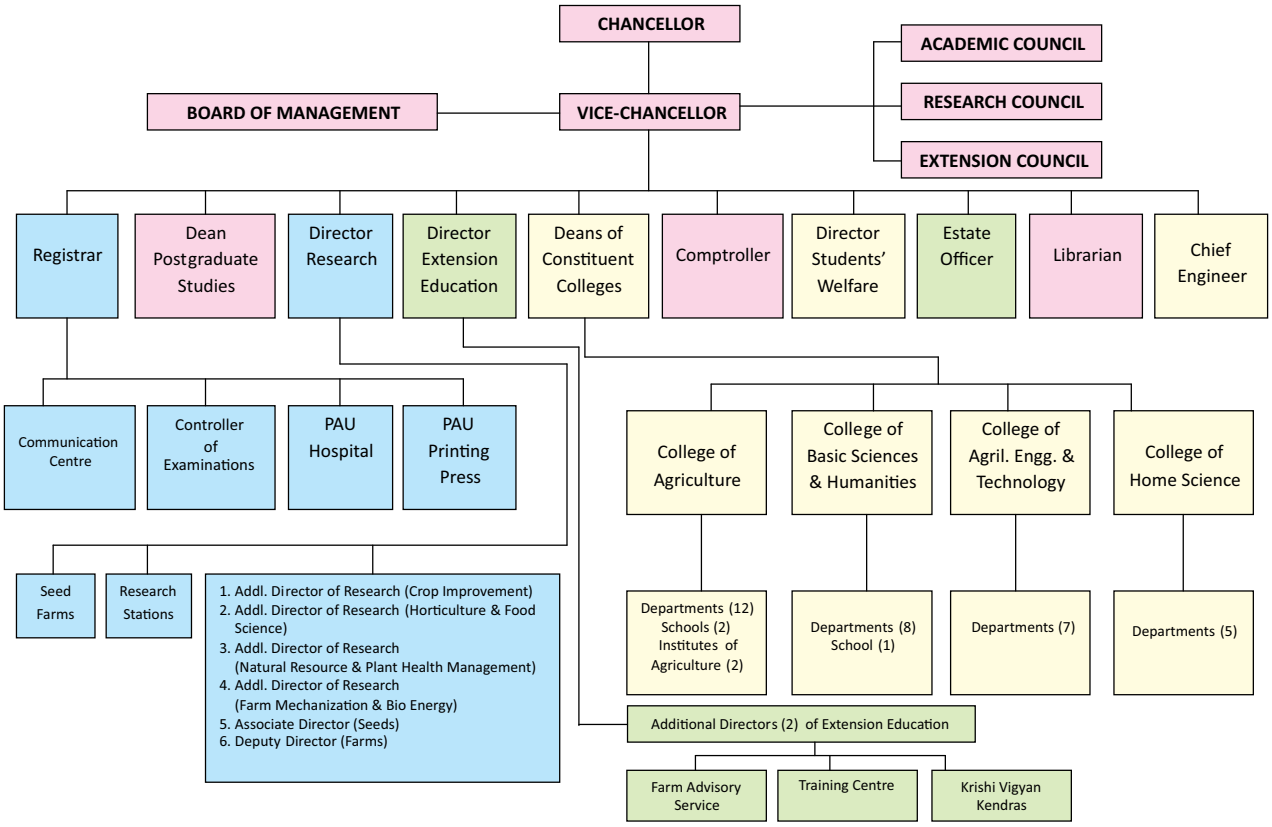


Fig. 3: Organizational Structure of Punjab Agricultural University

Mode of Appointment of Statutory Officers:

The following procedure shall be adopted for the appointment of all the Deans, Director of Research, Director of Extension Education, Registrar, Comptroller, Estate Officer, Librarian and Student Welfare officer.

a. The Vice-Chancellor may have the post advertised with such qualifications as may be prescribed by the competent authority.

b. On the expiry of the last date for the receipt of applications so received alongwith the biodata they shall be compiled and placed before the screening committee constituted for the purpose committee shall make recommendations as far as possible three persons in order of preference for each post separately.

d. The Vice-Chancellor shall then submit the recommendations of the Selection Committee for approval of the Board of Management. However, the Board of Management may also approve the panel recommended for appointment which shall be valid for a period of six months from the date of interview.

e. The posts of Deans of the Colleges, Dean, Postgraduate Studies, Director of Research,



Table 1.3: Status and details of statutory officers in Punjab Agricultural University

Sr. No.	Statutory officer sanctioned in the Act	Present position	Mode of appointment (selection/ nomination)	Joining date	Tenure	Reason for not appointment
1.	Vice Chancellor	Filled	Selection	1.7.2015	4 year	-
2.	Registrar	Filled	Selection	30.05.2017	4 year	-
3.	Dean, Postgraduate Studies	Filled	Selection	22.1.2019 (AN)	4 year	-
4.	Dean, College of Agriculture	Filled	Selection	30.5.2017	4 year	-
5.	Dean, College of Agril. Engg. & Technology	Filled	Selection	22.01.2019 (AN)	4 year	-
6.	Dean, College of Basic Sciences & Humanities	Vacant w.e.f. 22.01.19	-	-	4 year	Under process for selection
7.	Dean, College of Home Science	Filled	Selection	01.2.2019	4 year	-
8.	Director of Research	Filled	Selection	30.5.2017	4 year	-
9.	Director of Extension Education	Filled	Selection	22.1.2018 (AN)	4 year	-
10.	Director of Students' Welfare	Filled	Selection	22.1.2018 (AN)	4 year	-
11.	Comptroller	Vacant	-	-	4 year	Post advertised number of times but no suitable candidate found. Post again advertised now.
12.	University Librarian	Vacant	-	-	4 year	Due to administrative reasons. However, additional charge of this post has been given to faculty.
13.	Estate Officer	Vacant	-	-	4 year	Due to administrative reasons. However, additional charge of this post has been given to faculty.
14.	Chief Engineer	Vacant	-	-	4 year	Due to administrative reasons. However, additional charge of this post has been given to faculty.

Director of Extension Education shall be on whole time basis for tenure of four years or till superannuation, whichever is earlier. A person selected shall not be eligible for appointment for more than two terms. The appointment of Dean/Director can be terminated by the Board of Management on the recommendations of the Vice-Chancellor even before the completion of his/her tenure for reasons to be recorded and a new Dean/Director shall be appointed according to the procedure prescribed in the Statutes.

f. The posts of Student' Welfare Officer, Estate Officer and Librarian shall be on whole time basis for a tenure of four years or till superannuation, whichever is earlier. A person

selected shall not be eligible for appointment for more than two terms. The appointment of Student' Welfare Officer, Estate Officer and Librarian can be terminated by the Board of Management on the recommendations of the Vice-Chancellor even before the completion of his/her tenure for reasons to be recorded and a new Dean/Director shall be appointed according to the procedure prescribed in the Statutes.

6.6.1.4 Decentralization of Powers:

The Board of Management of PAU through Chapter XXIII of Act & Statutes of PAU provides decentra-lization of power by delegation of administrative and financial powers to the officers/employees of the university.

The administrative powers delegated to the officers of the University have been detailed in the Statutes of PAU and are given below.

Administrative Powers:

Vice-Chancellor

a. The Vice Chancellor shall be the principal executive and academic officer of the corresponding University and the Chairman of the Academic Council and shall, in the absence of the Chancellor, preside at convocation of the corresponding University and shall confer degrees on persons entitled to receive them.

b. The Vice Chancellor shall exercise control over the affairs of the corresponding University and shall be responsible for the due maintenance of discipline at that University.

c. The Vice Chancellor shall convene meetings of the Academic Council unless he temporarily delegates this power to some other officer of the corresponding University.

d. Without prejudice to the powers conferred by this act on the appropriate Government, the Vice Chancellor shall ensure the faithful observance of the provisions of this Act and the Statutes and he shall exercise all such powers as may be necessary in that behalf.

e. The Vice Chancellor shall be responsible for the presentation of the budget and the statement of accounts to the Board.

f. In any emergency, which, in the opinion of the Vice-Chancellor, requires immediate action to be taken, he shall take such action as he deems necessary and shall, at the earliest opportunity, report the action taken to the officer, authority or other body for confirmation who or which in the ordinary course would have dealt with the matter, but nothing in this sub-section shall be deemed to empower the Vice Chancellor to incur any expenditure not duly authorised and provided for in the budget.

g. Where any action by the Vice Chancellor under sub-section (6) affects any person in the service of the corresponding University to his disadvantage, such action shall not be taken unless the person concerned has been given a reasonable opportunity of being heard, and the person against whom any action is proposed to be taken may prefer an appeal to the Board within thirty days of the date on which the action proposed to be taken against him is communicated to him.

h. Subject as aforesaid, the Vice Chancellor shall give effect to the orders of the Board regarding the appointment, suspension and dismissal of officers, teachers and other employees of the corresponding University.

i. The Vice Chancellor shall be responsible for the close co-ordination and integration of teaching, research and extension education.

j. The Vice Chancellor shall exercise such other powers as may be prescribed.

k. The salary and allowances payable to the officers, teachers and other employees of the corresponding University shall be determined by the Vice Chancellor with the approval of the Board.

Registrar

In exercise of his duties under Section 17 of the Act, the Registrar shall :-

a. Issue notices and maintain the minutes of all meetings of the Academic Council and the Board of Management and of Committees appointed by them;

b. Conduct the official correspondence of the Academic Council and the Board;

c. Be responsible for admission of students to the University including the supervision of the entrance examination, if any;

d. Be responsible for registration of students of the University;

e. Be responsible for maintaining a register of all degrees/diplomas conferred by the University;



f. Be responsible for maintaining all students' records;

g. Obtain the grades of the students from the instructors and issue trimester/semester reports and transcripts;

h. Perform such other duties and functions as are assigned to him by the Vice-Chancellor.

Dean Post Graduate Studies:

The Dean Post Graduate Studies shall be responsible for the organisation and conduct of postgraduate teaching in all the constituent colleges of the Punjab Agricultural University and for that purpose, shall pass such orders as may be necessary in consultation with the Deans of the constituent colleges and the Directors of Research and Extension Education where such consultation is considered necessary.

a. He shall in collaboration with the Director of Research, be responsible for the coordination of research of the postgraduate students and its integration with the general research programme of the University.

b. He shall preside over the meetings of the postgraduate committee.

c. He shall formulate and present policies to the postgraduate committee for its consideration without prejudice to the right of any member to present any matter to the postgraduate committee.

d. He shall forward the recommendations of the postgraduate committee, to the Vice-Chancellor or the Academic Council as the case may be.

e. He shall maintain record of the postgraduate students in the Punjab Agricultural University and also supervise their progress.

f. He shall be responsible for the maintenance of proper standards of postgraduate instructions.

g. He shall, in consultation with the Heads of Departments, exercise control over the teaching load of the members of the postgraduate faculty.

h. He shall provide, in consultation with the Heads of Departments, guidance and leadership in the development of periodic evaluation of effective curricula within each subject-matter and integration of said curricula into appropriate instruction programme designed to prepare students for effective careers in research, teaching and extension.

i. He shall be a member of the Advisory Committee for Resident Instruction, Research Advisory Committee and Extension Education Advisory Committee.

j. He shall prepare budget for the postgraduate programme of the University which shall be incorporated in the budget of the constituent colleges by the concerned Deans.

k. He shall perform such other duties as may be entrusted to him by the Vice-Chancellor from time to time for effective co-ordination of postgraduate teaching in the University.

Deans of Colleges

There are four colleges in Punjab Agricultural University and each college is headed by the concerned Dean.

a. He shall be responsible for the organisation and conduct of teaching in the Departments comprising the College and for that purpose shall pass such orders as may be necessary in consultation with the Heads of Departments concerned.

b. He shall be responsible for the due observance of the Statutes and Rules relating to the College.
c. He shall preside over the meetings of the Board of Studies of the College.

d. He shall formulate and present policies to the Board of Studies of the College for its considerations, without prejudice to the right of any member to present any matter to the respective Board of Studies.

e. He shall submit reports to the Vice-Chancellor on the work of the College regarding resident instructions.

f. He shall be responsible to the Vice-Chancellor for the use of the buildings and rooms of the College and for the equipment of the College.

g. He shall serve as the medium of communication for all official business of the College with other authorities of the University, the students and the public.

h. He shall normally represent the College in conferences and where necessary, he may designate representatives from amongst the staff of the College for specific conferences on resident instructions.

i. He shall prepare the budget of the College.

j. He shall exercise, in consultation with the Heads of Departments, administrative control over the teaching loads of the members of faculty and work with the Directors of Research/Extension Education on work load assignments of joint teaching research or teaching extension personnel.

k. He shall be responsible to the Vice-Chancellor for maintaining discipline, law and order in the College and for the discharge of his duties, he may award suitable punishment e.g. fine/rustication/ expulsion etc., to students for acts of indiscipline and misdemeanour.

Director of Research

The Director of Research shall coordinate all research in the University in co-operation with the Deans. While his dealings would be mainly with the staff concerned with research in Departments of Colleges, he shall be directly responsible to the Vice-Chancellor for the initiation, guidance and coordination of the research programme of the University and its outlying stations.

a. He shall be responsible for initiation, organization and conduct of research programmes of the University and for that purpose, shall pass such orders as may be necessary in consultation with the Heads of the Departments concerned.

b. He shall exercise broad administrative control over: (i) research staff, (ii) research funds allotted for the purpose, and (iii) all physical properties, facilities and materials assigned by the University for the pursuit of the research programme.

c. He shall prepare in consultation with the Heads of Departments the budgetary needs of research of different Departments of the University.

d. He shall be the principal liaison officer for dealing with aid-granting agencies, such as I.C.A.R., Commodity Committees or private institutions.

e. He shall formulate and present policies to the Research Advisory Committee for its consideration.

f. He shall cause to be published regularly research bulletins, circulars, articles in scientific journals and popular magazines and press releases which summarize practical research findings on important problems.

g. In formulating research policies and programmes of the University, he shall work in close consultation with the Deans and the Director of Extension Education.

h. He shall assume leadership in development and maintenance of research productivity of a high level by :

- promotion of self-improvement on the part of research personnel;
- stimulation of a wholesome, aggressive *esprit de corps;* and
- development of an attitude in the minds of the staff as to the worthiness and self-satisfaction (humble pride) of a life vocation of service in the field of agricultural research.

i. He may represent the University in conferences regarding research.

Director of Extension Education

The Director of Extension Education shall plan and execute all extension education programmes and activities in co-operation with the Deans and the Director of Research.

The Director of Extension Education shall supervise and control the field activities of the extension subject-matter specialists who shall otherwise hold academic rank and be members of the staff of the departments.

a. He shall be responsible for initiation, organization and conduct of extension educational programmes of the University and for that purpose shall passes such orders as may be necessary in consultation with the Heads of Departments concerned.

b. He shall exercise broad administrative control over :-

(i) Extension Education staff.

(ii) Extension Education funds allotted for this purpose; and

(iii) All physical properties, facilities and materials assigned by the University for the pursuit of extension programmes.

c. He shall assess, in consultation with Heads of Departments, the budgetary needs of extension education of different Departments of the University.



d. He shall be the principal liaison officer for dealing with such agencies as the Departments of Agriculture, Animal Husbandry, Co-operation, Development and Panchayats of the Government in the matter of extension education.

e. He shall formulate and present extension educational programme of the Extension Advisory Committee, for its consideration.

f. He shall guide and supervise the working of the Information Section dealing with publications, audio-visual aids, radio, press and other materials directed to the successful implementation of the extension educational programmes.

g. In formulating the extension policies and programmes of the University, he shall work in close consultation with the Deans of Colleges and Director of Research.

h. He shall assume leadership in the development and maintenance of effective and productive extension educational programmes :-

- promotion of self-improvement on the part of extension personnel; and
- inculcation in them of a missionary spirit for dedicated service to the farmers of the State.

i. He may represent the University in conferences regarding extension education.

Director of Students' Welfare

The Director of Students' Welfare shall be directly responsible to the Vice-Chancellor and shall have the following duties:-

a. to make arrangements for the housing and messing of students;

b. to direct a programme of student counselling;

c. to arrange for the part-time employment of students in accordance with the plan approved by the Vice-Chancellor;

d. to assist in the placement of graduates of the University;

e. to obtain travel facilities for holidays, study tours of students;

f. to communicate with the guardians of students concerning the welfare of the students;

g. to exercise general control and supervision over the physical education programme and other co-curricular activities of the students;

h. to perform such other duties as may be entrusted to him by the Vice-Chancellor from time to time.

Comptroller

The Comptroller, PAU shall be responsible to the Vice-Chancellor to ensure:-

a. that expenditure, not authorised in the budget, is not incurred without appropriate sanction;

b. that all moneys belonging to the University are kept in a scheduled bank approved by the Board of Management;

c. that all the accounts of the University are properly kept, adjusted and audited;

d. that the budget of the University is prepared and submitted to the Vice-Chancellor and that the financial sanctions are obtained in time;

e. that income and fees due to the University are collected and that salaries and other amounts due to the staff and others paid promptly;

f. that notices are issued and the minutes of all meetings of the Finance Committee are maintained to conduct the official correspondence of the Finance Committee;

g. that development plans are prepared;

h. that dealings with the Government, with the authority responsible for the auditing of the accounts of the University, Commodity, Committees and other aid-granting agencies regarding financial and accounts matters, are on correct lines.

Estate Officer

The Estate Officer shall work under the control and supervision of the Vice-Chancellor and in the exercise of his responsibilities, under Section 19 of the Act, shall be responsible for the following:-

a. maintenance of the University buildings, fencing, lands, other than the land comprising the agricultural farms;

b. maintenance of fire protection services;

c. preparation of the maintenance budget of the University;

d. maintenance of accounts relating to the maintenance work in his charge on prescribed forms;

e. maintenance of an up-to-date record of all the immovable properties of the University including lands and buildings in co-operation

with the Heads of Departments;

f. procurement/disposal of immovable property of the University.

Chief Engineer

The Chief Engineer shall work under the control and supervision of the Vice-Chancellor and shall be responsible for the following:-

a. construction and maintenance of utility services;

b. maintenance of architectural and constructional services of the University;

c. all University construction;

d. preparation of the annual construction budget of the University and a periodical report showing the progress of works under construction;

e. maintenance of accounts relating to the works in his charge on prescribed forms.

(Powers of the Chief Engineer have been vested with the Estate Officer. Notification No. 265, dt. 12-11-98).

Librarian

The Librarian shall work under the control and supervision of the Vice-Chancellor and, in exercise of his responsibilities under section 22 of the Act, shall be responsible for the maintenance of all libraries of the University and for the organization of their services. The University Librarian shall have the following powers and duties:-

a. He shall have general overall supervision of the University Library, and Library personnel and departments; libraries or collections;

b. he shall prepare the Library budget for the University Library including Department collections;

c. he shall have the responsibility of receiving and accessioning all library materials;

d. he shall have the responsibility of initiating the purchase requisitions for all library materials;

e. he shall have the responsibility of renewing in time subscriptions to journals;

f. he shall prepare a library newsletter at monthly intervals which will carry a list of all library materials received since the last preceding newsletter and other timely library news of interest to students and staff;

g. he shall initiate, participate and co-operate in programme designed to stimulate and encourage the use of the library by students and staff;

h. he shall arrange library hours which will permit maximum library use by both students and faculty; and

i. he shall arrange for departments and selected research Sub-stations, small collections of volumes and journals that are in almost constant use by the staff and postgraduate students as references.

6.6.1.5 Supporting Units

Several supporting units have been established at the university level which helps in the effective functioning of the day to day activities on the campus (Fig. 4).

Estate Organisation: The estate organisation of PAU takes care of the university buildings, residential area, electrical supply lines, sewer and water supply lines, roads, landscape and security operations on the campus. Adequate staff strength including two Executive Engineers (Civil and Electrical), two Sub-Divisional Engineers (Maintenance and Public Health), Security officer are available in the estate organisation reporting to PAU Estate Officer. Further the maintenance wing, public health wing and electrical wings of the university are strengthened with the required manpower and equipment facilities to deliver these services. Necessary support to the outstation centres and offices are also provided by the estate organisation as and when required.

Office of the Chief Engineer: To carry out the construction work in the university, PAU has office of Chief Engineer which executes the civil project activities. This unit prepares the construction/ repair estimates, building designs, floating tenders (as applicable) and carrying out the construction work through contractors based on the project requirements.

***Health Facilities*:** To meet the medical needs of students, faculty and staff, PAU has 20 bed University Hospital in the campus on an area of 16604 sq.ft. The hospital has two female and one male Medical Officer, one staff nurse, one MHW, four nursing assistants, two pharmacist, two lab technicians and one radiography technician. The hospital is equipped with a clinical laboratory, a Radiology section with X-ray unit and an Ambulance. The biochemistry lab has an auto-analyser and caters to



various tests like CBC, ESR, Blood biochemistry test (LFT, kidney function test, lipid profile) blood serology for RA factor and routine urine analysis tests. The students and staff and staff dependants are provided with a free facility for all the above tests. Annually on an average about 30,000 patients are treated at this centre. In addition, regular medical examination of students and the new job entrants are done.

University Workshop: University workshop is not a commercial unit but a facility for the immediate supporting repairs. It is established for repair and maintenance, overhauling of the university vehicles, paintwork of buildings and road signage, carpentry, welding and fitting jobs etc. without any charges. Foreman, mechanics and equipment support are available in the workshop to perform duties. The estimation and inspection of tyres, batteries and spare parts is carried out by the university workshop.

Printing Press: PAU has its own printing press to prepare the university stationery items including writing pads, file covers, papers information brochures and other publications. Adequate paper printing, binding and cutting facilities are available in the campus for carrying in-house activities/jobs. However, processes for printing job work to be outsourced have also been established at university level.

Store Purchase Organisation: To make available routine usage centralized items like office stationery, electrical appliance etc. to various sections/ departments in the university, a central store is established under Store Purchase Organisation (SPO) working under the Office of university comptroller. The SPO also coordinates the Central Purchase Committee work, tender process, placement of purchase orders and procurement etc. to make purchase procedure efficient and transparent.

SC/ST Cell: The University has policy in place for the welfare of employees and students. A nodal officer has been appointed by the university to ensure the implementation of various policies as per the guidelines of state Government and central government for requisite representation of reserved categories in university services (direct recruitment and promotions). The university also ensures proper implementation of various schemes of UGC, Government of India and State Govt. concerning scholarships, stipends etc. for welfare of reserved categories. The University is having a dedicated scholarship cell for all the SC/ST scholarships through which scholarships are provided to the students. The guidelines, for various types of scholarship/ stipends as revised from time to time by the Central and State Govts. are notified to all departments & which are got displayed on the Notice Boards of the concerned departments. These are got incorporated in the University Prospectus also for its vide publicity for the benefit of the students of reserved categories. This Cell ensures that these guidelines are strictly adhered to.

6.6.1.6 Technology Support

To upgrade and enhance the system efficiency in academic, research, extension and administrative affairs of the university, technological interventions are always made at each level. Whole campus is covered under internet connectivity through cable network and also through WiFi facility in the colleges, hostels and office premises. Necessary hardware and software facilities have been incorporated in each section of the university. Accordingly, faculty and staff members have also been trained in bringing these changes and adopting technological tools in their work.

a) **Administration:** To bring administrative reforms in the university, PAU has introduced electronic and computer tools in the processes which include biometric attendance, online fee collection, centralised salary payment system, purchase and financial management system (PFMS), online AP&AR submission (Fig. 5), campus wide camera network for monitoring and control of security operations, jammer facilities in the examination areas.

b) **Academics:** Every college has SMART class rooms, need based computer labs and specialised softwares (as mentioned in point 6.6.2.6). Online semester registration (Fig. 6), attendance, result preparation and submission have been adopted in all the colleges of the university. The class rooms are equipped with latest audio visual aids to make learning process more participative and elaborative. The academic centre of the university, PAU library has been upgraded as fully computerised and digital facility with latest online solutions available to students and faculty of the university. The details

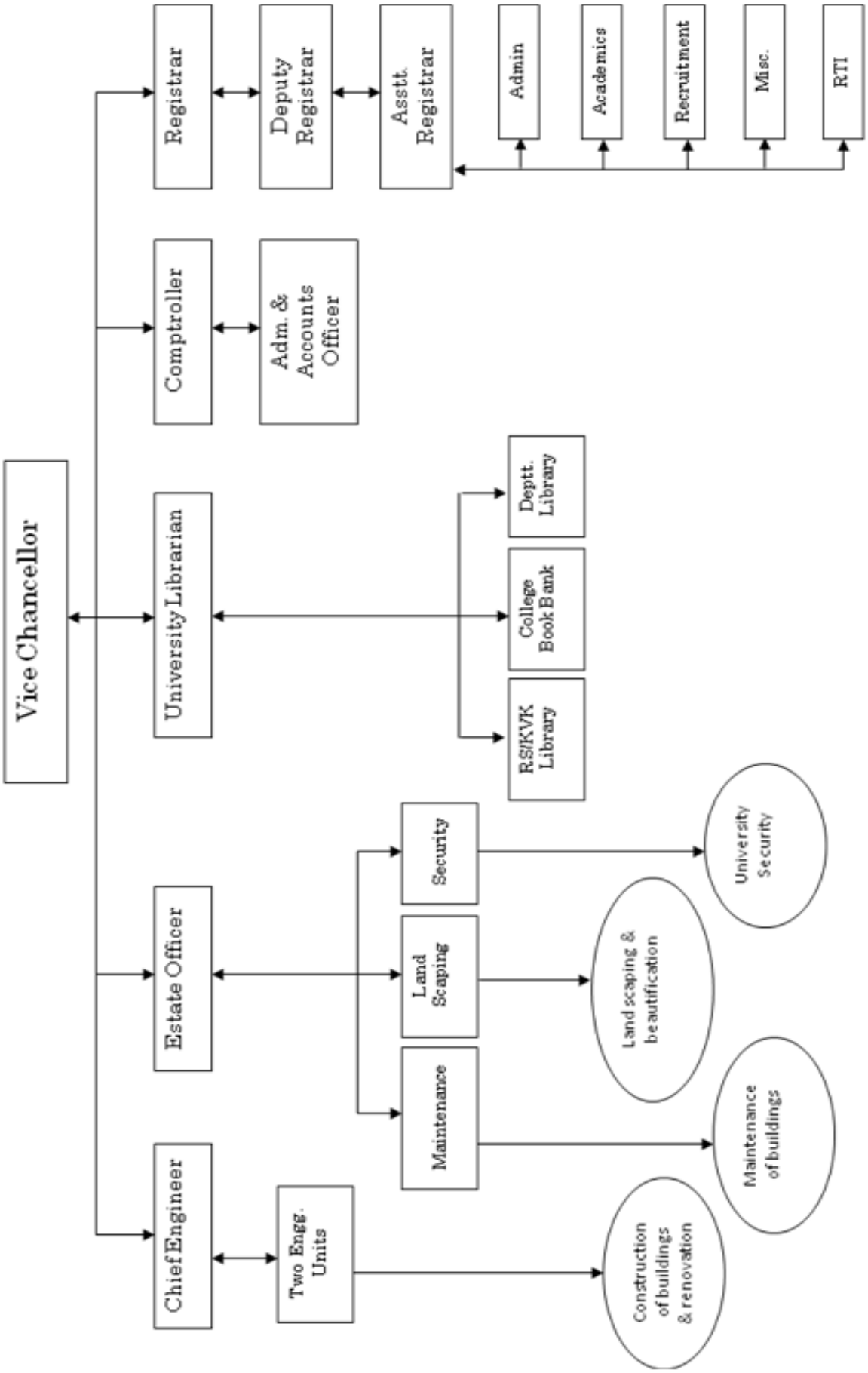


Fig. 4 Channels of Communication for support services in the University

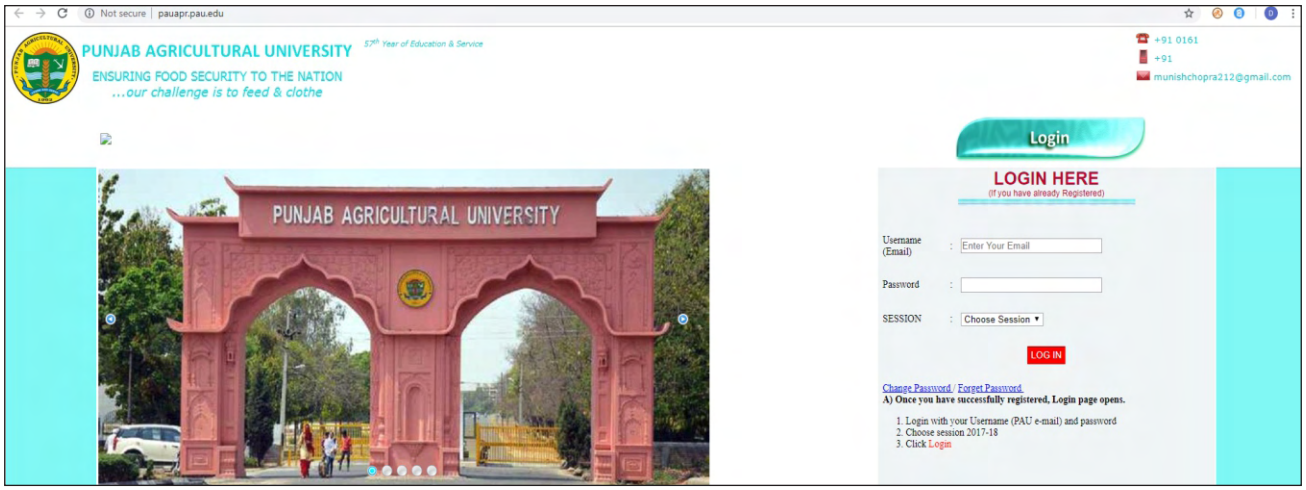


Fig. 5: Screen view of on-line Annual Progress & Assessment Report submission

regarding PAU library have also been discussed in point no. 6.6.2.3. Video lectures are also made available to the students through the National Knowledge Network (NKN) project in the university.

c) **Research:** PAU has been carrying out prestigious research work under various national and international projects as lead or consortium partner. Data management tools, decision support systems (Fig. 7), predictive analytics, MATLAB, design software solutions etc. are used by the research teams.

d) **Extension:** PAU has well established linkages with farmers and various functionaries to deliver its duties and build its capacity from the strengths/experience of partner stakeholders. Network of KVKs, FASS and extension agencies has been established through internet and android based group applications. Farm literature alongwith package of practices and latest information related crop production practices are shared with the farmers through dedicated web portals and mobile apps (Fig. 8).

6.6.1.7 Institutional Data Base and Website Update

The university Website is maintained and hosted by Department of Electrical Engineering and Information Technology. University Data Centre is

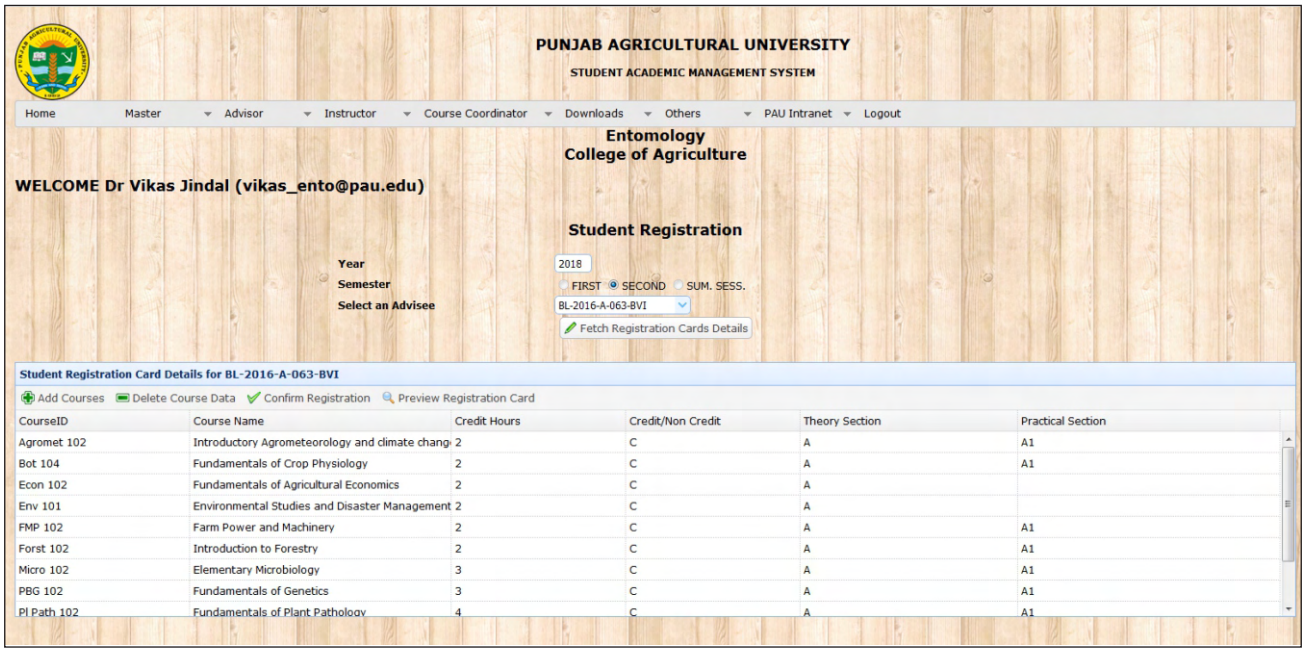


Fig. 6: Screen view of Student Academic Management System for on-line registration



Fig. 7: Screen view of one of the on-line Decision Support Systems

providing and maintaining the essential IT services viz. distribution of internet, e-mail and web server. The PAU website is being regularly updated. The research data is compiled at the level of Directorate of Research under the umbrella of ICAR research data management system. A new user friendly format of the website is being created. A database management group has been formed in the Directorate of Research. In all the colleges at department level one person is designated to update the website regularly. It will collect data of research as well as human resource development and act as a repository of data. Research outcomes in the form of Thesis/ Project reports / Technical Bulletins are archived at University Library. Softcopy of the same is uploaded to Krishi Prabha – A portal for thesis digitization updation. Institutional Data of NIRF is uploaded on University Website. All India Survey on Higher Education (AISHE) has been regularly uploaded on AISHE portal under MHRD. The website of the university (www.pau.edu) is maintained by the University Data Centre (UDC). Maintenance of web server and remote access server is also under the purview of the data centre.



Fig. 8: Screen view of PAU Kisan App and dedicated web portal



Institutional database has been maintained through different portals such as Fee Collection Portal, Online Registration System, Admissions Portal, Online AP & AR Proforma. The information about the events being organized by the university are displayed on the website. The different departments have been given their login credentials to update information of their respective departments. However, all departments keep on updating information pertaining to their departments every month on regular basis.

6.6.1.8 Inter-Departmental Linkages

The various departments, placed under the four constituted colleges, have very close linkages with each other. The academic programmes of the Colleges have been framed and implemented as per recommendations of Fifth Deans' Committee (FDC) of ICAR. The academic support for the various UG programmes are well supported by interdepartmental linkages. The support is provided by the departments of Basic Science College to the UG programmes of college of Agriculture, Agricultural Engineering and Home Science. In the PG programmes, students opt for minor and supporting courses from departments within their college or from other colleges depending upon the area of research to be undertaken by the student. This allows for very effective linkages within the university.

In the Directorate of Research, the university has created and filled four posts of Additional Director of Research (ADR) (Crop Improvement, Horticulture & Food Science, Natural Resource & Plant Health Management and Farm Machinery & Bio-energy) to augment research capability of the University in the prioritized areas and enhance coordination in research planning & monitoring. All the ADRs are assisting the Director of Research in planning, monitoring and coordinating scientific research on various aspects relating to Crop Improvement and IPR across the colleges in PAU Campus and outstations. They also motivate the faculty to write new research projects, scrutinize the submitted research projects and review the synopses of PG students.

Inter-disciplinary group of scientists have been formed to solve the emerging problems of agriculture. One such recent example is the crop residue management group formed for developing interventions for effective paddy straw management/utilization. This group has scientists from Departments of Farm Machinery and Power Engineering, Soils Science, Microbiology, Biochemistry and Renewable Energy Engineering.

The progressive farmers and industrialists are occasionally invited to deliver special lectures to UG students in the respective courses. The undergraduate students of all the programmes are associated with progressive farmers, KVKs, State Agricultural Department, State Forest Department, Food Processing Industries, Wood-based industries, etc. for Rural Agriculture Work Experience (RAWE), Experiential Learning Programme (ELP) and Agro-Industrial Attachment (AIA) trainings. Students develop close linkage with various organisations like cooperative societies, panchayats, industries and departments. Apart from this, exposure visits are arranged for students of many UG courses to the related industry, sites, situations, etc. to fulfil their course curriculum requirements. During mandatory educational tour visits, the students interact with industries, farmers, students and teachers in various national and international institutions outside the state. Experts from these industries are invited to share latest developments in the industry for the benefit of students. The research problems of the students are decided keeping in view the industry needs.

6.6.1.9. Monitoring Mechanism

The constituent colleges of the university follow the prescribed course curriculum with the suggested changes by internal faculty, if any, to have parity of syllabus with other State Agricultural Universities. The course curriculum is being revised periodically by following the National level expert committee recommendations. The recommendations of 5th Deans Committee with certain modifications suitable to the students according to their degrees have been implemented in the College of Agriculture, College of Agricultural Engineering and College of Home Science. The College of Basic Sciences and Humanities follow the course curriculum recommended by BSMA of ICAR.

Dean of respective college monitors the monthly attendance of the students in all the courses. The overall evaluation of a student in the courses registered is through hourly, mid-term and end of the term examination in the semester. Laboratory and library assignments on special

problems and seminars are also exercised to evaluate the students performance. The question papers are screened at Dean's Level for their comprehensiveness and students' evaluation quality. Teachers provide feedback to students and report student learning outcomes to parents at regular intervals. Similarly, the advisory system for post graduate students, HODs and Dean PGS keep a constant check on students academic performance as well as his/her personal and social behaviour.

The University has a well established advisory system for both undergraduate and postgraduate system. The newly admitted under graduate students are allocated with academic advisors who meet students once in a week to monitor the progress and problems faced by them during the course of study. Head of department and dean of constituent colleges interact with students from time to time to ensure quality education. They are also visiting classrooms especially the practical classes to ensure hand on trainings to the students and fields for farm demonstrations.

Even the newly recruited faculty undergo a 10 day Orientation Course on "Effective Teaching, Research and Extension". Further, they are mandated to undertake six month induction training at various KVKs and RRS to make them acquaint with the current agricultural scenario of the state.

University has developed a basic systematic monitoring and evaluation system for the performance of the teachers. CCTVs have been installed in all the lecture rooms to monitor the regularity of classes. The evaluation of teachers by the students helps to sensitize the teachers to improve upon their teaching skills. University is following comprehensive curriculum monitoring mechanism which includes teachers Annual Performance Appraisal Report (APAR) to check their teaching, research and extension effectiveness. APAR of assistant/associate professors or equivalent are evaluated by reporting officer, committee at department level and the accepting authority at Dean/Director level whereas the APAR of professors and equivalent are reviewed by the committee comprising of Head, Dean of respective college, Dean, Postgraduate Studies and Director of Research/Director of Extension Education. This helps administration to monitor the faculty effectiveness and also to stress upon the improvement in overall system.

6.6.1.10 Institute Quality Assurance Cell/ Project Monitoring & Evaluation (PME) Cell

The university is ISO 9001:2015 compliant.

Realizing the importance of a PME Cell and the critical role it could play in facilitating effective management of research projects at PAU, the PME Cell at PAU was established on 12.1.2014 and it was reconstituted on 22.12.2017. The constitution of the PME cell at PAU is given below:

1. Vice Chancellor- Chairman
2. Director of Research
4. All Additional Directors of Research- 4
3. All Additional Directors of Extension Education- 2
4. Additional Comptroller
5. Director, TMIPR Cell- (Secretary)

The scientists develop project proposals based on the information collected through: i) field visits and interaction with various stakeholders to identify the problems and research gaps; and ii) literature search to understand the existing research gap. The proposals are submitted to the Project Review Committee of the concerned college which after discussion with all Heads of Department recommend it to the PME Cell of PAU. Here it is critically examined in terms of relevance, scientific merit and feasibility by the Project Monitoring and Evaluation cell. The project is submitted to the funding agency only after approval by the PME cell.

The review of physical and financial progress of various research projects of all the Departments and Research Stations running in university is undertaken by the PME cell. This exercise was recently undertaken in 2018. The periodic review helps in plugging the loophole/deficiencies to achieve the physical and financial targets.

6.6.1.11 Collaboration with Academic Institutions and Industry

PAU is the leading SAU amongst all Agricultural Universities in India. It has collaborations with top academic institutions (international as well as national), various departments of Government of India and the state, and industry related with agriculture as under:

- ICAR – All India Coordinated Research Projects (45)



- UGC/ NHM / BARC etc.
- International collaborative projects
- ICAR – Institutes/NRC's, Bureaus
- Ministry of Earth Sciences
- Ministry of Health & Family Welfare
- Department of Agriculture and Cooperation
- Department of Biotechnology
- Department of Science & Technology
- University Grant Commission
- Bhabha Atomic Research Centre, Bombay
- NABI, Mohali
- PBTI, Mohali
- IIT, Ropar
- GNDU, Amritsar
- State Agricultural Universities
- Ratan Tata Trust (NGO) etc.
- Developed public-public Corporate partnership with the following public food industries: FCI; Markfed; Sugarfed; PAIC; Verka Chandigarh.
- Developed public-private partnership with the following food industries: Sharon Biotech, Abohar; Sampooran Agro, Fazilka; Nestle India; R& D Section, Gillco Agro Pvt. Ltd.; Field Fresh, Ladhowal; Overseas Foods Pvt. Ltd.; Bonn Food Products Pvt. Ltd.; Ludhiana cremica etc. Beverages Pvt. Ltd; Paras Spices Pvt. Ltd; Varun Beverages Pvt. Ltd.; Shbab drinks; Healthy Rainbow Colours Pvt. Ltd. Ludhiana; Farmers, entrepreneurs and food industries of the State.
- Developed and recommended Super Straw Management System attachment for combine harvesters and Straw Cutter-cum-Spreader for paddy straw management in collaboration with BISA and the local crop harvester manufacturers have responded favourably to it.
- Auto Rotate Gun Type Sprayer and PAU Multi-Purpose High Clearance Sprayer have been developed by the department in collaboration with industry M/s Mastermind Agro Industries, Barnala.
- Portable maize dryer (3 ton capacity) developed in collaboration with Nu-Tech Dairy Engineers, Ambala.
- Collaboration with CRI Pumps industry from March 2013. The industry encourages the farmers to provide different awards during PAU *Kisan Mela* in the month of March. These awards are CRI Pumps Award for Adopting improved Farm Mechanization in agriculture, CRI Pumps Award for outstanding farmer Adopting Organic Farming and Adopting improved water management Technology.
- PAU provides seed of PAU recommended wheat varieties free of cost to ITC for conduct of demonstrations in U.P., Bihar and West Bengal for quality seed production.
- The details of the 26 different schemes funded by various industries/organizations during last 5 years are given in Annexure II.

Chapter 2
Academic Support

6.6.2 Academic Support

6.6.2.1 Academic Council

The Academic Council is the supreme body administering the academic functioning of the university. The PAU Act and Statutes provides powers to the Academic Council to supervise, direct and control, and be responsible for the maintenance of the standards of instructions, education and examinations and other matters connected with obtaining the degrees and shall exercise such other powers and perform such other duties as may be prescribed.

Composition of the Academic Council

(a) The Vice Chancellor - Chairperson

(b) The Dean of the Postgraduate Studies

(c) The Deans of the Colleges of the University

(d) The Director of Research

(e) The Director of Extension Education

(f) Senior-most Head of Department from each College

(g) Registrar – Member Secretary

The Director Students Welfare, Controller of Examinations, National Professors and President, PAU Teachers' Association also attend meetings of the Council as special invitees. The Academic Council can call any teacher or officer of the University whenever discussion on a specific agenda item so requires.

The details of the meetings held in the last five years (2013-14 to 2017-18) are given in Table 2.1.

Table 2.1: Details of Academic Council meetings held in last five years

Sr. No.	No. of Academic Council meeting	Date of meeting	No. and date of proceedings*
1.	341st	2.7.2013	29581-92/9.7.2013
2.	342nd	8.7.2013	30856-67/15.7.2013
3.	343rd	2.8.2013	32460-71/6.8.2013
4.	344th	19.8.2013	35403-14/4.9.2013
5.	345th	3.9.2013	35634-45/6.9.13
6.	346th	1.10.2013	38749-60/7.10. 13
7.	347th	8.11.2013	41949-60/21.11.13
8.	348th	10.1.2014	1062-73/16.1.14



9.	349th	6.2.2014	3802-13/17.2.14
10.	350th	28.2.2014	5252-63/13.3.14
11.	351st	25.3.2014	6850-61/7.4.14
12.	352nd	25.4.2014	9391-9402/9.5.14
13.	353rd	20.6.2014	22224-35/23.6.14
14.	354th	8.7.2014	24952-63/15.7.14
15.	355th	5.8.2014	27235-46/7.8.14
16.	356th	26.8.2014	28781-92/29.8.14
17.	357th	2.9.2014	28924-35/3.9.14
18.	358th	12.11.2014	35251-61/26.11.14
19.	359th	01.01.2015	551-62/8.1.15
20.	360th	13.2.2015	4157-68/20.2.15
21.	361st	10.4.2015	8459-70/16.4.15
22.	362nd	23.4.2015	9224-36/29.4.15
23.	363rd	8.5.2015	9865-76/13.5.15
24.	364th	3.6/2015	11007-18/9.6.15
25.	365th	3.7.2015	13678-89/7.7.15
26.	366th	23.7.2015	16230-41/27.7.15
27.	367th	7.9.2015	21040-51/16.9.15
28.	368th	6.11.2015	26242-53/23.11.15
29.	369th	7.1.2016	1640-51/27.1.16
30.	370th	11.2.2016	2882-93/15.2.16
31.	371st	17.3.2016	6140-51/5.4.16
32.	372nd	10.6.2016	11691-702/21.6.16
33.	373rd	10.8.2016	15988-99/17.8.16
34.	374th	18.8.2016	16564-75/23.8.16
35.	375th	10.9.2016	18227-38/14.9.16
36.	376th	28.10.2016	21236-47/3.11.16
37.	377th	22.11.2016	22125-36/24.11.16
38.	378th	30.12.2016	83-94/4.1.17
39.	379th	19.1.2017	1698-1709/21.1.17
40.	380th	7.3.2017	1-12(spl)/8.3.17
41.	381st	13.3.2017	4965-76/27.3.17
42.	382nd	11.4.2017	6329-40/20.4.17
43.	383rd	4.5.2017	6907A-6918A/4.5.17
44.	384th	14.6.2017	9362A-73A/15.6.17
45.	385th	24.6.2017	10832-43/5.7.17
46.	386th	22.7.2017	11999A-12011A/24.7.17
47.	387th	8.8.2017	13143-54/8.8.17
48.	388th	5.9.2017	14550-61/5.9.17
49.	389th	13.10.2017	17601A-612A/18.10.17
50.	390th	25.11.2017	19916-27/25.11.17
51.	391st	28.12.2017	21877-88/29.12.17
52.	392nd	28.2.2018	3946-57/5.3.18
53.	393rd	24.3.2018	4926-37/24.3.18
54.	394th	30.4.2018	6519-30/30.4.18
55.	395th	19.6.2018	9971-83/20.6.18

* Proceedings of Academic council meeting as well as ATRs will be provided to visiting Accreditation committee.

6.6.2.2. Innovation and Best Practices

The university strives to bring new ideas and adopt best practices for improving overall performance of the students. The University has a strong advisory system for all undergraduate students of the different degree programmes. Under this system, a maximum of ten new entrants (fresh students) are allotted to one teacher (advisor) immediately after the completion of admission process for guiding and grooming of students throughout the degree programme. There is a mandatory culture of holding weekly advisory meetings of the teachers (advisors) with their advisees to discuss the progress of students, problems and other academic affairs. These meetings are held at individual advisor level, class In-charge level and Dean level in which students can discuss the problems and share their experiences with teachers and Dean. Career oriented and motivational lectures are arranged from time to time in these advisory meetings. To apprise the parents of students about the progress of their wards, Parent-Teacher Association (PTA) has been formed in the colleges. Meetings of PTA are also held regularly in which parents come to know about performance of their wards and give feedback for their further improvement.

During their undergraduate programmes, students are provided exposure to different state of art laboratories namely Electronic Microscopy and Nanoscience (EMN) laboratory, Plant Tissue Culture Lab, Plant Transformation Lab, Molecular Biology Lab, Molecular Cytogenetic Lab, Genomics Lab, Herbicide Residue Lab, Crop Physiology Lab, Insect Molecular Biology Lab, Biological Control Lab,

Toxicology Lab; are among few. These labs are equipped with latest equipments in the country. Classrooms in the various colleges are well furnished having all kinds of audio-visual aids along with computer, projector and internet facility. Smart classrooms have also been setup in all the colleges. To give a unique experience of learning, museums have been setup in the different departments namely Soils' museum, National Insect museum, Plant Disease museum, Plant Breeding museum, museum of Rural Life of Punjab, Zoology museum, etc. where students are regularly brought to witness the process of development in different fields.

Practical crop production is a very practical and carrier oriented activity of the students in which students themselves raise crops right from sowing to harvesting/threshing over the year. Each department is offering Experiential Learning Programme to develop entrepreneurial spirit and boost self-employability among the students. In this way, students learn the practical skills in a number of ELPs like commercial apiculture and mass production of parasitoids and predators of insect pests, nursery raising of flowers and ornamentals, nursery raising, hybrid seed production, nursery production of fruit crops, etc. Profit earned from these practical crop production and ELPs activities is distributed between students which develops a entrepreneurial spirit among them. Various departments provide an opportunity to students to organise various extension activities for the farmers viz. demonstrations, field days, seminars, etc as an experiential learning so as to escalate their managerial skills. To develop originality in ideas and research, plagiarism check for assignments, synopses, theses and dissertations through software has been introduced.

A student exchange programme for Ph.D. students has been developed in which Doctoral students from PAU go to other universities namely CCSHAU Hissar, CSKHPKV Palampur and YSPUHF Solan to study for one semester and vice versa. Further to improve the quality of PG research and exposure to advanced labs, PAU has introduced the concept of having reputed scientists from National/ International institutions as co-major advisors on the advisory committee of PG students. Presently 33 such co-major advisors are guiding students at PAU.

Academic excellence is also inculcated amongst students by inviting Alumni of the university who are placed at high positions through a series of guest lectures/sessions on latest developments in the industry. Field visits to industry/institutes are also taken up to help the students for practical exposure.

The university is in the process of digitalization of academic documentations in the “National Academic Depository (NAD)" in accordance with the guidelines of Ministry of Human Resources Development and University Grants Commission by appointing NSDL Database Management Limited (NDML) to facilitate Academic Institutions to Digitally, Securely and Quickly issue Online Academic Awards to the Students directly in their online NAD Account.

For sensitizing the students towards the clean and safe environment, PAU follows innovative/ good practices.

Green Environment

The University is kept very neat and clean with green environment. Volunteers of Eco Club, NSS and NCC play vital role in maintaining the eco-friendliness of the campus. Tree plantation, prohibition of the use of plastic and polythene bags, periodical cleaning of the campus are some of the Eco-friendly activities initiated by the University. With the objective of clean environment, University has also started ***PAU Peddlers***, where cycles have been provided on rent basis and ***E-rickshaws*** are available for movement within the campus without any charges.

Rainwater Harvesting

As water is a fast depleting resource in the country, there is a need to conserve this valuable resource and to motivate the students, farmers and other stakeholder in this regard. Rainwater harvesting systems have been provided at key locations on the campus.

Waste Management

University has started garbage collection through the firm 'A2Z'. An effective housekeeping system is practiced where hazardous waste management is effectively taken care of. The Environmental Club, with support from the NSS units, has taken up initiatives in solid waste management. Used papers and other recyclable wastes such as plastics are collected and sent to recycling units. The chemicals and other hazardous waste materials are neutralized before disposal. Old computers and their accessories are deposited to

Store Purchase Organization (SPO) office for further necessary action.

6.6.2.3. Library



Universities are the learning centres of higher education and their learning resources reflect the quality of education. Named after Dr. Mohinder Singh Randhawa, a renowned administrator and second Vice Chancellor of Punjab Agricultural University (PAU), the University Library caters to the informational needs of the academia comprising scientists and students of the University. It plays a pivotal role in supporting on-going research, teaching and extension activities of the University.

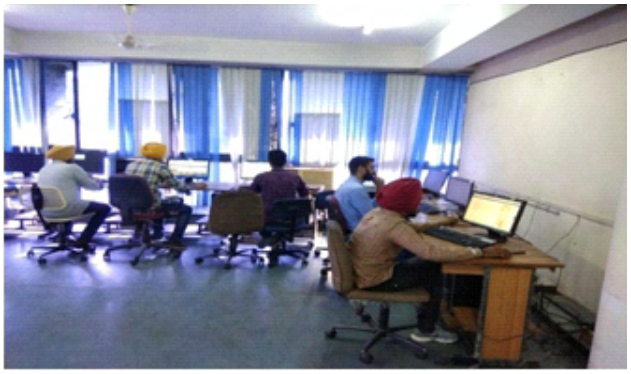
Library Space and Holdings

***Library Space*:** Mohinder Singh Randhawa Library is housed in a five-storey centrally air-conditioned building having total covered area of 93,320 sq. ft. and a seating capacity of 850 in its six reading halls. It is surrounded by lush green lawns, dotted with beautiful ornamental trees and has pollution free environment. The modular architect of the library is also focused on the state-of-the-art interiors along with providing congenial environment to the readers. The information about physical infrastructure of the library is given in Table 2.2.

Table 2.2: Physical Infrastructure of the Library

Number of floors	05
Total area	93320 sq.ft
Net area for books & reading halls	74170 sq.ft
Seating capacity	850
Research carrels for intensive study	39
Auditorium seating capacity	70
Two outer reading hall seating capacity (24x7)	100





Library Staff

Sr. No.	Staff	Number
1	Librarian	1 (Addl. Charge)
2	Deputy Librarian	2
3	Assistant Librarian	3
4	Junior Library Assistant	06
5	Library Attendants	08
6	Personal Assistant	01
7	Assistant Accounts Officer	01
8	Supporting Staff Sr Asstt.(3), Jr. Asstt.(1), Technical Asstt. (1), Clerk (1), Binder (1), Restorer (1), Packer (1), Messenger (3), Chowkidar (1), Sweeper (1)	14

***Library Holdings*:** Library has an excellent collection of books, journals, theses, e-books, e-journals, CDs, online databases in the field of Agriculture, Agricultural Engineering, Basic Sciences and Humanities, Home Science and allied areas. The library holdings along with journals and databases subscribed during the period under report (2013-18) are given in Table 2.3. Online Public Access Catalogue (OPAC), online databases, e-journals, e-books and other e-learning resources in addition to photocopying facilities, internet access through 40 computers are available for the members.

Table 2.3: Library Holdings

Particulars		2013-14	2014-15	2015-16	2016-17	2017-18
Total holdings		392200	39494	7397777	401464	404825
Books,Print journals, databases, e-journals and e-books added each year						
1	Books	1770	1680	1705	2778	2775
2	Theses	371	305	305	334	481
3	CD format Documents	537	334	334	376	527
4	Indian print journals	127	91	70	34	09
5	Foreign print journals	51	44	16	24	08
6	Online databases	4	5	5	1	3
7	Online journals	28	28	29	12	26
8	Online journals (under CeRA & j-gate)	37103	3578	3578	3947	3950
9	e-books	-	-	51	35	301

During the year 2017-18 the extensive usage of CeRA (103219), indiastat.com (5490), e-books (6695) and online databases (2449) was recorded in the library. PAU library was conferred with CeRA best usage Award and CeRA highest user profile registrations Award (2017-18).

Automation:

- Library has successfully automated all its library operations like Cataloguing, Circulation, Serial control, Reference services etc. by using open source software KOHA. All the documents of library are being entered in KOHA software for their easy access and retrieval.
- OPAC/WEBOPAC : Online public access catalogue is available on intranet and Internet for faster and easy searching of the library documents. Campus wide and remote access is available for online catalogue of the library.
- Scholarly databases CeRA & Krishikosh : Campus wide online access to scholarly databases **CeRA** (Consortium for e-resources in Agriculture) provides full text access to journal articles and KRISHIKOSH provides full text access to Theses. All these electronic services are available online to all the departments of the university. Remote access to all the resources is available for the faculty at the outstations

Anti-plagiarism software: In order to enhance the quality of research PAU library has been instrumental in procuring anti-plagiarism software TURNITIN for the university in order to check the plagiarism in synopses, theses and other research publications of the university during this period.

Library Timings and Usages: The library serves PAU fraternity 361 days of a year with extended working hours form 9.00 AM to 9.00 PM on all working days during summer season and from 9.00 AM to 8.00 PM during winter. The library also opens on Sunday, Saturday and all gazetted holidays from 9.00 AM to 5.00 PM. except Independence Day, Republic Day, Diwali and Holi. In addition to PAU students and faculty, the Library also caters to outsiders for their academic and informational needs through casual membership. Presently, there are 6315 permanent members and 137 casual members enrolled with the library. During 2017-18, the library had a foot fall of 34798 readers/visitors and 13932 books were issued during the year.

Additional Features

- **Research Carrels:** Thirty-nine research carrels are available to the postgraduate students, research scholars and faculty members engaged in library oriented research work.
- **Open book shelf:** Open book shelf facility in the outer reading hall of the library has been started for the library users under which gifted books (350) are kept for use/carry along by the reader as per their requirement.
- **Digitization:** Library has digitized all the theses and PAU publications like PAU Annual Reports, Proceedings of Research and Evaluation Committee, Agricultural Research Journal, Progressive Farming, Change Kheti from 1965 onwards.
- **Section for disabled:** A separate section for

disabled was set up with Braille collection to facilitate the disabled persons.

- **Competitive Books Section:** A section namely Competitive Books Section has been created. Books relating to various competitive examinations are displayed in this Section
- **ICAR Publications Corner:** The ICAR is an apex body for coordinating, guiding, managing research and education in agriculture. All the ICAR publications are of incredible significance for providing latest information on on-going national agricultural research. Thus, all such publications are housed separately for the speedy retrieval by the users
- **Maps Section:** The geographical world maps are displayed in this Section to provide single platform access to the users
- **Dr. Randhawa Section:** Rare documents authored by Padma Bhushan Dr. Mohinder Singh Randhawa, the former Vice Chancellor of the University and other books and art pieces donated by him are displayed in this section. This valuable collection is very useful to the historians and research scholars.
- **Book stall facility:** PAU library invite reputed book vendors on first cum first serve basis regularly to exhibit latest published material in the form of book stall covering agriculture & allied areas for the faculty and students of the university.
- **Hall of Fame:** Twenty three portraits of eminent international scientists and administrators are displayed here. These scientists made significant contributions in the field of agriculture and were associated with PAU in its development.
- **Museum of History of Agriculture:** Thirteen paintings, depicting growth of human civilization from the African ape man to the Green Revolution are displayed in the museum.
- **Library Auditorium:** Auditorium, with a seating capacity of 70, is available to conduct the library users training programmes and other lectures.
- **Outer reading hall :** Two reading halls namely Saxena Reading Hall and Kulbir Singh Gill Reading Hall have been set up to provide reading facility 24x7 to the members where they are allowed to bring their personal books.

Unique Instructional Material/Techniques adopted

- The university library has automated its operations using KOHA library management software.
- In order to acquaint the undergraduate and postgraduate students, other users and faculty members with Library rules and regulations the various activities are undertaken. The library staff conducted 51 such training/orientation programmes during this period on Using Web OPAC, Information retrieval, User Orientation Programmes for students/faculty and Training on features and use of various online databases.

6.6.2.4. Center for excellence/ Advance Studies/Centre for Advanced Faculty Training

Two Centres for Advanced Faculty Trainings (CAFT) have been established in the university to impart trainings to the scientists from institutes/ universities from various parts of the country:

1. *Centre of Advanced faculty Training (CAFT) in Soil Science*

Year of Establishment: 1994

Funding Agency: ICAR

The Centre of Advanced Faculty Training (CAFT) in Soil Science (earlier CAS in Soil Science) was sanctioned and established in the Department of Soil Science in the year 1994. The lectures in the



training programmes are delivered by the faculty of Soil Science, Agro-forestry, Microbiology, Soil & Water Engineering and other relevant departments. Apart from faculty of Soil Science, many eminent scientists from national and international institutes are being invited to share their experiences on various issues related to theme of the training programmes. Interactive sessions are organized in which all the participants make presentations about the nature of work they are performing at their respective institutes. This exercise has helped the participating scientists to integrate the knowledge they acquired/gained during the course of the training to further improve their teaching & research programmes and submit projects. The participating scientists are in regular contact with the faculty. 101 scientists from different parts of the country were trained in this centre during the accreditation period, the details of which are given below (Table 2.4).

2. *Centre of Advanced faculty Training (CAFT) in Genetics and Plant Breeding*

Year of Establishment: 1997

Funding Agency: ICAR

Centre of Advanced faculty Training (CAFT) in Genetics and Plant Breeding was established by Indian Council of Agricultural research (ICAR), New Delhi at Punjab Agricultural University (PAU),



Table 2.4: List of training programmes conducted by CAFT in Soil Science (2013-18)

Year	Title of the training programme	Duration	No. of participants
2013-14	Management Technologies for Improving Soil Quality and Crop Productivity	09.10.13 to 29.10.13	22
2014-15	Advances in Resource Conservation Technologies for Soil, Water and Crop Productivity	29.10.14 to 18.11.14	25
2015-16	Natural Resource Management viz-a-viz Climate Change	17.11.15 to 07.12.15	12
2016-17	Soil, Air and Water Pollution and Mitigation Strategies	02.11.16 to 22.11.16	25
2017-18	Conservation Agriculture and Soil Health	01.11.17 to 21.11.17	17

Table 2.5: List of trainings conducted by CAFT in Plant Breeding and Genetics (2013-18)

Year	Title	Dates	No. of participants
2013-14	Unconventional Breeding Approaches to Tackle Emerging Issues of Food Security	10.9.13 to 30.9.13	25
2014-15	Breeding by Design	7.8.14 to 27.8.14	23
2015-16	Mendelian Genetics to Molecular Genetics in relevance to Plant Breeding	6.8.15 to 26.8.15	15
2016-17	Innovative Breeding Techniques for development of Climate Smart Crop Varieties	23.8.16 to 12.9.16	21
2017-18	Enhancing germplasm use through prebreeding, evaluation and frontier	24.10.17 to 13.11.17	20



Ludhiana in year 1997. Since its inception, the Centre has organized 32 training programmes for the scientists working in various State Agricultural Universities and ICAR Institutes. The objective of these training programmes is to share the knowledge and experience of the researchers of PAU and experts from other institutes with the participating breeders, researchers and teachers to sensitize them to the developments in the field of crop improvement. From years 2013-2018, the CAFT centre at PAU has organized five training programmes and provided training to a total of 109 participants covering wide areas of genetics and plant breeding (Table 2.5). The training programmes were planned to apprise the young researchers about several emerging issues in different field crops, the effect of climate change on the crop plants and the paradigm shift in plant breeding approaches towards genomics, laying emphasis on designing new plant architecture of important field crops that are more productive, climate resilient and suitable for specific human needs. The emphasis was laid on the importance of pre breeding through planned utilization of plant genetic resources in crop improvement programme to confront future challenges. The participants were familiarized with several advances in the field of molecular biology techniques and various softwares for molecular data analysis. Experts from department of Plant Breeding and Genetics and other departments of College of Agriculture and Basic Sciences and Humanities, PAU including School of Agricultural Biotechnology, School of Climate Change, Vegetable Science, Fruit Science, Entomology, Plant Pathology, Biochemistry and Nanotechnology delivered lectures and conducted practical sessions. Guest lectures of eminent scientists from NBPGR, IARI and other ICAR Institutes were arranged for the benefit of the trainees. The basic amenities and food for trainings were also taken care of.

3. *Niche Area of Excellence on Kinnow Mandarin for Fruit Quality, Biotic and Abiotic Stress Tolerance*

A Niche Area of Excellence (NAE) on 'Genetic Improvement of Kinnow mandarin for Fruit quality, Biotic and Abiotic Stress tolerance' was awarded to PAU by ICAR in the year 2015 for a period of five years with a budget outlay of Rs. 282.08 lakhs.

The project aims at qualitative improvement of Kinnow mandarin for seedlessness, easy peelability and development of rootstocks with tolerance to *Phytophthora* and soil salinity. The pre-requisite for such improvement is to develop hybrid progenies. Prevalence of the polyembryony in *Citrus* creates problem in the development of zygotic embryos and identification of hybrids post germination. The use of polymorphic molecular markers like Simple Sequence Repeat (SSR) markers can prove useful for hybrid identification.

To develop seedless and easy to peel Kinnow hybrids, 'Kinnow' is being crossed with 'Mukaku Kishu', which bears completely seedless and easy to peel fruits. 397 'Kinnow' x 'Mukaku Kishu' hybrids have been developed and differentiated using polymorphic SSR markers in this project. The hybrid progeny could potentially provide a completely seedless and easy to peel mandarin hybrid.

For rootstock breeding, 7, 29 and 502 hybrids were developed and verified with SSR markers in the crosses namely 'Jatti khatti' x 'X-639', 'Jatti khatti' x 'Sour orange' and 'Volkamer lemon' x 'Cleopatra mandarin', respectively. These rootstocks will be screened with two virulent isolates of *Phytophthora nicotianae,* (identified in this project) and optimized level of soil salinity. The 'Jatti khatti' x 'Sour orange' cross could yield *Phytophthora* tolerant rootstock, while the hybrids from the crosses namely 'Jatti khatti' x 'X-639' and 'Volkamer lemon' x 'Cleopatra mandarin' could have tolerance to either *Phytophthora* or soil salinity or both.

In addition, 'PAU Kinnow 1', a low seeded mutant of seedy 'Kinnow' was found stable for low seed content after two cycles of vegetative propagation. **5000** plants of this elite mutant were multiplied and distributed to the growers.

4. *Centre of Excellence for Utilization of Brackish Water for Fruit and Vegetable Production in South- Western Punjab*

A mega Indo-Israel project "Centre of excellence for utilization of brackish water for fruit and vegetable production in South- Western Punjab" worth Rs. 1496 lakhs was awarded to the Punjab Agricultural University, Ludhiana by National Horticulture Mission (NHM) through Punjab State Horticulture Mission during 2012-13. In this mega project, a desalinization plant installed with 10 cum/hr capacity with 90% efficiency is powered with 60 KW solar photo voltaic power system. It is running smoothly to produce good quality desalinated water for irrigating fruits (Kinnow, guava and peach) and vegetables (tomato, cucumber, capsicum, chillies and potato) vis-à-vis canal water and saline groundwater using

automated drip and fertigation system in open as well as protected cultivation to address fresh water inadequacies expected in future.

5. Centre of Excellence in Apiculture

National Bee Board (MoA, GOI) funded Integrated Beekeeping Development Centre/Centre of Excellence project in Apiculture has been sanctioned to the Punjab Agricultural University, Ludhiana in 2016-17, with a total funding of Rs.1.31 crores. This project, inter-alia aims at developing quality queen bees for supporting to the Board for onward dissemination among the needy beekeepers. The other activities of the Centre include developing innovative bee husbandry technologies, establishing bee diagnostic facility, developing value added line products and the technology dissemination, including providing facility of quality assessment of various live products.

6. Centre of Excellence on Mushrooms

A Centre of Excellence on Mushrooms was sanctioned by the State Government during the year 2016-17 with a total outlay of Rs. 4.99 crores to provide the latest technical knowledge to the existing and new growers as well as to provide the physical demonstration of controlled mushroom production technology at different scales. The center has been planned with pilot scale production and demonstration facilities for all facets of mushroom production and research laboratories including hi-tech custom composting, bulk quality seed production, controlled mushroom growing, analytical labs for providing compost/casing/ sample analysis for mushroom producers and post harvest handling of the produce.

7. Centre of Excellence on Brassicas

Centre of Excellence on Brassicas was sanctioned by Department of Biotechnology, Govt. of India to initiate genomics assisted breeding for architectural restructuring of Indian mustard under the leadership of Prof. S.S. Banga, ICAR National Professor. Studies helped to link determinacy to a single recessive gene, *Sdt1* which was mapped to the linkage group 15 (corresponding to chromosome 5B) of *B. juncea*. Marker assisted transfer allowed development of many genotypes with determinate inflorescence for the first time. One such genotype, DTM184 was included in early mustard multilocation trials under ICAR-All India Coordinated Research Project during 2018-19. Determinate mustard hybrids were also developed. Project also allowed genotyping by sequencing of four recombinant inbred lines, two introgression sets and one diversity panel. These were also phenotyped for a large number of trait. Combined with genotypic data, studies allowed identification of a large number of QTLs and underlaying candidates for productivity and biotic stress related traits. Excellent cytogenetic probes were also created. World class facilities could be created for molecular cytogenetics and SNP genotyping.

6.6.2.5 Incubation Centre/Start up units/ Venture capital

Punjab Agricultural University established Food Industry Business Incubation Centre in the Department of Food Science and Technology with the technical guidance of Ohio State University, USA in the year 2015. The major objectives of the centre are to establish and strengthen the linkages between PAU, food processing industry and entrepreneurs, to transfer processing technologies to the farmers and small entrepreneurs, to provide consultancy facilities to the farmers and new food business start-ups for the development and expansion of food processing industry in the State. This centre has well furnished infrastructure facilities and processing lines i.e. drying and dehydration, canning, juice bottling line, cereals and pulse processing lines etc. Incubation facilities in the centre including Minimal processing techniques, Heat preservation techniques, Cold preservation, Drying and dehydration, Juices and beverages, Canning, Packaging, Extrusion processing and Soy milk processing. During the period 2015-17, the details of incubation facilities provided are given in Table 2.6.

6.6.2.6 Technology Enabled Learning Resources

- Most departments have developed ICT enabled teaching resources. All the departments are provided with Computer and Internet facilities to prepare computer-aided teaching/ learning material. Wi-fi facility is provided to all faculty members to use online content for teaching and learning. All the colleges have smart classrooms.
- In addition all the departments have lecture rooms with audio visual teaching aid facility. LCD projectors have been installed in all the



Table 2.6: Incubation facilities provided and Entrepreneur established (2015-2017)

Sr. No.	Technology Provided	Stakeholders
1.	Bottling of Sugar cane Juice	♦ Sri Om Sai Sugar Allied Products Pvt. Ltd, Khanpur, (Karnataka) ♦ Markfed, Punjab ♦ Kulwinder Singh, Tarantaran ♦ Agrineer Foods, Ludhiana ♦ Ripudaman, Rajpura
2.	Mushroom processing	♦ Bandana Chhetri, Beas, Amritsar
3.	Kaddu Chutney	♦ Iqbal Singh, Tarn Taran
4.	Quinoa Processing	♦ Mrs. Samerpal, Country Homes, Ludhiana
5.	Punjabi Mixed Tadka	♦ Iqbaljit Singh, Ladowal, Ludhiana
6.	Steeping Preservation, Pickling of Baby Corn and Processing and packaging of onion into puree	♦ Mrs. Samerpal, Country Homes
7.	Ready to Serve Fruit Drinks	♦ Param Health Drinks, Mohali
8.	Technology of Pure Rose Syrup	♦ Shergill Agri Farms, Patiala
9.	Mango Drinks & Jaljeera	♦ Ganga Traders, Mukatsar
10.	Lemon juice preservation	♦ Rajesh Saini, Hoshiarpur
11.	Packaging of fresh cut fruits & vegetables	♦ Healthy rainbow, Ludhiana
12.	Multigrain porridge: Chocolate porridge	♦ Shahnaz Fresh Hub, Bathinda and Kisan Health Foods,Ludhiana ♦ Glaxo Smithkline, Nabha
13.	Preparation of plum squash	♦ Dr APS Mann, Ludhiana
14.	Retort pouch processing and packaging of tomato puree	♦ Shalini Aggarwal, Ludhiana
15.	Processing of sugarcane juice	♦ Ripudaman, Rajpura ♦ Amarjeet Singh, Dia Health Foods under brand name of Diabliss.
16.	Processing of tamarind pulp, Processing of turmeric into turmeric pickle	♦ Mr. Navdeep Singh and Mr. Gursharan Singh, Rampura Phool, Bathinda
17.	Processing of frozen Peas	♦ Mr.Navdeep Singh Chahal, Bathinda ♦ Mr.Paramvir Singh, Ludhiana

classrooms to facilitate curriculum delivery system. The e-courses for undergraduate teaching developed under NAIP project and available under ICAR portal are being used by the faculty and students to supplement the class room teaching. The details are given below (Table 2.7).

- An Education Technology Cell placed under the Dean PGS is functioning in the university.
- Capacity building of HODs and faculty was undertaken by NAARM. Newly recruited faculty members undergo Induction training. Regular trainings are being arranged for the faculty on Statistical Analysis Software System and other genomic tools. It is mandatory for the faculty to undergo advanced trainings from time to time in their field of specialization.
- The faculty and students are being provided the online access to scholarly material through online databases namely Consortium for e-Resources in Agriculture (CeRA) for journal articles and *Krishikosh*.

Table 2.7: Details of technology enabled classrooms

College	Smart Classrooms	Video Conference Rooms	Classrooms with projection facilities	Seminar / Committee room
Agriculture	7	-	38	12
Agricultural Engineering & Technology	3	2	17	5
Home Science	3	1	07	5
Basic Sciences & Humanities	3	1	16	5

Access to these digitized documents has been provided to the faculty and staff posted at various research stations and KVKs of the university to enable personalized and technology enabled learning among them.

6.6.2.7. Integrated Learning Systems (Experiential Learning)

During the period under report, no new Experiential Learning Unit has been sanctioned by the ICAR. Though a total 9 Experiential Learning Units earlier sanctioned by the ICAR are still operational in the University. In addition, 12 additional Experiential Learning Units have been established by the University from its own resources. Currently, all the Experiential Learning Units are being run out of the income/profit earned and siphoned back into the Experiential Learning Unit to provide it due support to make their functional, and need based support is also provided by the University from its own resources. The system for profit sharing in the respective Experiential Learning Units has been established and is now in place.

College of Agriculture offers total of 16 experiential learning programme (ELPs) modules for the undergraduate students of the B.Sc. (Hons) Agriculture programme in this college. Out of these 16 ELP modules 4 are ICAR funded and the 12 are state funded. All modules are functioning as per guidelines of ICAR.



Experiential Learning Unit on Apiary



ELP on Apparel, Clothing and Textile



ELP on Vegetable Production

Table 2.8: Present status of all ELP Modules sanctioned to the Universities

Sr. No.	Department	Name of ELP	Funding Agency	Status
College of Agriculture				
1.	Entomology	Commercial apiculture	ICAR	Unit is functional
2.	Vegetable Science	Nursery raising techniques and protected cultivation of vegetables	ICAR	-do-
3.	Plant Pathology	Production of bio agents against plant pathogens	ICAR	-do-
4.	Microbiology	Mushroom production	ICAR	-do-
5.	Entomology	Production of important parasitoids and arthropod predators as bioagents against insect-pests of important field crops	State	-do-
6.	Soil Science	Module for evaluating soil health and irrigation water quality	State/Univ	-do-
7.	Fruit Science	Nursery production of fruit crops	State/Univ	-do-
8.	Agronomy	Practical seed production	State/Univ	-do-
9.	Floriculture & Landscaping	Nursery raising of flowers and ornamental plants	State/Univ	-do-
10.	Agroforestry tree species	Nursery production of important agro forestry	State/Univ	-do-
11.	Plant Breeding & Genetics	Hybrid seed production of sunflower	State/Univ	-do-
12.	School of Agricultural Genetics	BiotechnologyBiotechnological tools in crop improvement	State/Univ	-do-
13.	Post Harvest Technology and Value Addition	Production of value added processed food products	State/Univ	-do-
14.	Extension Education	Designing and preparation of facilitating material and organizing activities	State/Univ	-do-
15.	Economics & Sociology	Marketing of agricultural produce, preparing enterprise & financial budgets and identification of adoption gaps	State/Univ	-do-
16.	School of Business Studies	Case studies related to financial, project, retail and supply chain management and preparation of project profile	State/Univ	-do-
College of Home Science				
1.	Food and Nutrition	Bakery and Confectionary	ICAR	-do-
2.	Apparel, Clothing & Textiles	Apparel Manufacturing	ICAR	-do-
3.	Family Resource Management	Art creations	ICAR	-do-
4.	Human Development and Family Studies	Child Care Providers	ICAR	-do-
College of Agricultural Engineering & Technology				
1.	Farm Machinery & Power Engg.	Computer Aided Design (CAD)	ICAR	Software upgradation is required



6.6.2.8 Academic Industry Interface

- A meeting is held half-yearly between the academia of the university and the industrial stake holders. In this interface, the industry and the university brainstorm on the needs of the industry and a road map of need based research.
- Training of students is carried out in more than 60 different industries as part of their internship under RAWE/ELP program. Besides training, visits to the industry are also conducted to equip the students with the latest on-goings in the agriculture-industry sector.
- Owing to established liaison with the industry, the PAU students are securing prestigious Prime Minister Fellowship for their Ph.D. research. During the period under report six students successfully won the prestigious fellowship. Besides, the industry is providing financial support to assist UG and PG students in terms of scholarships/fellowships (Bharti Field Fresh, Dhanuka, Jain Irrigation, Bayer, etc). Many medals and honours for the students have been instituted with the financial support from industry.
- Further, to provide technological knowledge to the industry, the University is successfully running a two year diploma in Agrochemical which is being run at six stations of the university. This interface is highly beneficial for the faculty in getting field based knowledge from the industry.

6.6.2.9 National Ranking (ICAR/MHRD)

Ranking Agency	2016	2017
ICAR	3	5
MHRD (NIRF) Overall Ranking	40	60

National rankings started from 2016 onwards

Chapter 3
Research Support

6.6.3 Research Support

Research is a major mandate of the University. It is aimed at improving productivity, profitability and sustainability of Agriculture in the state/ region by pursuing a dynamic research agenda in light of emergent issues and challenges. In terms of technology development, the research sphere encompasses crop improvement, crop production and protection, natural resource management, farm mechanization, food processing and value addition besides a significant basic research component.

6.6.3.1 Research Council

The Research Council is an apex body to monitor research activities of the University. The outcomes with respect to on-going research and directions for future line of action are taken up by the council in its meetings. The composition of the Research Council is detailed as follows:

Chairperson

1. Vice Chancellor, Punjab Agricultural University

State Department Members

2. Director of Agriculture, Punjab
3. Director of Horticulture, Punjab
4. Chief Conservator of Soils, Punjab,
5. Chief Conservator of Forests, Punjab.

Expert Members

6. Dr. Viraj Beri (Soil science)
7. Dr. I.K. Garg (Farm machinery)
8. Dr. K.S. Minhas (Food processing)

Farmer Member

9. S. Jagtar Singh Brar, V&PO Mehma Sarja, Distt. Bathinda.

PAU Members

10. Director of Research
11. Director of Extension Education
12. Dean, Postgraduate Studies
13. Dean, College of Agriculture
14. Dean, College of Agricultural Engineering and Technology
15. Dean, College of Basic Sciences and Humanities
16. Dean, College of Home Science
17. Additional Director of Research, Crop Improvement
18. Additional Director of Research, Horticulture and Food Science
19. Additional Director of Research, Natural



Resource & Plant Health Management

20. Additional Director of Research, Farm Machinery and Bio-Energy
21. Registrar (Non-member invitee)
22. Comptroller (Non-member invitee)

Special invitees to research council during the report period included Prof. K.K Jindal, former ADG (Hort.), ICAR as an outside expert along with progressive farmers who have made a mark in specialised/ advanced areas of farming, namely S. Balwinder Singh Tikka, V&PO AbulKhurana, Distt. Muktsar, Major Manmohan Singh Verka, Ranjit Avenue, Amritsar, S. Rubash Singh Jakhar, V&PO Patrewala, Block Khuia Server, Ferozepur, S. Jaswant Singh Chotala, V&PO Chotala, Distt. Hoshiarpur, S. Harvinder Singh, V&PO Bhadalwad, Distt. Sangrur and S. Nek Singh Khokh, V&PO Khokh, Distt. Patiala as additional members.

General Agenda of Research Council Meetings:

- To review/discuss the research achievements of PAU in the previous 6 months particularly related to development of new varieties, production, protection and post-harvest technologies.
- Research programmes and projects undertaken or to be undertaken by the University scientists in the field of agriculture and allied sciences, their prioritization, monitoring and evaluation.
- Physical, fiscal and administrative facilities required for implementing research projects;
- Orienting research to meet farmers and other stake-holders'needs.
- Exploring Public-Private Partnership in research
- Any other matter pertaining to research programmes, which may be referred to it by the Vice Chancellor or the Board of Management of the University.

The meetings of Research Council are held twice a year (Table 3.1)



Meeting of Research Council

Table 3.1: Meetings of Research Council held during last 5 years

Year	Date of Meeting
2013-14	19.08.2013
	18.02.2014
2014-15	14.10.2014
	08.06.2015
2015-16	11.12.2015
	17.05.2016
2016-17	21.11.2016
	23.05.2017
2017-18	14.11.2017
	15.06.2018

6.6.3.2 Directorate of Research

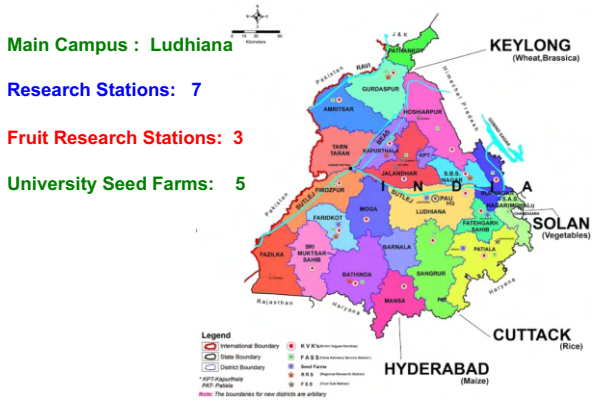
The Directorate of Research coordinates and steers the research programmes of the University by continuously adapting research agenda to needs, facilitating collaborations and monitoring ongoing projects. Technology management and protection of intellectual property are also taken care of by the directorate.

Present Establishment of Directorate of Research:

- Director of Research
- Additional Director of Research, Crop Improvement
- Additional Director of Research, Horticulture and Food Science
- Additional Director of Research, Natural Resource and Plant Health Management
- Additional Director of Research, Farm Machinery and Bio-Energy
- Directors of Regional Research Stations
- Associate Director (Seeds)
- Deputy Director (Farm)
- Editor, Research

Research set-up: Research is carried out in 35 departments/ schools on the main campus at Ludhiana, besides 7 Regional Research Stations and 3 Fruit Research Stations. The University set up also includes five seed farms. For carrying out off -season work (primarily accelerated breeding programmes), the University has its own research station at Keylong (Distt. Lahaual-Spiti, Himachal Pradesh) while facilities at various other sites such as Cuttack,

Research Setup



across the Colleges at PAU Campus and at Regional Research Stations. The departments/stations/units supervised by different Additional Directors of Research for facilitating complementation and integration, while minimizing redundancy are given in Table 3.2.

The Associate Director (Seeds) and Deputy Director (Farm) look after the work of seed production and distribution. The Editor, Research is involved in compilation of various reports at University level and publication of **Agricultural Research Journal,** (earlier known as Journal of Research, PAU) at a quarter year periodicity.

Table 3.2: Inter departmental linkages in the university

Sr No	Co-ordinator	Departments/stations/units associated
1.	Additional Director of Research, Crop Improvement	Department of Plant Breeding and Genetics, School of Agricultural Biotechnology, Department of Biochemistry and Department of Botany, Directorate of Seed, Regional Research Stations, University Farms, Home Science Extension
2.	Additional Director of Research, Horticulture and Food Science	Department of Fruit Science, Department of Vegetable Science, Department of Floriculture, Department of Food Science and Technology, Department of Food and Nutrition, Department of Processing and Food Engineering, Fruit Research Stations, Department of Biochemistry, Department of Botany, Department of Chemistry, School of Business Studies
3.	Additional Director of Research, Natural Resource and Plant Health Management	Department of Agronomy, Department of Soil Science, Department of Entomology, School of Organic Farming, Department of Plant Pathology, Department of Climate Change and Agrometeorology, Department of Forestry and Natural Resources, Department of Soil and Water Engineering, Department of Microbiology, Department of Zoology, Department of Economics and Sociology, Department of Human Development, Department of Agricultural Journalism, Languages and Culture
4.	Additional Director of Research, Farm Machinery and Bio-Energy	Department of Farm Machinery and Power Engineering, Department of Mechanical Engineering, Department of Renewable Energy Engineering, Department of Electrical Engineering and Information Technology, Department of Maths Statistics and Physics, Department of Family Resource Management, Department of Apparel and Textile Science

Hyderabad and Coimbatore are accessed through collaborative arrangements.

The Additional Directors of Research assist the Director of Research in planning, monitoring and coordinating scientific research on various aspects

Research Infrastructure: The University has a well-developed research infrastructure including Genomics and Molecular Biology Laboratory, Bioinformatics Facility, Electron Microscopy and Nano Science Laboratory, a NABL accredited



Pesticide Residue Analysis Laboratory, Food Industry and Business Incubation Centre, Pilot Food Processing Plants, Mushroom Research Centre, Weather Forcasting Centre, Farm Power Laboratory, Farm Machinery Testing Centre, CNC and CAD Laboratory and Precision Agriculture Laboratory. Besides the laboratory infrastructure facilities, University has extensive land and farm infrastructure for field experimentation as well green houses and net houses for plant propagation and protected cultivation.

Staff Pattern

a) Faculty engaged in research

Out of total faculty of 778 across the colleges and employed at PAU and outstations, 433 are engaged in research. The College of Agriculture has 242 faculty members on research side, followed by Regional Research Stations (92), College of Basic Sciences and Humanities (47), College of Agricultural Engineering (42), College of Home Science (9).

The faculty composition is broad based and a significant proportion of the faculty is recruited from outside the state. Almost all the scientists engaged in research also conduct teaching assignments and guide PG students. PG students are also allotted to the faculty at Regional Research Stations. The scientists at RRS Bathinda and Gurdaspur regularly teach courses at the two PAU Institutes of Agriculture at these stations.

All the departments have departmental research committees. As departments generally have multi disciplinary teams, scientists of different disciplines are also intergrated with the research in their parent department, from where they also draw their students and course assignments. The research committees also interact across the departments for multidisciplinary research.

b) Office staff of the Directorate of Research

The working of the Directorate of Research is being supported by office staff which consists of the following:

- Assistant Accounts Officer (1)
- Superintendent (2)
- Senior Assistant (7)
- Junior Assistant (3)
- Senior Scale Stenographer (2)
- Steno Typist (1)
- Clerk (2)
- Office Assistant (1)
- Junior Typing Assistant (1)
- Assistant Information Officer (1)
- Web site designer (1)
- Graduate Assistant (2)
- Library Attendant (1)
- Messenger (2)

Research Coordination Mechanism

Departmental Research Committees: The research activities of the University are coordinated at different levels. Each department has its own research committee. The proposals to be presented in the University level Research Evaluation Committee are finalized by Departmental Research Committees.

Research Evaluation Committee: It is the key committee that discusses and approves the technologies to be disseminated to the farmers for adoption in the state. For approval and inclusion of research recommendations in Package of Practices of PAU the research proposals are discussed in the Research Evaluation Committee meetings held once in 2 months. Since the inception of this evaluation mechanism in PAU, 272 meetings have been held to date to evaluate thousands of research proposals from different departments. (A digital archive of the proposals has been generated).The meeting is chaired by Director of Research and is attended by Director Extension Education, Additional Directors of Research, Additional Directors of Extension Education and all the Heads of the Departments along with chairpersons of Departmental Research Committees, across the colleges of the University. The teams who have developed the technologies make presentations and explain their proposals.

Technology Evaluation System: As part of standard system of evaluation of varieties and other technologies, generally 3 years performance on research farms including multilocation testing is required for putting up a proposal to the Research Evaluation Committee. This is followed by one year of adaptive trials at farmers' fields (generally about 6 per district), coordinated by PAU District Extension Specialists, *Krishi Vigyan Kendras* and Chief Agricultural Officers of the state Department of Agriculture and Farmers' Welfare. The adaptive trials are preferably targeted to region or agro-ecological niche for which technology is relevant. The

compiled data of research and adaptive trials is considered for approval by Research Evaluation Committee and in case of varieties successful proposals are forwarded to State and Central committees for release/notification etc. As per the need of hour, there is an increasing representation of food processing/ subsidiary occupation and farm machinery related technologies in the proposals.

Research reviews of departments and research stations: To monitor research progress as well as to plan the research strategy for future, comprehensive departmental reviews are held. During the period under report (2013-14 to 2017-18) two reviews of the departments, across the 4 colleges, besides outstations were held during 2016 and 2018.

Review of research proposals for funding: The research proposals prepared by the faculty for external funding are reviewed by the concerned ADR and then are forwarded to relevant funding agency though Director of Research.

Collaborative research: To widen the scope of research activities of various departments, collaborative research at national and international level is encouraged. Forty five MOUs have been signed with national/ international organizations during review period. Long standing international collaborations exist with CGIAR centres particularly IRRI, CIMMYT, ICRISAT, and ICARDA, besides Universities/ Institutes from US (Kansas State University, University of California, Washington State University, University of Florida etc.,) UK (Cambridge University, John Innes Centre, National Institute of Agricultural Botany, Rothamsted Experimental Station) and other countries. At the national level the University participates in 43 All India Coordinated Research Projects under ICAR. A regional cooperation mechanism has been developed with Agricultural and Horticultural

Universities of adjoining states through a Joint Technology Review and Dissemination Committee. The states include Haryana, Himachal Pradesh, Jammu and Kashmir and Delhi. Six monthly meetings have been held for exchange of ideas and technologies. Collaborations also exist in the form of industry sponsored projects of which 26 have been undertaken during the period under report.

Directorate of Research Emergent Fund: To cater to research requirements that may arise out of emergent situations on farmers' fields and issues of immediate concern, a short term funding provision has been created at the level of the directorate.

Centre for Agriculture Policy and Market Research: Special unit has been carved out under the directorate with faculty from Department of Economics and Sociology and School of Business Studies for greater focus on policy matters and market guidance to the farmers.

Institutional Biosafety Committee: This committee deals with potentially hazardous research protocols requiring containment and specific biosafety norms such as research on genetic transformation in plants and other organisms. The committee comprises Director of Research (Chairman), Head Department of Plant Breeding and Genetics (Secretary), Nominee of Department of Biotechnology, GOI, External Experts, Chief Medical Officer of PAU, and internal experts from relevant departments.

Institutional Ethical Committee for Research: This committee deals with research proposals involving ethical issues such as human nutrition trials. The committee includes Director of Research (Chairman), legal expert, Chief Medical Officer of PAU, Dean of relevant college, Head of the concerned department and faculty with expertise in relevant research area.

Capacity building/faculty training: A corpus fund is maintained and its interest is used for faculty training and exposure to latest research developments. The fund is being used primarily for training of faculty abroad and for visits of prominent scientists from advanced Universities. During the period under review, 10 faculty members have been sponsored through this in-house fund for about 3 to 6 months working and training visits to advanced laboratories abroad.

Research and Extension Experts Workshops: This provides an important interface with the State or Line Departments of Agriculture, Horticulture, Soil Conservation, Animal Husbandry etc,. Four workshops devoted to *Rabi* crops, *Kharif* crops, fruits and vegetables are held every year with extensive participation of officers of the State departments. The new recommendations emerging from research are presented, discussed and finalized by consensus for further dissemination to stakeholders.

Research Publications: The manuscripts of research publications from various departments are reviewed by the concerned Additional Directors of Research. This is to make sure that the research papers are submitted to quality journals having high NAAS rating/ Impact factor.



Research funding: Research received 48.98 to 54.78 percent of the total budget during last five years (Table 3.3).

A significant component of the working contingency for research is generated from ad-hoc national and international competitive grants.

Table 3.3: Budget spent on research activities from 2013-14 to 2017-18 (Rs in Lakhs)

Year	Budget for research	Total budget	Percentage of total budget
2013-14	26701.72	51073.22	52.28
2014-15	25978.08	52306.76	49.66
2015-16	26219.66	53531.65	48.98
2016-17	31256.66	57060.68	54.78
2017-18	32342.66	59913.42	53.98

Regional Stations

To cater to agroclimatic diversity within the state and crop niches the University has 7 Research Stations and 3 Fruit Research Stations as listed below (Table 3.4):

University Seed Farms and Seed Production:

Apart from regional research stations, the University has 5 seed farms namely USF Ladhowal (Ludhaina)- 1250 acres, USF Nabha (Patiala)- 493 acres, USF Naraingarh (Fatehgarh Sahib)- 372 acres and USF Raja Harinder Singh Seed Farm (Faridkot)- 1200 acres and USF Usman (Tarn Taran)- 45 acres which have a mandate of seed production of both *Kharif* and *Rabi* crops. Seed production activities are also carried out at research stations and KVKs. Different classes of seeds of field crops produced during years under report are given in Table 3.5.

To promote much needed crop diversification from the existing wheat-rice dominant cropping pattern, the area under seed production of field

Table 3.4: List of Regional Research Stations and Fruit Research Stations along with their research focus and achievements.

Sr No	Name of Research Station	Year esta-tablished	Research Focus	Salient Achievements during 2013-14 to 2017-18
1.	Regional Research Station, Gurdaspur	1910	Lentil, urdbean, wheat, sugar-cane, litchi, mango, disease testing hot spot	Wheat variety PBW 660 has been released for rainfed conditions at national level.
2.	Dr. JC Bakshi Regional Research Station, Abohar, (Fazilka)	1962	Citrus, cotton	Early Gold, a sweet orange cultivar on *'Jatti Khatti'* rootstock has been recommended for commercial cultivation.
3.	Fruit Research Station, Bahadurgarh (Patiala)	1963	Guava, ber, sapota	Developed two guava varieties namely Punjab Kiran and Punjab Safeda. Punjab Kiran has pink flesh and soft seeds, hence suitable for processing. Punjab Safeda is high yielding.
4.	Regional Research Station, Faridkot	1970	Cotton, sugarcane	• Associated with development of PAU Bt 1 variety of cotton, the first Bt cotton variety by any public sector institution in the country. • Developed mid-maturing sugarcane variety CoPb 91 in Punjab
5.	Regional Research Station, Bathinda	1972	Cotton, wheat, oilseeds, grapes	• Lead centre for development of PAU Bt 1

Sr No	Name of Research Station	Year established	Research Focus	Salient Achievements during 2013-14 to 2017-18
6.	Regional Research Station, Kapurthala	1972	Sugarcane, rice	• Developed CoPb 92 (early maturing variety), released at national level • Sub-soiling technology for increased cane yield
7.	Dr MS Randhawa Fruit Research Station, Gangian (Hoshiarpur)	1972	Mango, citrus, litchi	Standardization of rejuvenation techniques for old and senile mango orchards
8.	Dr DR Bhumbla Regional Research Station for *Kandi* Area, Ballowal Saunkhri (Shaheed Bhagat Singh Nagar)	1982	Chickpea, Taramira, rainfed wheat, water management under rainfed conditions	Development of contingent crop plan under aberrant weather conditions for *Kandi* region of Punjab.
9.	Fruit Research Station, Jallowal-Lesriwal (Hoshiarpur)	2012	Nursery production, citrus	Mass scale nursery production
10	Regional Research Station, Dayal Bharang (Amritsar)	2016	Oilseeds, Pulses, sugarcane, Seed Production	Research trials and seed production of target crops (Station is recently established)

Table 3.5: Details of seed production (q) of field crops during 2013-14 to 2017-18.

Quantity of Seed (q)	2013-14	2014-15	2015-16	2016-17	2017-18
Nucleus seed	144.7	344.7	192.1	193.0	184.5
Breeder Seed	4330.0	5041.4	5720.4	5383.7	7516.5
Foundation Seed	15322.8	9129.0	18210.1	7423.7	13993.6
Certified Seed	6951.2	17157.9	2952.1	4739.1	23795.8
Truthfully labelled	35261.4	35887.5	36861.6	42493.7	15615.2
Total	62010.1	67560.5	63936.3	60233.2	611005.6

crops has been diverted to vegetable crops particularly potato and turmeric. (The production figures for the field crops, thus, do not show an increase in the above table). The production of nursery of fruit and forest plants, vegetable seed of summer, winter vegetables and tuber crops is shown in Table 3.6.

Contribution in Academic Programmes

Review of work plan of PG students: The plan of research work (Synopsis) of M.Sc and Ph.D students is reviewed by the concerned Additional Directors of Research. The Applied research having a focus on resolving current and emerging problems in agriculture as well as relevant basic research is encouraged.

Facilitating PG student research: The funding support for various research schemes and projects, including ad-hoc projects is instrumental in setting up, maintaining and running laboratory and field facilities. PG student research is closely aligned with this set up in a mutually beneficial manner.

Quality Publications: The research teams consisting of faculty, students and research fellows are constantly encouraged to publish research work in quality journals (e.g., with NAAS rating > 6.0). The faculty are guided to send the publications through



Table 3.6: Nursery of fruit and forest plants and seed production of vegetables during 2013-14 to 2017-18.

Nursery/ seed production	2013-14	2014-15	2015-16	2016-17	2017-18
Fruit plants (number)	176535	263200	318123	361158	475284
Forest plants (number)	181000	215000	165000	130000	122000
Winter vegetables (q)	230.79	289.16	413.00	513.54	896.46
Summer vegetables (q)	27.42	32.79	64.91	51.21	46.47
Tuber crops: potato and turmeric (q)	1696.24	1351.1	2523.35	7455.7	6446.75

concerned Additional Directors of Research after proper vetting, so that good quality research papers are published.

6.6.3.3 Technology Developed and its Adoption

Technology developed

Varieties:

Varieties are the pivotal component of agrotechnological packages and a major strength of PAU research. During 2013-14 to 2017-18, the University has recommended 158 varieties/hybrids of different crops, vegetables, fruits and flowers for cultivation.

Varieties of field crops

The list of varieties of field crops released during this period is given in Table 3.7.

Wheat: PAU developed 10 wheat varieties during last five years, out of which four were released at national level. Three salient releases are discussed here. PBW 723 (Unnat PBW 343), carrying a four gene pyramid of rust resistance genes in PBW 343 background, is the first wheat variety in the country developed through Marker Assisted Backcross Breeding (MABB) strategy. Released at national level in 2017, it possesses resistance to both yellow and brown rust besides yield superiority over recurrent parent and check. The wheat breeding programme is also oriented towards developing varieties with high quality and specific end uses. In this context, wheat variety PBW1 Zn (HPBW 01) represents another first in the country as it is among the first two biofortified wheat varieties recommended at national level (during 2017). Compared to other varieties it has about 12-17% higher grain zinc concentration and yields 22.5 q/acre.

Unnat PBW 550 is a rust resistant version of PBW 550 variety and has been developed through Marker

Table 3.7: Varieties /hybrids of different field crops released during 2013-14 to 2017-18.

Crop	Varieties released*
Wheat (10)	**Unnat PBW 343** , Unnat PBW 550, **PBW 1 Zn**, **PBW 644**, PBW 658, *WH1105,* **PBW 660**, *HD3086,* PBW 677, PBW 725
Rice (12)	PR 126, **PR 124**, PR 123, PR 122, PR 121, Punjab Basmati 3, Punjab Basmati 4, PR 127, Punjab Basmati 5 *Pusa Basmati 1509, CSR 30, Pusa Basmati 1637*
Maize (6)	PMH 7, PMH 8, PMH 9, PMH 10, **[PMH 6, PMH 12]**
Cotton (14)	**PAU Bt 1** , F 2383, F 2228, **LH 2108**, **FMDH 9**, LD 949 , LD1019, **[LH 2256, F 2276, F2381, FHH 209, F 2164, FHH 141, FMDH 8]**
Sugarcane (6)	**Co Pb 92**, CoPb 93, CoPb 94, CoPb 91, *Co 118, Co 238*
Pulses (13)	
Mungbean (4)	ML 2056, **SML 1115**, SML 832 (Summer), *TMB 37 (Summer)*
Mash (2)	**[Mash479, Mash391]**
Soybean (2)	**SL 955, SL 979**
Chickpea (3)	PBG 7 (Desi), L 552 (Kabuli), **[L 555 (Kabuli)]**
Pigeon Pea (2)	**PAU 881,** AL 882

Oilseeds (12)

Raya sarson (5)	RLC 3, **PBR 357,** *Giriraj,* **[RLC 2, PBR 378]**
Gobhi sarson-canola type (1)	**GSC 7**
African sarson (1)	PC 6
Sunflower (3)	PSH 1962, PSH 996; *DK 3849*
Sesame (1)	Punjab Til No 2
Toria (1)	TL 17
Groundnut (1)	TG 37 A
Pearl millet (2)	PHB 2884,**[PHB 2168]**
Forages (11)	
Oat (6)	OL 10, **OL 11(OL1760), OL 12 (OL1802-1), [OL 1802, OL 1804, OL 1769]**
Sorghum (1)	Punjab Sudax Chari 4
Guara (1)	*HG 365*
Napier Bajra (2)	PBN 346, **PBN 342**
Berseem (1)	BL 43
Medicinal and aromatic crops (2)	
Mentha (1)	*Kosi*
Celery (1)	Punjab Celery 1

*PAU varieties released at state and central level are given in normal and bold font respectively. PAU varieties released in other zones are given in square brackets. Varieties developed by other centres and released by PAU are given in italics.



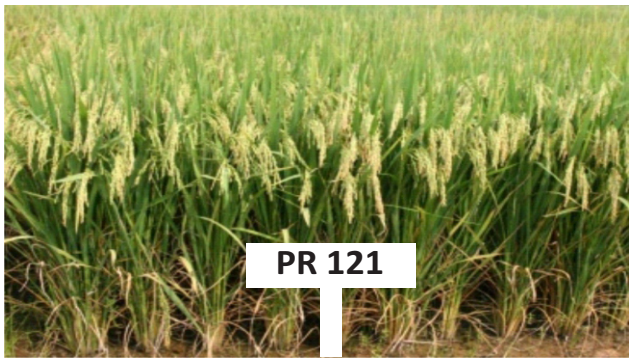
PBW 1 Zn



PBW 723 (Ünnat PBW 343)

Assisted Selection (MAS). On account of its short duration, Unnat PBW 550 can extend window available for rice residue management and facilitate timely sowing of summer *moong*. It has good grains with high hectoliter weight and *chapati* quality. It has short plant height (86 cm) and yields on an average 23.0 q/acre.

Rice: In the past five years, twelve new varieties of rice were released for Punjab, six parmal and six basmati rice. Keeping in view the concerns of depleting ground water table and window for straw management, the breeding strategy has been oriented towards development of short duration varieties. Short duration variety PR 121 (released in 2013) has come to occupy highest acreage in state (32 % of area under rice cultivation), due to its high yield (30.5 q/ acre), resistance to bacterial blight disease and excellent milling properties. Rice variety PR 126 (released in 2017) represents further progress in this direction. It matures in 93 days after transplanting (about 5 weeks less than long duration varieties). PR 127 released in 2018, combines high yield, earliness and resistance to all the 10 prevalent bacterial blight pathotypes. It carries a novel bacterial blight resistance gene from *Oryza glaberrima*. On an average, PR 127 yields 30.0 q/acre.





Basmati rice: About 15 % of rice acreage in state is under basmati rice. Pusa Basmati 1637 (developed by Indian Agricultural Research Institute) is a blast tolerant version of Pusa Basmati 1. Blast tolerance would help to reduce pesticide use and residue issues which is a health and export market related concern. Average paddy yield of this variety is 17.5 q/acre.



Maize: During the past five years, PAU released six hybrids of maize, two at national level and four for the state. PMH 6, and PMH 12 are medium maturity Kharif maize hybrids released for cultivation in Zone III (Bihar, West Bengal, Jharkhand, Eastern U P, Orissa). At state level the cold tolerant hybrid, PMH 9 was recommended for winter season in 2014. PMH 7(2013), PMH 8 (2014) and PMH 10 (2015) have been released for cultivation in state during spring season.



Cotton: In this period PAU has released 14 varieties out of which ten were identified at national level. PAU Bt 1, developed by PAU is the first Bt cotton variety from the public sector and has been recommended (2017) for the states of Punjab and Rajasthan. A shattering tolerant variety of *Desi* cotton LD 1019 has been released in 2018. It can retain seed cotton in the opened bolls for a longer time and thus saves labour on account of fewer pickings.



Pulses: PAU has released thirteen new varieties of pulses during last five years. Summer mungbean has emerged as the largest grown pulse crop in the state. The adoption of summer mungbean as an additional crop by Punjab farmers is sought to be expanded through release (in 2017) of a new short duration variety, TMB 37, developed by BARC, Mumbai. Arhar variety, AL 882 with determinate growth habit has been released in 2018. It's early maturing and enables timely sowing of succeeding wheat. Its compact architecture facilitates effective pest management with chemicals. Two soybean varieties, SL 979 and SL 955 have been recommended for Northern Plains Zone. These are resistant to yellow mosaic virus and soybean mosaic virus. Chickpea is another important pulse crop and recent releases include L 552 variety of *Kabuli* chickpea with very bold seeds (33.6 g/100 seeds) and PBG 7 variety of desi chickpea with resistance to Ascochyta blight and high yield (8.0 q /acre).

Oilseeds: PAU released 12 varieties of different oilseed crops in the last five years. Of these, four varieties have been released at national level. After successful development and release of canola quality Gobhi sarson varieties, like GSC 7 (released in 2014), canola quality has also been introduced in mustard (raya), leading to recommendation of RLC 3 (in 2015), the first canola quality raya variety yielding 7.3 q/acre with 41.5% oil content and tolerance to white rust. In another advance, PAU has recommended world's first determinate type African sarson variety PC 6 (in 2016), yielding 7.7 q/acre with oil content of 40.1%. Its determinate growth habit, uniform maturity, resistance to pod shattering and medium stature, make it suitable for use of combine harvester. In sunflower, a hybrid PSH 1962 has been recommended and yields 8.2 q/acre and with oil content of 41.9%. A white, bold seeded phyllody tolerant Sesame variety Punjab Til 2, yielding 2.8 q/acre and oil content of 49.0% has been recommended (in 2015). A mutant variety TG37A (Groundnut) developed by Bhabha Atomic Research Centre, Mumbai has been recommended (2018) for cultivation in Punjab.. This early maturing groundnut variety is suitable for sowing in spring season after potato/pea and has helped develop new groundnut niches in Hoshiarpur and Sangrur districts.

Sugarcane: New sugarcane varieties for all maturity segments have been released in this period. CoPb 92 of sugarcane is an early maturing variety and has been recommended for cultivation in North Western Zone. It possess tolerance to red rot and has lesser susceptibility to borer complex. A high yielding, mid-maturing variety of Sugarcane, CoPb 91 having high sugar was released in 2014. The average cane yield was 410 q /acre and its juice contains 17.0% sucrose in January. It is tolerant to the prevalent isolates of red rot pathogen.



CoPb 92

Forages: PAU has released eleven forage varieties/hybrids during last five years. Punjab Sudax Chari 4 (PSC 4) is a multicut sorghum forage hybrid giving three cuts. It yields 445 q /acre of green fodder. A berseem variety BL 43, released during 2017, gives green fodder yield of 390 q/ acre. Multicut, high yielding and superior quality hybrid PBN 342 of Napier bajra has been released at national level (2018). OL 11 and OL 12 (OL 1802-1) are single cut varieties of oats recommended for Punjab and North West Zone of the country respectively. Three oat varieties developed at PAU have been recommended for other zones at the national level.

Varieties of Horticultural Crops

During this period special emphasis has been given on breeding of horticultural crops particularly fruit crops. This has paid rich dividends in form of several breakthroughs presented below. In vegetable crops, 36 varieties of 18 crops have been recommended, while in fruit crops 23 varieties of 12 crops and in flowers 15 varieties of 5 crops have been recommended for commercial cultivation in the state.

The complete set of varieties released in case of vegetable, fruit and flower crops during last five years is given in Tables 3.8, 3.9 and 3.10.

Varieties of vegetables

During the period under report, 36 varieties/hybrids of different vegetables were released. Out of these, seven varieties/hybrids have been identified at the national level. Notably a large set among the recommended varieties is suitable for protected cultivation. Some of the salient releases are discussed here. Matar Ageta 7 released in 2014 is an early maturing green pea variety fits in well with

Table 3.8: Varieties/hybrids of Vegetable crops released during 2013-14 to 2017-18.

Crop	Varieties/ hybrids released
Vegetables (36)	
Pea (2)	Mattar Ageta 7, *AP 3*
Tomato (6)	Punjab Varkha Bahar 4, Punjab Sartaj, Punjab Gaurav, Punjab Red Cherry, Punjab Sona Cherry, Punjab Kesar Cherry **[Punjab Sartaj]**
Brinjal hybrid (6)	PBH 3, PBH 4, PBH 5, PBHR 41, PBHR 42

	[PBH 5, PBHR 41, PBH-4, PBH-3, PBHL 52]
Okra (1)	Punjab Suhawani
Chilli (3)	Punjab Tej, Punjab Sindhuri, CH 27
Bottle gourd (2)	Punjab Bahar, Punjab Barkat
Bitter Gourd(1)	Punjab Jhaar Karela 1
Radish (1)	RB 21
Carrot (2)	Punjab Black Beauty, Punjab Red Carrot
Muskmelon (2)	MH 51, MH 27
Fenugreek (1)	Kasuri Supreme
ChiniSarson (1)	Saag Sarson
Broccoli (1)	*Palam Samridhi*
Garlic (1)	PG 18
Pumpkin (3)	PPH 1, PPH 2, PAU Magaz Kadu I
Cucumber (1)	Punjab Kheea 1
Tinda (1)	Punjab Tinda 1
Potato (1)	*Kufri* Ganga

*PAU varieties released at state and central level are given in normal and bold font respectively. PAU varieties released in other zones are given in square brackets. Varieties developed by other centres and released by PAU are given in italics.

early maturing rice/maize-pea-wheat rotation. In case of tomato, virus resistance in variety Punjab Varkha Bahar 4, makes it suitable for cultivation in rainy season. For protected cultivation, Punjab Sartaj and Punjab Red Cherry varieties of tomato have been released. Indeterminate habit makes them suitable for training. Among the cheery group of tomatoes released for protected planting is variety Punjab Kesar Cherry (released in 2017) with beta carotene content of 13mg per 100 gram (double than that of other varieties).

Brinjal hybrid PBH 3, belonging to small round fruit group has gained popularity with the growers. Chilli hybrid variety CH 27, released in 2015 has spread to several North Western states and owes its acreage to leaf curl virus, fruit rot and root knot nematodes resistance and tolerance to sucking pests such as thrip and mite wilt and virus resistance. Punjab Raunak an early maturing variety of long fruit group has been recently recommended (2018). The fruits, borne in clusters, are attractive with shining deep-purple colour and green calyx. Average yield of this variety is 242 q/acre.'

Keeping in view nutraceutical value, anthocyanin rich variety of carrot, Black Beauty, has been released in 2015. Muskmelon hybrid MH 27 has resistance to Fusarium wilt while MH 51 is based on an easily identifiable (rudimentary stamens) new male sterility system. Pumpkin hybrid PPH 1 with extra early maturity and small fruit size has been developed.

Another variety of Pumpkin, PPH-2, and one variety of bottle gourd Punjab Bahar have also been recommended. Other vegetable varieties developed during the period include, garlic variety PG-18 (2016), okra variety Punjab Suhawani (2017) and bitter gourd variety Punjab Jhar Karela-1 (2017). Punjab Jhar Karela-1 represents a domestication event from a local, semi wild plant species. PG-18 variety of garlic is suitable for processing. The first hull-less seed pumpkin variety of the country PAU Magaz Kadoo 1. suitable for use as *'Magaz'.* has been recently recommended (2018) .Its immature fruits can be used as vegetable also. The fruits are medium sized and round which turn golden yellow at maturity. Its seeds have 32 per cent omega-6 fatty acids, 3 per cent protein and 27 per cent oil content. Its seed yield is 2.9 q/acre.

This table purpose potato variety Kufri Ganga has compact and vigorous plants with light green foliage has been recently recommended (2018). Its



Punjab Raunak



PAU Magaz Kadoo 1

tubers are large, oval creamy white with shallow eyes and white flesh. This variety gives an average tuber yield of 187 q/ acre.



Kufri Ganga

An early maturing white fleshed variety of Tinda (round melon) Punjab Tinda 1 suitable for spring season cultivation has been recommended (2018) Its fruits are round, shining, green, pubescent, and weigh on an average 60 g (immature stage). Average yield of this variety is 72 q/acre.

For cultivation under protected conditions, Punjab Kheera-1 (cucumber) has been recommended (2018). Its fruits are seedless. September and January sown crops are ready for picking after 45 and 60 days, with cumulative yield of 300 q/acre and 370 q/acre, respectively. The seed of this variety (non hybrid) can be produced Likewise, Punjab Swarna (Tomato) has been recently recommended (2018) for cultivation under protected conditions. Its fruits are medium in size, oval and orange in colour. Fruits are borne in clusters and have carotene content of 14mg per 100g of fresh weight. The average cumulative yield is 1,087 q/acre.



Punjab Kheera 1

Varieties of fruits

Shifting to high value and diversified cropping systems is an important avenue of improving farmers' income and profits. Unlike vegetable crops discussed above, it is only recently that crop improvement has been prioritized in fruit crops. Success of this strategy is however evident from release of 23 varieties of different fruits by PAU during the last five years.

Table 3.9: Varieties/hybrids of Fruit crops released during 2013-14 to 2017-18.

Crop	Varieties/ hybrids released
Fruits (23)	
Mandarin (3)	PAU Kinnow 1 *Daisy (mandarin), W. Murcott (mandarin)*
Sweet Orange (1)	*Early Gold*
Rootstock (1)	*Carrizo*
Guava (5)	*Punjab Pink, Punjab Safeda, Punjab Kiran, Shweta, Portugal rootstock*
Pear (1)	*Nijisikie*
Grapes (1)	*Superior Seedless*
Datepalm (2)	*Hillawi, Barhee*
Bael (1)	*Kagzi*
Aonla (3)	*Balwant, Neelam, Kanchan*
Sapota (2)	*Kalipatti, Cricket Ball*
Fig (1)	*Brown Turkey*
Papaya (1)	*Red Lady 786*
Pomegranate (1)	*Bhagwa*

*PAU varieties released at state and central level are given in normal and bold font respectively. PAU varieties released in other zones are given in square brackets. Varieties developed by other centres and released by PAU are given in italics.

PAU has done path breaking research work on Kinnow mandarin which now ranks first with respect to the area under its cultivation (51637 ha, about 62% of the total area under fruit crops in the state). To bring diversification in citrus cultivation, two new mandarin varieties Daisy Tangerine and W. Murcott were released. Daisy Tangerine, matures 2 months earlier than Kinnow, possesses less seeds, good juice quality and gives fruit yield of 40 kg/tree. W. Murcott matures along with Kinnow, has loose skin and less seeds. In a recent breakthrough, PAU has released through mutation breeding, a low seeded cultivar of Kinnow – 'PAU Kinnow-1 (See figure) which is equivalent to Kinnow for all other attributes. Less seededness has greatly enhanced table and processing value of Kinnow.Further, the seedless

trait can be maintained without isolation making it easy to integrate PAU Kinnow 1 in existing orchards.



PAU Kinnow 1 Kinnow

Further, to enhance area under Kinnow (having greater concentration in South Western districts) in sub-mountainous and central zones of Punjab, **Carrizo rootstock** has been recommended. This rootstock is tolerant to *Phytophthora* disease and Kinnow fruits produced on it possess higher TSS (11.3%) and fruit weight (211.2 g) as compared to plants raised on rough lemon. Daisy and W. Murcott mandarin varieties in sub-mountainous and central regions are also thriving well on this stock.

For further diversification of citrus cultivation, **Early Gold** (Sweet Orange) has been recommended in 2018. It has low seed number (2-6 seeds/fruit) and high juice content (47.2%) with attractive golden yellow colour (compared to light coloured juice and flesh of *Mosambi*), and a good blend of sugar and acidity. Fruit ripens during last week of October to mid of November. Average fruit yield of this variety is 45 kg/ tree.

Guava has emerged second most important fruit crop that has overtaken mango in the state. Two varieties, Punjab Pink (red fleshed) and Shweta (white fleshed) have been released.

Punjab Safeda and Punjab Kiran have been recommended in 2017 for commercial cultivation in the state. Fruits of **Punjab Safeda** are medium to large in size, round with smooth creamy-white skin, white flesh and have firm texture. This variety surpasses the popular Allahabad Safeda variety in yield, TSS and fruit weight. A pink fleshed variety Punjab Kiran (2018) having small and soft seeds has been recently recommended. Its fruits are medium, round to oblong.



Early Gold



Punjab Safeda Punjab Kiran

Table 3.10: Varieties of Flower crops released during 2013-14 to 2017-18.

Crop	Varieties released for commercial cultivation in state
Flower Crops (15)	
Chrysanthemum (3)	Punjab Shyamali, Punjab Shingar, Punjab Mohini
Gladiolus (2)	Punjab Glad 1, Punjab Glad 2
Pansy (4)	Punjab Sunaina, Punjab Neelima, Pansy Purple Wave, Punjab Choco Gold
Marigold (1)	Punjab Gainda No. 1
Sweet Pea (5)	Punjab Sweet Pea 1, Punjab Sweet Pea 2, Punjab Sweet Pea 3, Punjab Sweet Pea 4, Punjab Sweet Pea 5

*PAU varieties released at state and central level are given in normal and bold font respectively. PAU varieties released in other zones are given in square brackets. Varieties developed by other centres and released by PAU are given in italics.

Varieties of ornamentals

During the last five years, PAU has released 15 varieties of flower crops namely chrysanthemum, gladiolus, marigold, pansy and sweet pea, including a marigold variety, Punjab Gainda No.1 that extends its cultivation to the harsh summer season of North West India.

The recently released (2018) varieties of chrysanthemum are Punjab Shingar and Punjab Mohini of chrysanthemum. **Punjab Shingar** is a

mid- to late-season variety suitable for loose flower production that requires 122 days for flowering. Plants are compact and with upright growth habit. Flowers are white in colour and decorative type. Flower yield of this variety is 71.8 q/acre, while, **Punjab Mohini** is an early- to mid-season variety that requires 93 days for flowering. Flowers are single, Korean type, white with yellow centre and 3.1 cm wide. This variety is suitable for pot culture without staking and pinching, and produces 331 flowers per plant with flowering duration of 30 days. It is moderately resistant to *Septoria* leaf spot disease.



Punjab Shingar



Punjab Mohini

Production Technologies

Along with the development of improved varieties, the matching production technologies have been developed in crops including fruits, vegetables and flowers.

Wheat

- Dual inoculation of biofertilizer, *Azotobacter* sp. and *Streptomyces badius* ($1x10^8$cfu/g charcoal carrier) in wheat @ 500 g/40 kg seed for 30 minutes before sowing increases grain yield of wheat.
- Incorporation of paddy straw or its retention through Happy Seeder for more than 3 years helps in increasing the wheat productivity and improves soil health.
- Ammonium phosphate as an alternative source of phosphorus can be used in case DAP is not available.
- Foliar application of zinc heptahydrate (0.5% solution) at anthesis and early milk stage enhances zinc content in wheat grains.
- Application of rice straw biochar @ 5t/ha each to rice and wheat increased the grain yield of rice and wheat and saved 40 kg N/ha.

Rice

- The seedlings of varieties PR 124 and PR 126 gave maximum yield when transplanted at the age of 25-30 days, while PR 121 and PR 122 gave higher yield when transplanted at the age of 30-35 days.
- Neem coated urea at the rate of 90 kg (42 kg N) in lieu of 110 kg ordinary urea (50 kg N) per acre should be applied in transplanted rice.
- Application of 132 kg urea/ha (60 kg N ha^{-1}) should be in three equal splits at 3, 6 and 9 weeks after sowing in direct seeded basmati rice.
- Application of phosphorus to direct-seeded rice should be omitted when previous wheat has received recommended P dose.
- Application of *Azorhizobium* biofertilizerfor enhancing yield in rice.
- Need based N scheduling using leaf colour chart (LCC) for basmati rice.

Cotton

- Drip irrigation and fertigation scheduling in cotton.
- Cyclic use of sodic water with good quality water for sustaining crop productivity in cotton-wheat system.
- Neem based biopesticides namely Nimbecidine and Achook @ 1.0 litre per acre for management of whitefly on cotton.
- Two sprays of magnesium sulphate @ 1.0 per cent for management of leaf reddening.
- Apply 42 kg N/acre (90 kg Neem Coated Urea/acre) in 2 equal splits for Bt cotton hybrids instead of application of 60 kg N/acre.
- Application of Boron @ 400 g/acre in soils low in boron and/or having more than 2% calcium carbonate.



Maize

- Drip irrigation schedule for spring maize saves 40 per cent irrigation water and results in 20-25 per cent higher yield as compared to flood irrigation.
- Organic farming for fodder production in maize-berseem-bajra and maize-berseem-maize+ cowpea cropping system.
- Use Consortium biofertilizer @ 500 g/acre through seed treatment for higher grain yield as well as better soil health.
- In maize-wheat system, do not apply P to both the crops for soil test- P status more than 16 kg/acre.
- Bed planting and furrow irrigation in spring maize save 33 per cent irrigation water as compared to flood irrigation with flat sowing.
- New cropping systems maize/ summer groundnut-*kharif* onion-onion; for crop diversification.

Pulses

- Sow the *kharif* mungbean crop in the second fortnight of July for obtaining higher grain yield.
- Application of new native isolate of *Bradyrhizobium* sp. (LSBR 3 culture) enhances soybean grain yield by 4-8 per cent.
- Application of *Rhizobium* culture as biofertilizer in pigeonpea improves yield by 5-7 per cent.
- Application of consortium culture of *Rhizobium* (LLR 12) and Rhizobacterium (RB 2) in lentil enhances grain yield up to 9%.

Oilseeds

- In boron deficient soil, application of boron @ 1.0 kg /ha enhances yield of raya.
- In case of *gobhi* sarson, apply 80 kg gypsum or 13 kg bentonite-S per acre in sulphur deficient soils.

Sugarcane

- Sub-soiling in sugarcane improves cane yield by 16 % over check where no sub soiling is done.

Vegetables

- Plant two rows of turmeric on 67.5 cm wide beds (37.5 cm bed and 30 cm furrow) with plant to plant spacing of 18 cm.
- Alternate use of saline-sodic ground water with good quality canal irrigation water (1:1) and incorporation of rice straw mulch @ 6 t/ha at sowing is recommended to sustain soil health and to obtain optimum yield of summer crop of okra in light textured soils.
- In pea, drip irrigation resulted in 30% higher yield, 30% water saving and 20% fertilizers saving.
- In turmeric, drip irrigation and fertigation resulted in saving of 33% water and 20% fertilizers, and enhanced yield by 25%.
- In brinjal, drip irrigation with plastic mulch resulted in 70-106% yield increase and with 50% of water saving.
- Application of *Consortium* biofertilizer @ 4 kg/acre as soil application at the time of planting to enhance yield in turmeric, potato and onion and to improve soil health.
- The application of Biozyme @ 8 kg/acre at the time of sowing and again at the time of earthing up followed by foliar spray @ 200 ml/acre improves the yield of potato by 15-20 %.

Fruits

- Nutrition garden plan: 21 different types of fruit plants can be planted in an area of 1.25 *kanal* or 625 m^2 (25m x 25m). This plan is for ensuring the nutritional security and availability of fruits to a family round the year.
- Paddy straw compost @ 150 kg/acre in maize, 6 kg/acre in chilli and 20 kg/tree in guava in the month of May along with the recommended dose of fertilizer improved the yield of these crops.
- Three superimposed foliar applications of potassium nitrate @ 1.5% at 15, 30 and 45 days after full bloom improve the fruit size and yield in semi-soft pear.
- New Propagation technique – wedge grafting, has been developed in mango.
- Two sprays of 15g NAA in 500 litres of water once in 2nd fortnight of October and again in the 2nd fortnight of November reduce the physiological fruit drop in 'Umran' ber.
- Guava (15 years old) can be rejuvenated by heading back trees at 1.5 m from the ground level in March leaving 2-3 primary scaffolds.
- Mango (30 years old) can be rejuvenated by heading back trees at 2 m from the crotch angle (approx. at 3.0 m from the ground level) in first week of January.

Agro Forestry

- Wheat varieties PBW 725, PBW 677 and WH 1105 should be preferred for sowing in poplar plantations. These should be sown in first fortnight of November for getting higher productivity.
- The fertilizer dose, timing and its method of application to plantations of clonal eucalyptus during different growth years were standardized for obtaining higher productivity from plantations.

Plant Protection Technologies

Intensive cultivation practices, as followed in the state encounter serious challenges of insect pests, diseases and weed problems. The University has developed and recommended cost effective, efficient technologies for their management. While developing recommendations, emphasis has been given on judicious use of chemicals which are safe, eco-friendly and are fit for IPM modules. By following IPM approach in various crops, the use of insecticides has been reduced.

Non-chemical measures:

- Mechanical control of rice leaf folder by shaking the plants with the help of coir/ jute rope has been recommended.
- Adoption of cropping sequence cauliflower-onion-okra in place of cauliflower-tomato-okra and growing of onion crop in root knot infested field.
- Management of maize borer on fodder crop with two releases, each of 50,000 per acre of *Trichogramma chilonis* parasitized *Corcyra eggs;* first release at 10 days old crop and second release a week thereafter
- Neem based biopesticides, namely Achook and Nimbecidine @ 1.0 litre/acre have been recommended for the management of whitefly in cotton.
- Delfin WG (bacterial biopesticide) @ 300 g/acre has been recommended against diamond back moth on cole crops.
- MAK Horticulture Mineral Oil spray @ 6.25 litres in 500 litres of water/acre has been recommended in citrus against psylla and aphids.
- Eco-friendly management of termites by burying maize cobs without grains *(Gul)* filled in 24-holed earthen pots of diameter 13 inch, with lid @ 14 per acre in termite infested orchards of pear, ber, peach, grape and amla during first week of April and again during first week of September.
- Eco-friendly management of fruit flies in mango and plum orchards can be done by fixing PAU fruit fly traps @ 16 traps/acre in the 3rd and 2nd week of May, respectively. Recharge the traps, if required.
- Paddy straw mulching in guava orchards for management of weeds, higher fruit yield and quality.
- For management of citrus foot rot/ gummosis, Sodium hypochlorite 5% can be sprayed @ 50 ml per tree in the foot and basin region of the trees during February-March and again during July-August.
- Green chemistry insecticide, Lano 10EC (pyriproxyfen) was recommended for management of whitefly on cotton
- Application of paddy straw mulch @ 6.0 t/ha for weed control in potato, as an alternate to herbicides.
- To manage weeds in organic turmeric apply 100 q/ha paddy straws mulch at the time of planting and if needed, give one hand weeding at 3 months after planting. If straw mulch is not applied then give three hand weedings at 1, 2 and 3 months after planting the crop.

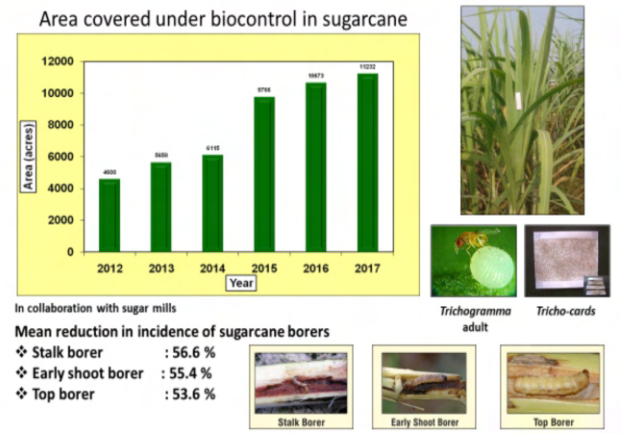
Research efforts have been targeted at refinement of screening techniques, pathogen variability, host resistance, survey and surveillance, decision support systems, and integrated disease management. Biocontrol agents are receiving increasing attention. The production of biocontrol agents at PAU is detailed in Table 3.11.

- Control of foot rot of basmati rice by seed and root dip treatment with biopesticide based on *Trichoderma harzianum* (Licensing agreement with International Panacea Limited New Delhi.
- Treatment of pea seed with talc formulation of *Pseudomonas fluorescens* for the contol of pea wilt.
- *Trichoderma harzianum* recommended for the black scurf of potato.
- Work on biocontrol of foot rot of citrus, potato scab, muskmelon, watermelon and cucumber wilt, guava wilt and damping off in vegetables is in progress.

Table 3.11: Production of biocontrol agents (q) at PAU in last 5 years.

Biocontrol agent	2013-14	2014-15	2015-16	2016-17	2017-18
Trichoderma harzianum	5.53	8.0	8.5	9.0	8.0
Pseudomonas fluorescens	3.0	3.0	3.5	4.0	1.5

Biocontrol: a successful non chemical pest management strategy in sugarcane



Decision support systems for disease and insect pest management: An important aspect of integrated disease management is prevailing and predicted weather conditions and survey of pathogen population including its survival and build up. Weather and survey based integrated rust management system in wheat has been developed and recommended during 2017 to prevent build up of rust epidemics, saving the farmers expense incurred on repeated fungicide use. A similar decision support system along with a mobile app has been developed for cotton whitefly management in 2018.

Chemical measures:

With an emphasis on targeted, green chemistry and CIB approved pesticides, various chemicals have been recommended to the farmers over the last five years and the number of technologies given under different categories is presented in Table 3.12

Table 3.12: Number of chemical based plant protection technologies developed for different crops during 2013-18

Crop	Plant protection technologies		
	Insect pest management	Disease management	Weed management
Wheat	-	2	4
Rice	10	5	8
Cotton	11	-	-
Maize	1	-	1
Pulses	1	1	2
Sugarcane	3	-	1
Fodder	2	-	-
Vegetables	4	3	6
Fruits	2	-	-

Food Processing, Food Engineering and Post Harvest technologies

Processing and value addition is the key to enhancement of farmers' income. It also makes possible the much needed shift in focus from food security to nutritional security. The university research in this field focuses on developing varieties amenable to processing, processing technologies, drying and storage systems, washing and polishing machines, and packaging technologies. Processing technologies aimed at both reducing and recycling waste have also been developed. Due emphasis is laid on promoting entrepreneurship in the field by imparting trainings and handholding.

Apart from the above technologies, the University has collaboratively developed and recommended post harvest technologies specifically involving horticultural produce. This was done jointly with Punjab Horticultural Post-Harvest Technology Centre (PHPTC) and technologies developed in the in the relevan period are listed below.

- Fruits of winter guava *cv.* Sardar harvested at physiological maturity stage can be ripened at 20°C for 72h and these fruits can be kept for 48-72 hrs at ambient conditions in winters.
- Enhancement of shelf life of Daisy mandarin fruits with Citrashine wax helps in improving the appearance and maintaining the fruit quality during transit, storage and marketing for two weeks.
- Daisy fruits harvested at colour break stage develop orange colour in 3-4 days after dip in ethephon @ 1000 ppm for 5 minutes.
- Debittering technology of citrus juices has been

Table 3.13: Food processing technologies developed during 2013 to 2018

S No.	Name of food processing technology	Year
1	Gluten free flour	2013
2	Multi grain flour for diabetics	2013
3	Pure rose syrup	2013
4	Technology for shelf stable ready to serve bottled sugarcane juice	2015
5	Multi grain flour formulation	2015
6	Premix for ready to fry potato snacks	2015
7	Development of naturally fermented baby corn pickle from industrial by-products	2016
8	Technology on processing of mushroom into mushroom powder, chips , chutney and bakery products (muffins, cookies, cakes and bread)	2017
9	Technology of preparation of quinoa bars using jaggery and honey	2017
10	Development of pre-biotic drink-finger millet, oat, double toned milk and rose based functional drink	2017
11	Formulation for maize flour rollable chapatti	2018
12	Development of aloo *bhujia, aloo chakli* and *aloo wari* from common purpose potato varieties	2018

standardized using yeast, *Clavispora lusitaniae*.

- Technology for apple and sugarcane based vinegar production.
- Gluten free flat bread, rollable maize 'chapatti' and utilization of Kinnow products in development of cereal health bars.
- Technologies for the preparation, packaging and preservation of paste and slurry (puree) of onion.

Nutritional aspects of food, processed and otherwise are of paramount importance and the Department of Food Nutrition, works closely with other related departments for this aspect. It conducts nutrition related research which is relevant to a spectrum of technology development from crop varieties to food processing. Recent findings are listed below:

- The total antioxidant activity was the highest in maize among the cereals, black gram among pulses, *bathua* among leafy vegetables and lady's finger among other vegetables and colocassia among roots and tubers.
- Indoor cultivation of wheatgrass was far better than outdoor cultivation in terms of higher protein, ash and crude fat.
- Addition of dehydrated curry leaves powder to traditional fermented foods significantly improved crude protein, fibre, iron, calcium, β-carotene and vitamin C.
- Quinoa based gluten free bakery products, namely cookies, cakes, muffins, pies and tarts were found to be highly acceptable at 10 per cent level of supplementation of quinoa flour with rice and oat flour with an overall acceptability scores of 7.46, 7.54, 7.32, 7.78 and 7.56, respectively on a 9-point hedonic scale. The products had increased nutrient content in terms of protein and fibre.

A large number of processing technologies require extensive engineering interventions and fall in the domain of Department of Processing and food engineering under College of Agricultural Engineering and Technology. The technologies developed are listed in Table 3.14 below

Department of Renewable Energy Engineering has developed processing oriented technologies based on solar energy as listed in the Table 3.15 below:

A brief description of salient engineering based processing technologies:

- **Forced circulation solar dryer (2015):** The dryer uses solar energy for drying of turmeric and is an environment friendly, low cost and efficient technology. It reduces the drying time



Table 3.14: Processing and food engineering technologies developed during 2013 to 2018

S No.	Name of processing and food engineering technology	Year
1	Use of shrink film to enhance shelf life of Kinnow fruit for retail marketing	2013
2	Farm level Fruit & Vegetable Washing Machine	2013
3	Drying of *Kasuri methi*	2014
4	Turmeric washing and polishing machine	2014
5	Enhancing shelf life of peach with packaging films for retail market	2015
6	Enhancing shelf life of bell pepper with packaging films for retail market	2015
7	Portable Maize Dryer of 3 Ton Capacity	2016
8	Drying technology for bitter gourd	2017
9	Design of plastic crate and corrugated fiber board (CFB) box	2017
10	Corrugated Fiber-board Boxes of 2kg, 4kg & 10 kg Capacity for Packaging of Litchi Fruit.	2017
11	Mechanically Ventilated Onion Storage Structure	2017
12	Technology for extending shelf life of fresh black carrot cv. Punjab Black Beauty by Modified Atmosphere Packaging and Storage	2017
13	Corrugated Fiber-board Boxes of 2kg, 4kg (for retail) & 10 kg (for wholesale) Capacity for Packaging of Kinnow Fruit.	2018
14	Technology for development of onion flakes	2018
15	Technology for Enhancing Shelf Life of Fresh Cucumber by Modified Atmosphere Packaging and Storage	2018
16	Agro-commercial Solar Dryer for Vegetables 1-2 Qtl capacity	2018

Table 3.15: Solar energy based technology for processing of agricultural produce

S No.	Name of technology	Year
1	Forced circulation solar dryer	2015
2	Advanced domestic solar dryer	2018

significantly besides enhancing the quality. The PAU has offered non-exclusive rights to Vishivkarma Solar Energy Corporation, Phillaur regarding the manufacturing and selling of the Forced Circulation Solar Dryer, developed by the university.

- **Honey heating-cum-filtration machine (2013):** The PAU has designed and developed a Heating-cum-Filtration Machine that saves time and eases the cumbersome process of heating and filtration of honey under hygienic conditions, as both the processes are achieved simultaneously in one unit.
- **Vegetable washing machine (2013):** The Vegetable Washing Machine designed and developed by the university performs mechanical washing of fruits and vegetables (carrot, potato, reddish, turnip, ginger, okra, tomato, spinach, turnip, kinnow and pears) and can replace the prevalent practice of washing which involves drudgery and unhygienic conditions.

Microbiological Technologies Developed:

- **Bacteriological Water Testing Kit (BWTK) - (2018):** The water testing kit has been developed to detect the presence/absence of total coliforms, faecal coilforms and emerging pathogens from drinking water. BWTK possess all desirable properties of diagnostic test (Affordable, Sensitive, Specific, User-friendly, Rapid and Equipment free).
- **Mushroom Processing Technology (2017):** The technology for processing of mushroom into products like chips, powder, pickles and bakery products i.e. bread, cakes, muffins and cookies has been commercialized.

Portable Maize Dryer



Main Specifications	
Capacity of Dryer (TPH)	3.0
Loading Time (hr)	1.0
Power (Tractor PTO/ Electricity, KW)	15
Drying Air Temperature (°C)	70°C
Diesel Consumption (L/h)	4-2
Drying Time (h)	8-10
Seed Grain Germination (meets ISCS)	Yes

Maize Dryer	With tractor	With electricity
Cost of maize drying (Rs/kg)	2.04	1.50

- **Natural vinegar (2016):** The Department of Microbiology has developed five types of natural vinegars viz., Sugarcane vinegar (2012), Grapes vinegar (2015), Sugarcane-Apple blend vinegar (2018), Apple vinegar (2018) and Jamun vinegar (2018). Approximately 1200 vinegar bottles are being sold every year. One patent has also been obtained for the technology of concentrated sugarcane vinegar production in 2018.
- **PGPR culture (Bio-fertilizer) (2015):** The PAU has granted the rights to the Schiron Crop Sciences Incorporation, Abohar on non-exclusive basis for manufacturing and marketing of the Bio-fertilizer based on the PGPR culture developed by PAU.
- **Consortium Bio-fertilizer (2015):** The PAU has granted the rights to the OMSS3, Patiala for manufacturing and marketing of the Consortium bio-fertilizer developed by PAU on non-exclusive basis. The *application* of consortium bio-fertilizer has been recommended for use in sugarcane, wheat, maize, onion, potato and turmeric crops.
- ***Trichoderma harzianum* strain for biological control of foot rot in basmati rice (2013):** A local strain of *Trichoderma harzianum* showing high level of disease control potential for foot rot of basmati rice has been developed. Foot rot is a serious disease in Basmati crop. This disease is both seed as well as soil borne. The formulation of local strain of *Trichoderma harzianum* minimizes disease attack with the dip treatment of seed and nursery. The technology has recently been licensed with International Panaacea Ltd., New Delhi in 2013. The PAU provides the *Trichoderma* Strain to International Panaacea Limited to undertake further development, manufacture, and market the *Trichoderma* based bio-pesticide.

Farm mechanization technologies

About 45 % of the total farm machinery recommended by ICAR at national level has been developed at PAU. During the reporting period, the University has designed, developed and evaluated a large number of machines and tools thereby facilitating drudgery reduction and large scale mechanization of farm operations in Punjab. A major focus has been machines used for paddy straw management. Farm mechanization technologies developed during 2013-18 are given in table 3.16.

Salient Farm Mechanization Technologies

- **PAU Super Straw Management System (2016):** PAU has developed a straw management system (SMS) for the self-propelled combine harvester. This attachment is fitted at the rear of the combine harvester. It chops and uniformly spreads the loose straw coming out of harvester after processing. After

Table 3.16: Farm mechanization technologies developed during 2013-2018

	Name of technology developed by Department of Farm Machinery and Power Engineering	Year
1	Tractor drawn pick positioner for pruning of trees and plucking of fruits	2013
2	Spatially modified no-till drill	2013
3	Optimum plant spacing's for mechanically transplanted rice (25 hills/m2)	2013
4	Tractor mounted planter for planting of carrot seed on beds	2014
5	Baler for bailing of paddy straw of combine harvested field."	2014
6	Hydraulic brakes for tractor trailer	2014
7	Straw Management System (spreader type)	2014
8	Lucky Seed Drill for seeding and simultaneous application of	

9	PAU Happy Seeder for seeding and simultaneous application of inter row mulch in wheat	2016
10	Backpack type air assisted electrostatic sprayer for cotton for inclusion in Package of Practices	2016
11	AC cabin for Tractor	2016
12	PAU Super SMS	2016
13	PAU Multipurpose High Clearance Sprayer for cotton, potato, sugarcane etc.	2016
14	Auto Rotate Gun type sprayer for cotton, potato, sugarcane etc.	2016
15	PAU Straw Cutter cum Spreader for cutting and Spreading of whole paddy straw	2017
16	Offset Rotavator for fruit, trees and agro-forestry crops	2017
17	PAU Happy Seeder for seeding and simultaneous application of inter row mulch in fodder oats	2017
18	Tractor operated Rotary Weeder	2018



PAU Happy Seeder



PAU Super SMS

operation of PAU Super SMS, wheat can be directly drilled using Happy seeder.

- **PAU Straw Cutter-cum-Spreader (2017):** Existing Stubble Shaver has been modified by improving the cutting system. It is a low cost implement that can be used for chopping and simultaneous spreading the left over straw (loose and standing stubbles) after paddy harvesting with combine harvester.
- **PAU Happy seeder (modified) (2016):** This is used for sowing of wheat in paddy residues in a combine harvested paddy field. The strip of stubble in front of the sowing tines is cut, picked up and placed in between drilled rows as mulch and is pressed by the press wheels.
- **PAU Multipurpose High Clearance Sprayer (2016):** Sprayer having boom and drop up type mechanism along with auto rotating gun has been developed for effective spraying at all growth stages of the crop. It is mounted on high clearance tractor with narrow rear tyres. Cost, labour and time saving by using high clearance



PAU Straw Cutter cum Spreader



PAU Multi-purpose High Clearance Sprayer

sprayer was 66, 95 and 95% respectively as compared to knapsack sprayer.

- **Lucky seed drill (Direct seeding of rice & wheat with spraying attachment) (2015):** It is used for direct drilling of rice & wheat and simultaneous application of pre-emergence weedicides thus avoiding extra operation. The drill consists of inclined plate seed metering mechanism with notched cells, nine furrow openers, a tank, hydraulic pump and nozzles mounted on boom.



Lucky Seed Drill

Department of Soil and Water Engineering has developed technologies for microirrigation-fertigation in different crops, protected cultivation, soilless cultivation and has taken steps toward input efficient, precision agriculture technologies. The technologies developed are listed in Table 3.17

Technology Adoption

The pace of production varies for different technologies. This section highlights adoption of technologies and their impact on productivity, natural resource management, value addition etc,.

Varietal adoption under Major Crop Rotation:

Adoption of recommended varieties of wheat and rice which are grown on about 35 and 30 lakh hectares respectively out of 42 lakh hectares cropped area in the state are a key indicator of technology adoption. The adoption trend of recommended varieties of wheat and rice for the last 5 years are given in Table 3.18.

The adoption of recommended varieties is near complete except for non basmati paddy. In this case also the area under recommended varieties has increased progressively over the years. The situation of partial adoption in this case on account of use of long duration varieties which are relatively high yielding (but not necessarily more profitable) and preferred by farmers. These varieties have not been recommended on account of disease susceptibility as well as greater water requirement. Except for this the varietal adoption situation in wheat and rice shows almost complete coupling of technologies recommended and adopted.

Table 3.17: Soil and water engineering technologies developed during 2013-2018

Name of Technology	Year
Tractor drawn bed former cum-plastic mulching machine	2013
Developed irrigation and fertigation schedule for various vegetable crops and field crops:	
For Wheat	2013
For Spring maize, Brinjal, Pea and Sunflower	2015
For Cotton	2017
Roof top soil less vegetable garden	2018



Rooftop soilless vegetable garden

Table 3.18 : Area (%) covered by PAU recommended varieties in Punjab in last five years (%age of total area under the crop)

Crop	2013-14	2014-15	2015-16	2016-17	2017-18
Wheat	82.8	92.1	95.7	96.9	97.7
Non- Basmati paddy	38.2	42.4	54.5	61.9	68.3
Basmati paddy	89.9	94.9	94.1	95.5	95.2



Increased wheat-rice system productivity on account of adoption of package of practices:

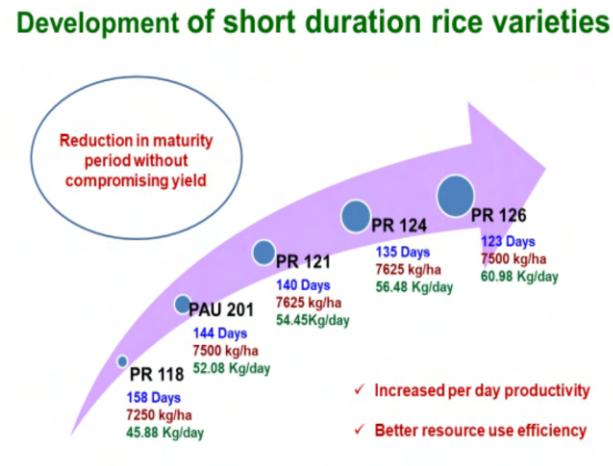
Comparisons of crop productivity are often made across regions and countries and are seen as an index of technology refinement. In case of Punjab state the combined productivity of wheat and non basmati rice have crossed the 12 t/ ha mark as shown in the Table 3.19 below. This is unrivalled anywhere in the world for a region of this size. This reflects the excellent matching of varietal component with production-protection technology in the given agro ecology and its wide spread adoption.

Table 3.19: Breaching the 12 t/ ha threshold in Punjab for food grain production on account of improved varieties, production and protection technologies.

Year	Wheat (Kg/ha)	Paddy-non basmati (Kg/ha)	System productivity (Kg/ha)
2013-14	5017	6410	11427
2014-15	4305	6449	10754
2015-16	4583	6324	10907
2016-17	5046	6593	11639
2017-18	5090	6932	12022

Adoption of short duration varieties of rice; a major water saving technology:

In view of continued predominance of the wheat-rice rotation in deference to national food security needs, a means of water saving has been devised by developing rice varieties which take 3-5 weeks less to mature without significant yield reduction. Adoption of these varieties has been a major highlight of technology dissemination during the last 5 years as shown below:



The progress in adoption of the above depicted short duration varieties over the years is given in the Table 3.20 below:

Table 3.20: Area (%) under short duration rice varieties in Punjab.

2014	2015	2016	2017	2018
41.9	54.2	66.6	74.6	81.9

Adoption of new wheat varieties at State and National Level:

The area under newly released wheat varieties Unnat PBW 343 (2017) and Unnat PBW 550 (2017) as per wheat sowing 2018 in Punjab is about 9 and 5 percent respectively, indicating their quick adoption in the state. Area under PBW 725 (2015) during the 2017-18 crop season was about 15 percent. These varieties are providing diversity on farmer fields to the present popular variety HD 3086 grown in this season on 40 percent area.

The national breeder seed indent is an index of variety's popularity with growers and seed producers. Two PAU varieties (PBW 723, PBW 725) released in this period feature among top five in national wheat seed indent as given in Table 3.21 below:

Table 3.21: Most popular wheat varieties in India (based on National Breeder Seed Indent)

Rank	2018-19	
	Variety	Indent (t)
1	HD 2967	297.3
2	HD 3086	193.6
3	PBW 723	156.9
4	RAJ 4238	95.5
5	PBW 725	74.6
6	LOK 1	60.0
7	HI 6713	46.2
8	GW 366	44.5
9	HI 1544	40.0
10	GW 322	38.7

Integrated pest management in cotton:

During the epidemic year 2015, the cotton productivity went down to 197 kg lint per ha. Successful implementation of integrated pest management involving clean cultivation, ETL based pesticide application, new targeted (non-broad

spectrum) pesticides and advanced mechanized spray technology (Auto rotating gun type sprayer-2017 and PAU Multipurpose high clearance sprayer-2017) led to management of whitefly and other cotton pests in years 2016, 2017 and 2018. A record production of 756 kg lint per ha along with a saving of Rs 2589 kg/ ha on account of reduced use of pesticides was attained in year 2016 as shown in Table 3.22 below. The continued focus on these interventions further led to all time record production of 778 kg lint per ha during 2018.

Table 3.22: Productivity and saving in insecticide use per hectare in cotton in Punjab

Component	2015	2016	2017	2018
Yield (kg lint/ha)	197	756	750	778
Saving (Rs/ha)	-	2589	2808	-

Integrated rust management in wheat:

The technology of Integrated rust management comprising resistant varieties and their regional deployment, surveillance, judicious fungicide application appropriate practices (avoidance of wheat cultivation under poplar) etc., has been widely adopted leading to successful management of rust in all the 5 years under report with substantial curtailing of expenditure on fungicides as well as high productivity.

Paddy Straw Management Technologies:

Paddy straw management emerged as a serious issue on account of wide spread practice of burning the straw to prepare fields for wheat sowing. Soil health and environment pollution fallouts necessitated technologies which manage paddy straw without burning or delay in wheat planting. One such technology, Happy Seeder was recommended in 2006 with relatively low adoption. It was only after development of complementary machines such as PAU Super SMS (2016) and PAU Straw cutter cum spreader (2017) during this period that machine based paddy straw management started picking up. Further modified Happy Seeder with press wheels (2016) and Mould Board Plough (2018) were added to the repertoire of paddy residue management machinery. The adoption of paddy straw management technologies in last 3 years is depicted in the Table 3.24.

During 2016, 102379 burning events were observed through satellite imagery. This number came down to 67079 and 59695 during 2017 and 2018, respectively. Though the reduction in burning events during 2018 was relatively small but most of this was partial burning the extent of burning was far lower than 2017. The use of straw management technology in 2018 particularly mulching and incorporation showed a great jump in adoption.

Crop diversification:

- Varietal releases such as SML 832 (2010) followed by TMB 37 (2017) has led to development of sizeable niche of summer moong in central districts of Punjab with total acreage in state of 17,200 to 48,000 ha during this period.
- Rapeseed and mustard productivity and production have increased from 1306 kg/ ha and 39000 tonnes respectively in 2013-14 to 1511 kg/ha and 45400 tonnes respectively in 2017-18. Release of high yielding and high quality gobhi sarson variety GSC 7 now grown on about 22000 ha contributed to this increase in productivity and production.
- Sugarcane productivity and production have increased from 750 q/ha and 6675 thousand tonnes respectively in 2013-14 to 836 q/ha and

Table 3.23: Use of broad spectrum pesticides and total cost of pesticides used on cotton in Punjab during 2015, 2016 and 2017

Sr.	Insecticide	Rs (2015)	Rs (2016)	Rs (2017)
1	Acephate 75SP	43,579,900	2,286,900	212,500
2	Triazophos 40EC	205,450,000	86,909,200	44,894,800
3	Imidacloprid17.8SL	44,381,600	9,416,800	11,709,900
4	Thiamethoxam 25WG	138,073,000	33,266,000	31,709,000
5	Acetamiprid 20SP	28,222,400	524,800	210,000
	Total sale including above pesticides	1,144,681,550	406,919,850	327,419,800



Table 3.24: Area (ha) under paddy straw management in Punjab

Practice	2016	2017	2018
Mulching (Happy Seeder)	6900	25600	474000
	(0.23)*	(0.85)	(15.8)
Incorporation (Chopper, Rotavator, MB,	5000	18360	610800
Harrow etc)	(0.17)	(0.61)	(20.4)
Collection/ Removal with balers,	602750**	437000**	640800**
manually etc (including Basmati)	(20.09)	(14.57)	(21.3)
Total	614650	480960	1725600
	(20.49)	(16.03)	(57.5)

*Percent of total paddy area given in parenthesis ** Assuming 75% basmati area

8024 thousand tonnes respectively during 2017-18.

- In cotton, the area fluctuated during last 5 years, however, the productivity rose from 572 kg lint/ha (2013-14) to 778 kg lint/ha (2017-18).

Technologies for subsidiary occupations:

Punjab pioneered the introduction of Italian bee *(Apis mellifera)* in 1960's. Presently Punjab is top producer and contributes **39.5%** of national apiary honey (~17,500 tonnes). It has also emerged as hub for apicultural equipment fabrication. With respect to another important subsidiary occupation i.e mushroom cultivation Punjab is ranked as the top producer and contributes about **14%** of total national production (~17,000 tonnes). This level of productivity both in case of honey and mushrooms has become possible due to adoption of PAU technologies disseminated through extensive training programmes.

Expansion of horticultural crop acreage due to improved technologies/varieties

The acreage and production of both vegetables and fruits has grown in a gradual but sustainable manner during the last 5 years (see Table 3.25 below) in response to adequate technological support in form of new varieties and other technologies.

Adoption of technologies for fruit crops:

- **Adoption of new varieties of fruit crops-** Quality fruit nursery plants, produced at PAU are in high demand. To meet the requirement the fruit nursery production has been enhanced from 1.76 to 4.75 lac plants in 2017-18. Among the latest varieties 15,000 plants of PAU Kinnow 1 (less seeded Kinnow) have been sold to progressive farmers of the state in last 2 years. Similarly nursery of Daisy Tangerine and guava varieties such as Shweta, Punjab Safeda and Punjab Kiran are in high demand.
- **Management of *Phytophthora* in citrus (2018)** - *Phytophthora* is a serious problem in citrus orchards. The recommendation of sodium hypochlorite 5 % per tree has been adopted in approximately 1500 acres and revived about 100 Kinnow orchards in the state.
- **Rejuvenation in orchards (2018)** - The PAU recommended technology for rejuvenation of senile guava and mango orchards is being adopted well in the state.

Table 3.25: Area and production of fruits and vegetable crops (2013-18)

Year	Vegetables		Fruits	
	Area (000 ha)	Production	Area (000 ha)	Production (000 tons)
2013-14	203.7	4011	76.6	1541
2014-15	214.4	4240	77.7	1645
2015-16	213.9	4302	85.5	1791
2016-17	245.7	4871	80.0	1700
2017-18	258.5	5136	83.6	1784

- **Fruit Nutrition Garden Model (2016) -** A plan for planting 21 different kinds of fruit plants in an area of 25 m x 25 m (625 sq m) has been recommended by PAU. Till date 150 such gardens have been planted in the state, which include 25 in government institutions and 125 farmers.
- **PAU Fruit Fly traps (2013):** The management of fruit fly in Kinnow, guava, pear, peach and mango has been recommended by PAU. Since its recommendation, 25,926 fruit fly traps have been sold, which have covered about 1620 acres of the area in the state.

Adoption of technologies for vegetable crops:

- **CH-27 (2014)-** A chilli hybrid has become very popular among farmers due to its high yield potential and virus resistance. Presently, it occupies **70% area** under north-western plains of the country. **15 MoA's** have been signed with private industries for its seed multiplication and sale.
- **PBH-3 (2013) & PBH-4 (2015)**- Brinjal hybrids got *tremendous response* from farmers due to its high yield potential and excellent fruit quality. **5 MOAs** have been signed with private industries for its seed multiplication and sale.
- **Matar Ageta-7 (2014)-** Due to its early maturity, this garden pea cultivar fits well in wheat-rice and wheat-maize rotation *and gives extra income to the farmers.*
- **Low tunnel technology-**Recommended for *cucumber and bell pepper has been adopted on more than **4000 ha area** in the state. It helps in getting early and high yield of these vegetable crops.*
- **Protected cultivation-**High yielding indeterminate tomato variety- *Punjab Swarna* (2018), cherry segment tomato varieties- *Punjab Red Cherry (2015), Punjab Sona Cherry* (2017), Punjab Kesar Cherry (2017) and parthenocarpic cucumber variety- Punjab Kheera-1 (2018) are getting popularity among the farmers. About 1200 net houses have come up in the state. The trainings with respect to protected cultivation are being imparted to the growers.

Floriculture

- **Punjab Gainda No 1**- It is a heat tolerant variety of marigold and is gaining popularity as it is first marigold variety which is suitable for summer cultivation.

Biofertilizers

- Biofertilizers have been developed for 17 crops. New *Rhizobium* strains for pigeonpea (2013), soybean (2014), lentil (2015) and mash (2018) have been developed. Consortia for non pulses like wheat, maize, turmeric, potato and onion have been developed which also reduce P requirement. *Azorhizobium* (2017) and *Azospirillum* (2018), free living N fixers, for rice have been developed. Biofertilizer production by PAU has increased from 5 q in 2010-11 to 335 q per year during 2017-18. Biofertilizer for about 64000 acres of wheat crop were provided to the farmers during 2017-18 crop season.

Integrated Nutrient Management

- Focusing on need-based fertilizer use, promotion of biofertilizers, composting technologies, and incorporation of crop residues have contributed towards stabilizing N and P chemical fertilizer use in the state over last 5 years.
- Intensive promotion of PAU technologies during *Kharif* 2018 led to 9 percent decrease in consumption of urea and 16 percent decrease in consumption of DAP, thereby extending an advantage of Rs 200 crore to farmers under *Tandrust* Punjab Mission (Department of Agriculture, Punjab). Omitting P application to Kharif crops as per PAU recommendation played a key role in this saving.
- Neem coated urea- Nitrogen dose for rice, wheat and cotton were reworked for neem coated urea vis a vis ordinary urea. A reduction of 20 kg urea/ acre can be made without sacrificing yield. Recommendations have been made accordingly and adoption is assured on account of availability of only neem coated urea in 45 kg (smaller) bags.

Laser land leveler

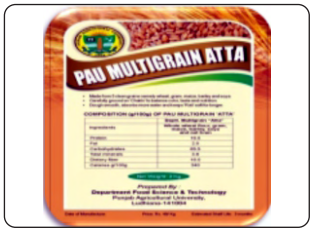
This technology recommended by PAU is presently adopted on 18 lac hectares in the state. About 8000 laser land levelers are available in service provider mode for this purpose. The entire cropped area of the stare is potentially covered through laser leveling in 3 years cycle. This technology provides water saving of about 15 percent.

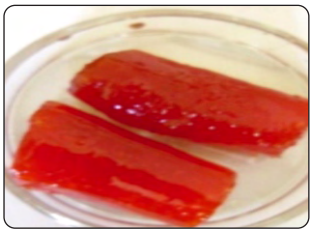
Food processing technologies

- **Bottled Sugarcane Juice (2017):** Technology

for shelf stable ready to serve bottled sugarcane juice has been transferred to Sri Om Sai Sugar Allied Products Pvt. Ltd, Khanpur, (Karnataka). They had trial production of around 5000 bottles. The product received great response from both investors and customers.

- **Blended Juices:** Technologies of blended juices of Kinnow + mango and Kinnow + guava were taken up (2017) for commercialization by state owned corporation- Punjab Agro Juices Limited (PAJL).
- **Dia Flour (2013):** Technology of Dia Flour was transferred to Agrineer Foods, Ludhiana, now known as Overra foods. The monthly sale by the company is around 8-10 tons across India out of which 5-6 tons is within Punjab.
- **Pure Rose Syrup (2013):** Technology for large scale production transferred to Shergill Agricultural Farm, Patiala. They are producing around 2500 boxes with 30,000 bottles of rose syrup and 30,000 bottles of rose water during the season. The products are high in demand in state of Punjab.







Agroprocessing complexes: More than 300 primary agro-processing complexes and large number of single units in rural areas set up with due guidance from PAU. These agro-processing complexes are a remarkable example in placing farmers at all the three steps of grower-processor-retailer in a value chain.

Societal behaviour

- The slogan *"Saade Viah, Saade Bhog, Na Karza, Na Chinta Rog"* (Have simple marriages and social ceremonies, incur no debt neither worry) coined by PAU has evinced massive response from the farmers of the state. Capacity building initiatives taken under ICAR-NASF project have led to the adoption of resolutions of not spending lavishly on weddings and other social ceremonies by about 200 village panchayats, mainly in cotton belt of Punjab. In order to counsel distressed farmers, 232 rural youths have been trained as para - professionals.

6.6.3.4 Research Publications

The agricultural research conducted in the different areas such as basic and applied fields has been published by the faculty in the journals of international and national repute. 1347 research papers (NAAS ranking 5 or more) during the period under report have been published (Annexure III).

6.6.3.5 Innovation and Best Practices

Innovations in research have helped the University to enter into cutting edge areas and bring forth solutions to several challenging problems. Salient innovations and advances in research orientation and strategy in different areas are listed:

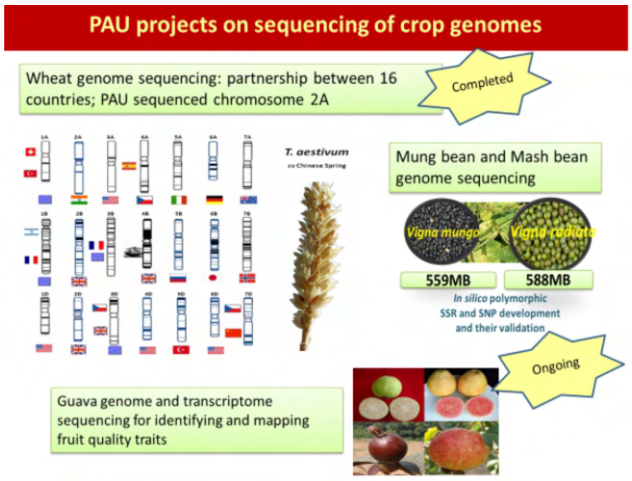
Plant Molecular Biology and Biotechnology

Genome sequencing and transcriptomics:

The 'International Wheat Genome Sequencing Consortium' supported wheat genome sequencing project (Physical Mapping and Sample Sequencing of Wheat Chromosome 2A) that concluded at PAU in 2016, helped PAU graduate in terms of human resource and infrastructure into the crop genomics research zone. Ongoing projects now include genome sequencing and marker development in mungbean, genome sequencing and transcriptomics of guava, besides projects on sequencing parts of leaf and stripe rust pathogens of wheat and rice bacterial leaf blight strains.

Molecular marker tagging and transfer of genes in wheat and rice

Marker assisted selection has come to be routinely practiced in wheat and rice. Unnat PBW 343, released in 2017 at national level is the first wheat variety in the country, developed through



marker assisted back cross breeding. It carries multiple rust resistance genes from wild species *(Ae. ventricosa, Ae. umbellulata), with some of the genes (Lr76 and Yr 70) originating from in-house research. Other MAS based varieties include rust resistant wheat Unnat* PBW 550 and bacterial blight resistant rice PR 121, PR 122 and PR 124. Important genes for which marker assisted selection is being practiced in wheat and rice are listed in Table 3.26.

Genome editing:

Several new projects are being pursued for targeted modification of economically important genes in major crops. In wheat knockouts of *Asparagine synthase* I (responsible for neurotoxin in acrylamide in grain), gliadin genes (contributing to celiac disease) and starch branching enzyme II (leading to high glycemic index) is being attempted. In rice knockouts of gene for phospholipase D (resulting in rancidity of bran oil) and *Mtl* I locus (related to haploid induction) is underway. *Mtl* I knockout is also being attempted in maize to bring the haploid induction trait in adapted background.

Cotton transgenics for boll worm and whitefly resistance:

- Conversion of American cotton hybrids to Boll Guard II having *cry 1Ac* and *cry 2Ab* genes (MON 15985 event) is in progress (under MOU with Gujrat Seeds Corporation).
- Boll guard II version of PAU Cotton Leaf Curl Virus resistant cotton hybrid, LHH 144 BG II is being evaluated in multilocation trials at Bathinda, Faridkot and Abohar
- Event Tg2E13 carrying Cry1Ac in Cocker 310FR background has been obtained from Delhi University to develop American cotton varieties and hybrids. BC3 was planted under contained conditions for further backcrossing in 2016-17.
- Whitefly resistant transgenic American cotton genotype *(Tma 12* event carrying gene from *Tectariama crodonta* – an edible fern).

Biotechnological interventions in maize, pulses and oilseeds:

- Four maize inbred lines converted to QPM maize using marker assisted selection and are being improved for high beta-carotene. QTLs for bacterial stalk rot, southern leaf blight and *Fusarium stalk* rot resistance have been mapped.
- The QTLs identified for water logging are being fine mapped using maize genome sequence information. The QTLs for resistance to shoot fly have been mapped on chromosomes 3, 9 and 10 and Maydis leaf blight on chromosomes 3, 8, 9. The favourable beta-carotene alleles are being introgressed into four Quality Protein Maize (QPM) lines, using MAS technology.
- Pigeonpea transgenics using *Cry1Ac* gene for pod borer *(Helicoverpa armigera)* resistance have been developed through in planta method, in variety PAU 881. *In vitro* insect bioassay for pod borer was carried out on six real time PCR (RT-PCR) positive plants. In two T2 transgenic plants with the highest gene expression, 98% larval mortality was observed

Table 3.26: Important genes for which marker assisted selection is being practiced in wheat and rice.

Wheat	
Traits	**Genes**
Leaf rust, Stripe rust	*Lr57, Lr58, Lr76, Yr40, Yr70, Lr24, Lr28, Yr10, Yr15*
Grain protein content	*GpcB1*
Drought tolerance	*Multiple QTL*
Powdery mildew	*PmTb7A.1, PmTb7A.2*
Grain weight	*GW_RS111*

Rice	
Traits	**Genes**
Bacterial blight resistance	*xa5, xa13, Xa21, Xa38*
Plant height and aroma	*Sd1 and BADH2*
Brown plant hopper resistance	*Bph32t, Bph34*
Grain number	*Qspp2.1*



on the pods and 100% on leaves. Marker assisted selection is being conducted for *Cry1Ac* gene in chickpea for developing pod borer resistant genotypes.

Biotechnological interventions in Brassica oilseeds:

- The first source of resistance against *Sclerotinia sclerotiorum* in Brassica has been identified in wild species *Erucastrum cardamonoides*
- MAS for low erucic acid, low glucosinolates and white rust resistance is being carried out for accelerated quality breeding in Brassica.
- Gene based marker was developed and is being used for MAS for fertility restoration in Ogura based CMS system in *B. juncea* and *B. napus*.
- Discovery and mapping of *Brassica juncea Sdt 1* gene associated with determinate plant growth habit.
- Mapping resistance responses to *Sclerotinia* infestation in introgression lines of *Brassica juncea* carrying genomic segments from wild species *B. fruticulosa*.
- Development and molecular-genetic characterization of a stable *Brassica* allohexaploid.
- Heterosis as investigated in terms of polyploidy and genetic diversity using designed Brassica *juncea* amphiploid and its progenitor diploid species.
- Development and characterization of *Brassica juncea fruticulosa* introgression lines exhibiting resistance to mustard aphid *(Lipaphisery simi Kalt)*.

Strengthening breeding of horticultural crops and biotechnological initiatives:

- Breeding for fruit trees has paid off well at PAU resulting in major successes such as seedless Kinnow PAU Kinnow 1, pink fleshed soft seeded guava Punjab Kiran and high TSS guava Punjab Safeda. Extensive wide hybridization work has been taken up in citrus under ICAR-Niche Area of Excellence project underway at PAU Regional Research Station, Abohar. *Phytophthora* resistant transgenics of Kinnow root stock, rough lemon have been produced using genes cloned in house. Genome and transcriptome sequencing is in progress in guava under a DBT project. In vegetable crops, the breeding methodology (Table 3.27) now integrates the use of molecular markers e.g. marker assisted selection for male sterility (onion & chilli) and virus resistance (tomato & chilli).

Table 3.27: Biotechnological initiatives in vegetable and fruit crops.

Sr No	Crop	Focus Trait	Biotechnology Approach
	Vegetables		
1	Chillies	Male sterility Leaf curl virus, Fruit length	Marker assisted selection Gene mapping
2	Bitter Gourd	Cucumber Mosaic Virus Nematode resistance	Wide hybridization and gene mapping Wide hybridization and gene mapping
3	Musk Melon	Male sterility Haploid production	Gene mapping Pollen culture
4	Tomato	Late blight, leaf curl virus, root knot nematode	Marker assisted selection
	Fruits		
5	Citrus	Phytophtora resistance Seedlessness Bitterness (Kinnow)	Transgenics using *Trichoderma harzinanum* cloned in house Gene Identification Gene Identification
6	Guava	Guava wilt Coloured fruit Fruit fly resistance	Cisgenesis Gene mapping RNAi
7	Mango	Irregular bearing	Gene expression

Doubled haploid technology in crop improvement:

- Accelerated breeding is acquiring great significance in view of situations requiring urgent genetic amelioration. Doubled haploid (DH) technology allows derivation of inbred lines directly (within a single season) from F1 generation, thus bypassing the protracted selfing phase (F2 to F7 or more advanced generations) involving about 5 to 6 years. At PAU, wheat, maize, rice and oilseed Brassica spp. are being targeted for application of doubled haploid technology. In wheat elite crosses are being used for wheat x maize cross facilitated doubled haploid (DH) production and several DH lines are at advanced stages of yield testing. The synergy of molecular marker and haploid technology is also being exploited. In case of maize haploid induction has been initiated and is based on use of recently acquired haploid inducer maize genotypes. Anther and microspore based protocols for rice and *Brassica* DH production have been standardized and breeding applications are envisaged.

Developing varieties suitable for natural resource conservation and value addition:

- Breeding programmes in different crops are now aiming beyond productivity and resistance. A recent success has been the development and adoption of short duration and low biomass rice varieties such as PR 121, PR124, PR 126 (detailed in a previous section) as an important ground water saving intervention. These varieties cut off 3 to 5 weeks from crop duration without a serious yield disadvantage. Their economics is favourable if we take pesticide use and ease of machine paddy straw management into consideration. These also facilitate a third crop option such as peas and potato. Short duration rice varieties now occupy 74 % of rice acreage.
- Another advance has been the development of varieties for processing and nutritional needs e.g., high anthocyanin carrot Punjab Black Beauty (2013), canola oil quality Gobhi Sarson GSC7 (2014), less seeded PAU Kinnow 1 (2014), Canola quality) raya RLC 3 (2016), high carotene Punjab Kesar Cherry Tomato (2017), high grain zinc wheat PBW 1 Zn (2017), Seedless Punjab Kheera 1 (2018), hull less seeded pumpkin PAU Magaz Kaddu 1 (2018), pink fleshed soft seeded guava Punjab Kiran (2018), high TSS white onion PWO 35 (2019)



Nutrient management

- Inductively coupled plasma mass spectroscopy (ICP-MS) technique is being employed to monitor ultra-low concentrations of pollutant and micronutrient elements in soils.
- Plant based nutrient application is the key to precision fertilizer application. Optical sensor (Green Seeker™) based technology has been developed and recommended to prescribe N fertilizer dose to increase N efficiency in wheat.

Biofertilizers:

Due emphasis has been laid on developing biofertilizers to reduce dependence on or to complement chemical fertilizers. Biofertilizers have been recommended for 17 crops:

- New *Rhizobium* strains for pigeonpea (2013), soybean (2014), lentil (2015) and mash (2018)
- Consortium for non-pulses (2015) (wheat, maize, turmeric, potato and onion)-also reduces P requirement
- *Azorhizobium* (2017) and *Azospirillum* (2018) (free living N fixer) in rice

Soil organic matter and carbon sequestration:

- Use of Reflectance Spectroscopy is being explored to develop more rapid, economical and reproducible methods of assessing soil organic carbon and other fertility parameters.

Management of salinity affected water logged soils:

The university played a pioneering role in bringing under plough 6 lakh ha of salt affected soils under plough during 1970-80. However, water-logging induced salinity is a concern in South-western districts. One hotspot in this area has been



Village Rattakhera: Before (A) and after adoption (B) by PAU.

adopted by the University (village RattaKhera) for demonstration of technologies since 2013.

An innovative technology for raising Eucalyptus under water logged saline conditions was standardized and demonstrated. Salinity tolerant basmati rice CSR 30 has been released on basis of its performance, while in wheat a salinity tolerant variety KRL 210 has been identified. In sugarcane, outstanding performance of variety CoPb 91 has been recorded.

Spray technology for white fly management in cotton

In order to enhance profitability of farming system, innovations in Farm Machinery and Power Engineering are necessary. At PAU, new machinery for precision spraying has been recommended, which besides saving cost makes the spray operation more effective. The Auto Rotating Gun Type Sprayer sprays insecticides on the crop (on upper and lower portion of the leaves simultaneously) leaving no escape for insects. Similarly, the high clearance sprayers have been developed for tall crops like cotton, pigeon pea etc., making spraying an effective operation since manual sprays are very difficult in these crops.

Paddy straw management machinery

In order to reduce pollution and improve air quality, burning of paddy straw was banned. Management of paddy straw residue posed as gigantic task with more than 20 million tons of straw in the fields and availability of short window for sowing of wheat. PAU accepting the challenge, developed an innovative way of managing straw through the use of PAU Super SMS (attached to combine harvesters), followed by direct sowing of wheat with Happy Seeder.

Portable Maize Dryer

Maize harvested from the farmer's field arrives in the grain markets with high moisture content. Though, the government had installed maize driers, but these have not been successfully utilized because of their large capacity (16 tons). PAU innovated a portable maize drier (3 tons capacity) which can be used right at farmers' fields, thus ensuring supply of corn at appropriate moisture in the market.

Using Unmanned Aerial Vehicles (UAVs)/drones to monitor crop health-a step towards precision agriculture

- Project initiated in collaboration with industry Techbaaz Innovation Pvt. Ltd. Mumbai in 2015-16
- Health assessment of wheat and cotton crop taken up
- Images from UAV mounted NIR camera, NDVI data from Green Seeker and Spectral signatures using ASD Spectroradiometer obtained.
- Relationships established between spectral reflectance data and different treatments like stresses due to nitrogen and insects/pest attack, lodging etc.

Subsurface microirrigation-fertigation technology

- Initially taken up for fruit plants and high value vegetables, this technology has been standardized for major field crops as well. Sub surface drip irrigation system holds promise in field crops and recommendations have been given for entire cropping systems. Further sensor based automation is being integrated into this system for greater precision and economy. A tractor mounted subsurface drip line layer has also been developed. The salient recommendations along with water saving and yield advantage are given below in Table 3.28.

Table 3.28: Water saving and yield advantage in drip irrigation technology.

Cropping System/crop	Water saving (%)	Yield advantage (%)
Wheat-maize	53	9
Wheat-rice	47	2
Sugarcane	30	23

***In situ* paddy straw degradation**

- Eight microbial cultures from national and international sources are under testing. The objective is to cut down decomposition time

from the current 40-42 days to about 20 days so as to facilitate sowing of wheat crop with conventional seed drill. Promising results, though much short of the 20 day objective have been achieved by PAU *Delfitia* strain and PAU consortium.

Nanotechnology initiatives

- Urea-chitosan nano fertilizer improved growth and chlorophyll content.100% tuber yield was obtained by use of nano-chitosan urea at 75% of the recommended dose of N fertilizer. No negative effect was observed on soil microflora as depicted by soil dehydrogenase enzyme activity.
- Ongoing research- Seed priming and coating with nano zinc in maize and rice, Coating of fruits with essential oil nano emulsions, de contamination of heavy metal ions by carbon nano materials, nano emulsions for enhancing shelf life in tomato.

Protected cultivation

The development of an appropriate package of practices for protected cultivation of horticulture crops has been one of the research areas in the last 5 years. Package of practices for fruits like papaya Red Lady 786 and vegetables like cucumber, tomato and capsicum has been developed. While, for grapes, orchids and vanilla it is in progress.

Pesticide bioremediation studies:

- Pesticide Residue Analysis Laboratory of PAU (first laboratory among SAUs to be accredited by the NABL) conducted dissipation studies on 75 crop-pesticide combinations to work out waiting periods and the data submitted to national regulatory authorities for fixation of maximum residue limits (MRL). Bioremediation study (2014 onwards) of different insecticides revealed that four bacterial species *(Bacillus thuringiensis, Brevibacterium figoritolerans, B. acropushil* and *Pseudomonas fulva)* could be used as potent degraders of commonly used insecticides *(imidacloprid, phorate, thiomethaxam, fipronil* and *endosulfan)* residues in soil.

Honey bee research:

- Five new bee species have been recorded namely, one for the first time from India, viz., Andrena agilissima, and four from the Punjab, *viz., Tetragonula iridipennis, Megachile anthracina, Megachile creusa* and *Megachile ramakrishnae* (2014). Nesting behaviour of stingless bee, *Tetragonula iridipennis,* its bee flora and overwintering were studied and its successful domiciliation accomplished in baby mating hives of *Apis mellifera* and in a plastic pipe.
- PAU pioneered the introduction of *Apis mellifera* bees in the country in 1960s and Punjab continues to lead the country by producing 37% of country's honey. Phenotyping studies (2015-16) revealed that the hygienic colonies group took an average of 25.71 h and non-hygienic colonies took 47.33 h to achieve 100 per cent removal of Varroa infested brood. Molecular studies carried out to characterize and select hygienic colonies revealed that the molecular marker based grouping pattern of the hygienic and non-hygienic colonies remained distinct over brood cycles. Sequencing of the PCR amplicons in one of the test four genes, viz. GB19509 showed 6 differential SNPs between hygienic and non-hygienic colonies.

RNA*i* for the management of insect-pests and diseases

- **RNA*i* for whitefly:** Different potential targets of whitefly are being identified, which can be used in future to develop RNA*i* based transgenics or dsRNA based formulations. These targets include vital genes associated with osmoregulation (aquaporins, diuretic hormone and calcitonin like receptor), moulting associated genes such as ECRs and virus transmission associated genes (heat shock proteins). Besides these sucrose transporters, vitellogenin, IAP (inhibitor of apoptosis) and other genes associated with vital processes are being evaluated through dsRNA feeding assays for their efficacy against whitefly.
- **Using Nanoparticles for the Delivery of dsRNA in whitefly:** Feeding RNAi efficiency in whitefly, dsRNA targeting potential genes (Hsp70, Snf7 and IAP) has been improved by conjugating with chitosan and carbon quantum dots (CQD) and feeding it to the whitefly through membrane feeding assay.
- **RNA*i* in cotton jassid:** Many genes have been also been screened for first time in cotton jassid using RNAi technology. We are in process of identifying potential genes in jassid which can



be used in future for its management through transgenic or dsRNA formulation.

- **Mass production of dsRNA in bacterial cells:** The dsRNA expressed in vector L4440 and finally transformed in bacterial cells HT115 cells is being used to produce large scale dsRNA. The heat killed bacteria containing dsRNA against target gene will be used to spray on the crop against the target pest.

Development and commercialization of processing technologies:

Sugarcane juice technology (2017): Using an innovative thermal processing, no preservative technology, a sugarcane juice bottling system with 1 year shelf life at room temperature has been developed and commercialized.

A research based approach to prevent farmers' suicides:

Under the ICAR- National Agriculture Science Fund (NASF) project various strategies are being adopted to understand psycho-social issues and devise interventions. stigmatizing mental health issues. Six-D (Debt, Depression, Drugs, Death, Disputes & Diseases) cyclic model of triggering and confounding factors has been developed. Interpersonal stressors are the foremost reason of suicides (as per field notes, case studies). Sensitizing media for responsible reporting of suicides (report but not publicize) has been one of the initiatives. Large scale engagement of farmers through literature, mass and one to one contact has made headway. More than 200 village panchayats have adopted resolutions for simplicity in organizing social functions. About 230 rural youth have been given para-professional training as counsellors.

The above items provide a non-exhaustive listing of research innovations being pursued in different departments. The thrust has been on multidisciplinary efforts targeted to current and emerging issues of agriculture in the region as well as harnessing of latest technologies to improve the power and reach of the interventions.

6.6.3.6 IPR Cell/ITMU

The University has a Technology Marketing and IPR Cell with the responsibilities of filing of the IPR issues i.e. patents, copyrights, PPV&FRA. This cell also helps in the commercialization of the technologies developed by various Departments established in different colleges of the University. MoA and MoU signing with different firms/companies is also the function of this cell. The University has filed 24 patents (Table 3.29) since 2013 and 4 have been granted (one filed in 2006).Two copyrights (Table 3.30) too have been registered.

Table 3.29: Applications filed under Indian Patent Act, 1970 and Patents granted.

Sr. No.	Invention	Department	Application No.
2013-14			
1.	Process Technology for Utilization of Digested Biogas Slurry for Cellulase production	School of Energy Studies for Agriculture	1711/MUM/2013
2.	Zinc in clay-mineral receptacles in nanoforms for their use as advance materials including novel fertilizer	Department of Soil Science and EMN Laboratory	2093/DEL/2013
3.	Heel Pushed Dual Foot Operated Sugarcane Bud Chipping Apparatus	FASS, Kapurthala	218/DEL/2014
4.	Nanofabrication Process Involving Clay Minerals As Receptacles For Manufacturing Advance Nano materials Including Novel Fertilizer (Process)	Electron Microscopy and Nanoscience Laboratory	959/DEL/2014
5.	Nanofabrication of phosphorous on kaolin mineral receptacles	Electron Microscopy and Nanoscience	989/DEL/2014

6.	Benefication of phosphate rock for the segregation of phosphorus containing heavy metal free minerals	Electron Microscopy and Nanoscience Laboratory	1042/DEL/2014
7.	A Nutritional Supplement Composition for Metabolic Syndrome'	Department of Food and Nutrition	614/DEL/2015
8.	Flour composition of gluten free food grain	Department of Food Science and Technology	768/DEL/2015
9.	A gluten free whole grain flour composition and food product	Department of Food Science and Technology	914/DEL/2015
2015-16			
10.	Pollen Collector-cum-pollinator for research and commercial use in agriculture	Department of Vegetable Science	949/DEL/2015
11.	Fermentation process for enhanced glucose production from sweet sorghum bagasse using acidothermophilic fungal cellulases	Department of Microbiology	984/DEL/2015
12.	Bioprocess for production and purification α-L-rhamnosidase to convert bitter naringin to non-bitter rhamnose and pruning in citrus juice	Department of Microbiology	1359/DEL/2015
13.	A fungal consortium for degradation of lignin and or silica, process therefore and application thereof	Department of Microbiology	1514/DEL/2015
14.	Improved water and nutrient perforation and re-circulation system for pot based substrate hydroponics	Department of Mechanical Engineering	1567/DEL/2015
15.	Paddy Straw Bale Combustor or Geyser	College of Agricultural Engineering and Technology	2038/DEL/2015
2016-17			
16.	Straw Cutter-cum-Spreader	Department of Farm Machinery and Power Engineering	201711009894
17.	Electronic Soil Disinfector	Department of Plant Pathology	TEMP/E-1/7957/2017-DEL
18.	A hybrid combine harvester	Department of Farm Power and Machinery Standard Agricultural Works (Regd.), Handiaya, Department of Farm Power and Machinery, Registrar and Department of Farm Power and Machinery	Patent granted on 28/02/2017 & number : 280778



19.	A Novel Spraying Attachment For Seed Drill And/or Multi crop Planter	Department of Farm Machinery and Power Engineering	TEMP/E-1/16082/2017-DEL
20.	Bacteriological food testing kit (BFTK) for rapid and efficient detection of presence/absence of recurrent indicator and emerging pathogens in food sample	Department of Microbiology	201711032209
21.	Portable Maize Dryer	Departments of Processing and Food Engineering and Farm Machinery and Power Engineering	TEMP/E-1/33427/2017-DEL
22.	Biomass Incorporator	Department of Farm Machinery and Power Engineering	201811037830
23.	Molasses Based Microbial Fertilizer And Method Thereof	Department of Microbiology	201811039891
24.	Conveyer Belt Type Mechanical Feeding System for Axial Flow (Paddy Thresher)	Department of Farm Machinery and Power Engineering and	201811046415

Table 3.30: List of applications filed for registration under Copyright Act, 1957.

Sr. No.	Diary Number	Class of work	Title of work	Applicant Name	Communication address	Status
1	L-47275/ 2013	Literary/ Dramatic	Expert System for Precision Computation of Automatic Weather Station Data.	Rohit Sharma & Harinder Singh	Department of Processing and Food Engineering & Deputy Director (Trg), KVK, Fatehgarh Sahib	Registered
2	13652/ 2016-CO/L	Literary/ Dramatic	Pump Selection	Dr A K Jain	Professor, Department of Soil and Water Engineering, PAU, Ludhiana	Re-Scrutiny

Technologies Developed and Commercialized

PAU has developed and recommended several technologies which have been well received by the farmers and industrialists. Tie up with agro industry has been developed for licensing technologies such as improved seeds, farm machinery, processing technologies and biopesticides etc. The University has commercialized 36 technologies to 178 stake holders (Table 3.31).

Table 3.31: Technologies Developed and Commercialized from 2013-14 to 2017-18

Name of Technology	No
Food Science and Technology	
Multigrain Atta for Diabetics	2
Multigrain Instant Porridge	1

	Gluten Free Atta	2
	Kadhu Di Chutney Technology	1
	PAU Punjabi Mixed Tadka Technology	1
	PAU Quinoa Bars Technology	1
	Premix for ready to Fry potato snacks	1
	Probiotic Beverage from Black Carrots	1
Microbiology		
	Apple Cider (Vinegar)	1
	Bacteriological Water Testing Kit Technology	1
	Bottling of Sugarcane Juice Technology	1
	Consortium bio fertilizers	
	Fermented Beverage from Fruit and Vegetable Juices	
	Mushroom Processing and its Use in Value Addition	1
	PGPR (Plant Growth Promoting Rhizobacteria)	1
	Trichoderma	1
	CH 27 (Chilli hybrid)	8
	Brijal hybrid PBHR-42	1
	Brinjal Hybrid PBH-3	2
	Brinjal Hybrid PBH-4	1
	Muskmelon MH-27	2
	Onion PRO-6	1
	Hybrid Lines Mustard	1
	Pumpkin hybrid PPH-1	1
	Pumpkin hybrid PPH-2	1
Plant Breeding		
	Maize PMH-5	1
	Maize PMH-6	1
	PMH-1 Maize hybrid	1
Soil Science		
	PAU Leaf Colour Chart	1
Farm Machinery and Power Engineering		
	PAU Super SMS	121
	Lucky Seed Drill Technology	1
	PAU Cutter-cum-Spreader	5
	PAU Happy Seeder	4
	Straw Cutter-cum-Milcher	1
	Vegetable washing machine	1
Processing and Food Engineering		
	Honey heating-cum-filtration machine	1



Department of Renewable Energy Engineering	
Forced Circulation Solar Dryer	1
Clothing and Textiles	
Aromatherapic Textile Products	1
CKD Kits for Poly net House	1
Total MOUs Signed	178

Meetings conducted by TM & IPR Cell:

The details of meetings conducted (Table 3.32) by Technology Marketing and Intellectual Property Right Cell (TMI&PR) are as below:

Table 3.32 : List of meetings held at TMI&PR cell of Punjab Agricultural University, Ludhiana in last 3 years.

Sr.No	Date	Major Recommendations
1.	10.04.2015	Regarding ISO 9001: 2008 certification of PAU approved
2.	07.05.2015	Terms and conditions for commercialization of PGPR approved
3.	06.07.2015	Assessment of technology for filing the patent
4.	04.08.2015	Commercialization of Multigrain Atta, Gluten Free Atta & Multigrain Instant Porridge
5.	29.10.2015	MoU between Maharashtra State Seed Corporation Ltd. & PAU, LDH for seed production of Maize Hybrid PMH-1
6.	10.07.2015	Commercialization of Tractor operated Garlic Planter, Lucky Seed Drill/Multi crop Planter and Expert System for Precision Computation of Automatic Weather Station Data
7.	04.08.2015	Commercialization of Forced Circulation Solar Dryer
8.	19.10.2015	Commercialization of vegetable varieties/hybrids
9.	14.12.2015	Commercialization of vegetable varieties/hybrids
10.	04.04.2016	MoU for Seed production of moong variety SML 668 under PPP
11.	06.06.2016	Assignment Deed with NRDC, Seed production of Sorghum Hybrid PSC-4 under PPP, MoU between Smart Crop and PAU regarding Mobile App, MoU between Khalsa College, Amritsar and PAU for Seed Production
12.	08.07.2016	Commercialization of recommended maize hybrids for seed production by private/public sector companies
13.	11.08.2016	Assessment of technology for filing the patent
14.	20.10.2016	Commercialization of products/technologies developed by PAU
15.	24.10.2016	Evaluation of the software for filing copyright
16.	15.11.2016	Commercialization of natural vinegar production technology
17.	18.11.2016	Assessment of technology for filing the patent
18.	08.12.2016	Commercialization of sugarcane and grapes natural vinegar production technologies and technology of multigrain atta for diabetics
19.	08.02.2017	Commercialization of Lucky Seed Drill Technology
20.	11.04.2017	Assessment of technology for filing the patent
21.	19.05.2017	Commercialization of Mushroom Processing and its use in value addition, Kaddu Chutney, Lauki Juice and Thickening of Syrups Technology
22.	29.06.2017	Commercialization of Super Straw Management System

23.	06.07.2017	Commercialization of PAU Cutter-cum-Spreader Technology, Black carrots for Kanji Beverages and naturally carbonated beverages from fruit juice texchnologies
24.	19.07.2017	Commercialization of making of Aloe Vera Juice and its Preservation Technology
25.	23.08.2017	Commercialization of PAU Quinoa Bars technology and PAU Punjabi Mixed Tadka Technology
26.	30.08.2017	Evaluation of the software for filing copyright
27.	26.09.2017	Commercialization of Kabuli Chickpea L 552 and Chilli Hybrid CH 27
28.	02.01.2018	Evaluation of the technology for filing the patent
29.	04.01.2018	Commercialization of water testing kit technology
30.	05.02.2018	Commercialization of Happy Seeder Technology
31.	26.03.2018	Assessment of process for filing the patent
32.	11.04.2018	Commercialization of Leaf colour chart (wheat and rice) and vinegar/cidar (Apple wine) Technologies
33.	02.05.2018	Commercialization of Prebiotic drink: Finger Millet, Oat, Double Toned and Rose based Drink Technology
34.	09.05.2018	Commercialization of Punjab Sweet Corn 1, Parkash hybrid and baby corn lines
35.	21.05.2018	Commercialization of Pear Juice and Beverages Processing Technology
36.	18.06.2018	Commercialization of Straw Chopper-cum-Spreader/Mulcher

6.6.3.7 Central Instrumentation Unit

The University does not have a single Central Instrumentation Unit but several central facilities which cater to various research, analytical and other necessities of the graduate students and the faculty members. These facilities are as follows:-

1. NABL accredited pesticide residue laboratory

The NABL accredited pesticide residue analysis laboratory functions as the 'Referral Lab' for agrochemicals residue analyses at the national level. This laboratory was established in 1968 under the guidance of Dr H.R. Krueger from Ohio State University, USA. It is equipped with latest sophisticated instruments like Gas Liquid Chromatographs (GLC), Gas Chromatograph-Mass Spectrometry (GC-MS), High Performance Liquid Chromatograph (HPLC), Liquid Chromatograph-Mass Spectrometry (LC-MS/MS), Solid Phase Extraction (SPE), High Performance Thin Layer Chromatograph (HPTLC), and other accessory equipments required for preparation and processing of the samples for the analysis. The laboratory has contributed for the development and validation of simple, cost effective and reliable methodology for the estimation of pesticide residues in different commodities.

2. Food analytical laboratory

This laboratory caters to analysis of various types of raw and processed food samples with the use of several analytical equipment, including the Fibre tech, Water Activity meter, Spectrophotometer, Salt Analyzer, Rapid ViscoAnalyzer, Differential Scanning Calorimeter, Gas Analyzer, MoistureAnalyzer and Instant Analyzer. Another central facility, Food Industry Business Incubation Centre (FIBIC) was established in the year 2015. The main objective of FIBIC is to develop and upscale technologies for processing and value addition of agricultural produce, provide hands on training, incubational facilities and development of entrepreneurship skills so as to minimize post-harvest losses and to manage the glut of perishable crops. This central facility has specialized types of equipment such as forced convection oven, oven stream series, burst strength analyser which are required for performing different food analysis.

3. Irradiation laboratory

The laboratory houses a Gamma Chamber (model GC 2000) established in the year 2009



which has been operational to carry out radiation breeding research for various crop plants in different departments of the university.

4. Plant tissue culture and genetic transformation facility

The plant tissue culture and genetic transformation facility hosts students from various departments of the University for their post-graduate research. The facility supports research on various aspects of plant tissue culture on vegetable, horticultural, field, forest and floricultural crops. In addition, the gene transfer facility is used for incorporating biotic and abioitc stress related genes in crop plants.

5. Bioinformatics Unit

Another central facility has also been developed in School of Agricultural Biotechnology. Bioinformatics Unit hosts a sub-DIC centre funded by DBT to support bioinformatics infra-structure and facilities. This centre is offering bioinformatics courses and training to the students and faculty. This facility is equipped with 22 computers for teaching and practical classes. Centre also hosts one 40 node high performance computing system for cutting edge research in the field of agricultural genomics. Sub-DIC was the part of International Wheat Genome Sequencing Consortium and has contributed towards generation of genetic and physical map of wheat chromosome 2A. Centre provides support in research for whole genome and transcriptome assembly and annotation projects within the University belonging to crops like wheat, rice, maize, pathogens, guava, mango, pulses, etc.

6. Natural Resource Management Laboratory

The Natural Resource Management Laboratory was established in the year 2003 as a central facility for the analysis of soils, plants, manures, water, etc. The laboratory is equipped with sophisticated analytical instruments including Inductively Coupled Argon Plasma- Atomic Emission Spectrophotometer (ICP-AES) model iCAP 6300, Inductively Coupled Plasma - Mass Spectrophotometer (ICP-MS) Agilent make 7700 series ICP-MS system, Atomic Absorption Spectrophotometer (AAS) model Avanta, Gas Chromatograph (GC), CHN Analyser and an Ion Chromatograph. These instruments have been utilized for analysis of soil, plant, water and other biological samples for research purposes and for testing on payment basis.

6. Electron Microscopy and Nanoscience Laboratory

This laboratory was established in the year 2006out of one-time special grant of Rupees 3.5 crores by the Indian Council of Agricultural Research, New Delhi. It caters to the electron imaging and spectroscopy needs of the students of various departments of the University and other institutes across India. The laboratory houses Scanning Electron Microscope model s3400-N, Transmission Electron Microscope model H-7650, Fluorescence microscope model DM-5000B, Fourier Transform Infra Red Spectroscope model thermo 6700, Atomic Force Microscope di-CP-II, Ion sputter coater and bench top evaporator facilities for analysis of material, biological and other samples.

7. Central Instrumentation Lab

College of Basic Sciences has one Central Instrumentation laboratory. The lab is equipped with UV-VIS Spectrophotometer attached with computer from Shimadzu Corporation. Water Alliance Series Column Heater and Column Heater/ Cooler from Waters Corporation, USA. In addition to these major instruments cell is also equipped with five BODs, metabolic shaker, Rotary Vacuum evaporatoer, leaf area meter, digital melting point apparatus, Centrifuge, cooling centrifuge, sonicator and many more commonly used instruments.

8. Molecular Biology Laboratory

State of art Molecular Biology laboratory was established in the College of Basic Sciences and Humanities. The lab is equipped with HPLC, atomic absorption spectrophotometer, Beta Scintillation Counter, PCR, gel doc system, 2D electrophoresis with series of vertical and horizontal electrophoresis, refrigerated centrifuges, laminar flow, bio-photometer and -700C deep freezers for studying biological processes, DNA amplification, characterization of the molecular markers and cloning full length genes responsible for providing various abiotic and biotic stresses, resistance to heavy metal toxicity in plants and understanding the basic metabolic regulation and anti-nutritional factors at molecular and biochemical levels.

6.6.3.8 Global Support

Different initiatives serve to impart global support to the faculty and students:

- The University has MoU with many Agricultural Universities/ Institutes abroad as listed elsewhere. An adjunct faculty member provides coordination support in these matters.
- The alumni of the university are spread around the globe and coordinate with PAU through our Alumni cell in forging ties with top Agricultural Universities and Institutes of the world. A faculty member is designated for coordinating corporate and international affairs.
- PAU maintains a corpus fund for sponsoring faculty trainings of three months to one year in

Table 3.33: List of scientists trained under the scheme, "Training of PAU faculty members in new technologies"

S. No.	Name of faculty & Deptt.	Name of Institute	Field of training	Date
1.	Dr. Paramjit Kaur, Asstt. Acarologist, Deptt. of Entomology	University of California, Davis, USA	Bioecological studies, population dynamics and bio control of two spotted spider mite, Tetranychus urticae kochand lewis mite, Eotetranychus lewisi (McGregor) on castor bean and strawberry at different temperatures.	August, 2012 to November, 2012
2.	Dr. Pawan Kumar Malhotra, Asstt. Biotechnologist, School of Agricultural Biotechnology	University of Florida, USA	RNAi mediated genetic transformation of sugarcane suppression gene(s) to enhance its potential for ethanol production.	October, 2012 to April, 2013
3.	Dr. K.S. Suri, Entomologist, Deptt. of Entomology	University of Tennessee, Knoxville, USA	Physiological changes leading to mortality of Heliothis virescens in response to its infection by Heterohabditis bacteriophora and Photorhabus luminescens using a transcripmics approach.	November, 2013 to May, 2014
4.	Dr. G.S. Dheri, Asstt. Soil Chemist, Deptt. of Soil Science	Ohio State University, USA	Effect of crop fertilizers and residue management on N2O emission.	November, 2013 to April, 2014
5.	Dr. Anu Kalia, Asstt. Professor, Nano Science	Taxes A &M University.	Development of Nitrozen Nano fertilizers.	January, 2016 to July, 2016
6.	Dr. Hira Singh, Asstt. Professor, Deptt. of Vegetable Science	Ohio State University, USA	Effect grafting in tomato on horticultural.	-do-
7.	Dr. Prashant Mohanpuria, Asstt. Professor, School of Agricultural Biotechnology	Tokushima University, Japan	Genome editing technique for crop improvement.	March, 2017 to August, 2017
8.	Dr. Krishan Kumar, Asstt. Horticulturist	University of Florida	Genetic Improvement of citrus using classical breeding tissue culture	November, 2017
9.	Dr.Amandeep Mittal, Asstt. Professor	University of Western Australia	Gauva genome assemble and mining of useful SNPS to design a chip.	February, 2018 to May, 2018
10.	Dr.R.K. Dhall, Deptt. of Vegetable Science	Israel	Intensive vegetable production	January, 2018 to February, 2018



advance laboratories abroad. During the report period 10 faculty members have been trained abroad under this initiative. Detail is given below in Table 3.33.

- PAU has a provision for taking Co-major advisors from faculty of advanced universities/institutes abroad on advisory committee of the postgraduate students and 33 students have benefitted from this provision during this period.
- PAU has a system of sabbatical leave (one year, with pay) for focussed academic work in advanced institutes.
- International projects serve as platform for further collaborations. During the report period, 23 international projects were executed.

Chapter 4
Extension Support

6.6.4 Extension Support

6.6.4.1 Extension Council

As per the requirement of Model Act of ICAR, the Extension Council was constituted on 28.11.2011 by an amendment of Statutes in the meeting of BOM, for finalizing all the matters concerning extension.

Composition

a. Vice Chancellor – Chairperson
b. Directors of Agriculture/Horticulture/Animal Husbandry/Fisheries and Chief Conservator of Soils, Punjab, Principal Conservator of Forests, Punjab (depending upon mandate and programmes of the University) of the Government.
c. Director of Research
d. Dean, Postgraduate Studies
e. Additional Director of Extension Education
f. Associate Directors of all KVKs
g. All Deans of the constituent colleges
h. All Additional Directors of Research.
i. Two eminent persons in the field of Extension Education from outside nominated by the Vice Chancellor.
j. Two progressive farmers to be nominated by the Vice Chancellor.
k. Vice Chancellor may co-opt upto two members from related organizations.
l. Director of Extension Education – Member Secretary.

Registrar and Comptroller shall be the non-member invitees.

Functions of the Extension Council

The Extension Council shall consider and make recommendations in respect of:

a. Extension Education Programmes and Projects of the University.
b. Coordination of Extension Education Activities.
c. Development of Farmers' Education, Training and Advisory Services.
d. Monitoring and evaluation of the Extension Education Programmes and Projects of the University.
e. Any other matter referred to it by the Vice Chancellor, Board or any other authority of the University.



Extension Council Meetings

Eleven Extension Council meetings (Table 4.1) were organised during the period.

Table 4.1 Details of Extension Council meetings held in last five years

Sr. No.	Extension Council meeting	Date of Meeting
1.	1st	19.8.2013
2.	2nd	28.2.2014
3.	3rd	14.10.2014
4.	4th	08.6.2015
5.	5th	11.12.2015
6.	6th	17.5.2016
7.	7th	23.11.2016
8.	8th	23.5.2017
9.	9th	14.11.2017
10.	10th	15.6.2018
11.	11th	05.11.2018

6.6.4.2 Directorate of Extension Education

The mandate of Directorate of Extension Education is

- Planning, organization and coordination of trainings for farmers, farm-women, entrepreneurs and extension workers
- Dissemination of latest research findings among farmers / farm-women / entrepreneurs and extension personnel
- Feedback to the Directorate of Research

Directorate of Extension Education has following establishment (Fig. 4.1):

- One Director of Extension Education
- Two Additional Directors of Extension Education
- One Additional Director of Communication
- Krishi Vigyan Kendras (KVKs) : 18
- Farm Advisory Service Centres (FASCs) : 15
- Subject Matter Specialist of different departments : 23

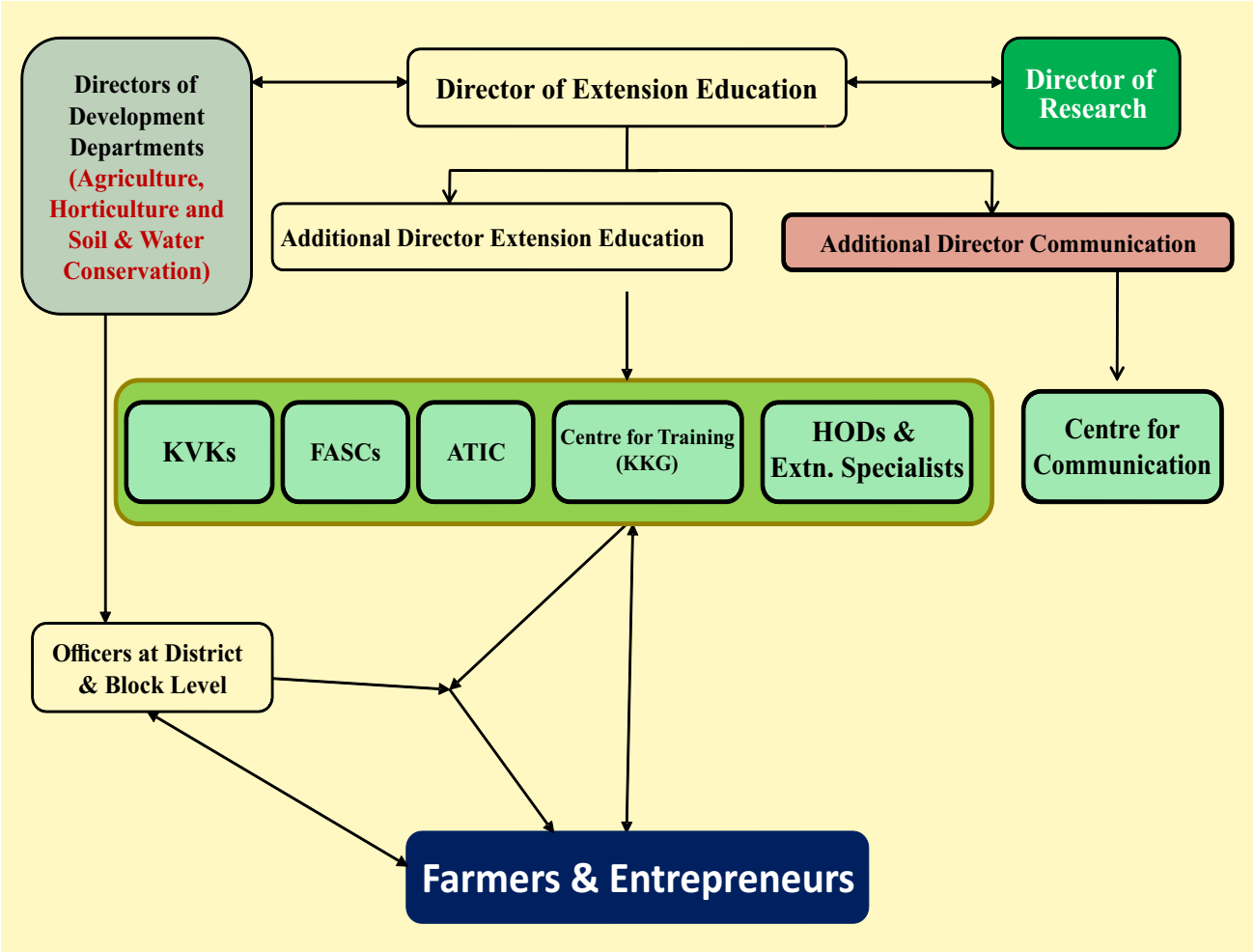


Fig. 4.1: Setup of Directorate of Extension Education

- Agricultural Technology Information Centre (ATIC) : One
- Training Unit of PAU, Kairon Kisan Ghar : One
- Communication Centre

Staff Pattern: Under Directorate of Extension Education, a total of 298 scientists are involved in the extension education activities of the university. Staff position of KVKs is given in table 4.2

KVKs have strength of 126 scientists who are involved in imparting training to farmers, farm women and in-service extension personnel on various activities of agriculture and allied fields in 18 districts. There is unique system of Farm Advisory Service Centre in 15 districts of the state in which 32 scientists are working. The main mandate of these scientists is conducting of adaptive research trials at farmers' fields and providing feed back to research system. There are 23 subject matter specialists working in the field of Agronomy, Soil Science, Entomology, Plant Pathology, Farm Machinery, Fruit Science, Food Processing etc. which are directly involved in extension activities of the University. The departments of Agronomy, Plant Breeding and Genetics, Soil Science, Farm Management, Entomology, Plant Pathology, Fruit Science, Vegetable Crops, Floriculture & Landscaping, Extension Education, Food Science and Technology, Food and Nutrition, Clothing and Textiles, Home Science Extension and Communication Management, Family Resources and Management, Human Development, Processing and Food Engineering, Farm Machinery and Power Engineering, Soil & Water Engineering, Economics, Forestry and Natural Resources and Zoology are associated with various extension education activities of the university.

In Agricultural Technology Information Centre (ATIC), four scientists in the discipline of Agronomy, Plant Pathology, Soil Science and Plant Breeding are working to deliver technology and redress the field problems of the visiting farmers. Kairon Kisan Ghar has strength of 4 scientists who are involved in imparting training to farmers, farm women and in-service extension personnel on various activities of agriculture and allied fields. In Communication Centre, 4 scientists are involved in disseminating the technologies through publications, online farm literature, T.V./Radio talk, audio/video cassettes, DVDs/CDs, posters etc.

Table 4.2: Details of staff position in the KVKs of PAU

Name of KVK	Programme co-ordinator	Scientist	Ministerial Staff	Technical	Supporting staff (driver/beldar)
Amritsar	1	5	2	5	2
Bathinda	1	6	2	5	2
Faridkot	1	6	2	5	2
Fatehgarh Sahib	1	5	1	5	1
Ferozepur	1	5	2	5	2
Gurdaspur	vacant	5	2	4	1
Hoshiarpur	1	6	2	5	2
Jalandhar	1	6	1	5	1
Kapurthala	1	6	2	4	2
Ludhiana	1	6	2	4	3
Mansa	1	5	2	5	1
Moga	1	6	2	4	2
Muktsar	1	5	2	4	1
Patiala	1	6	2	5	2
Pathankot	1	6	1	3	0
Ropar	vacant	6	1	5	2
Sangrur	1	6	2	3	2
SBS, Nagar	1	5	2	5	2

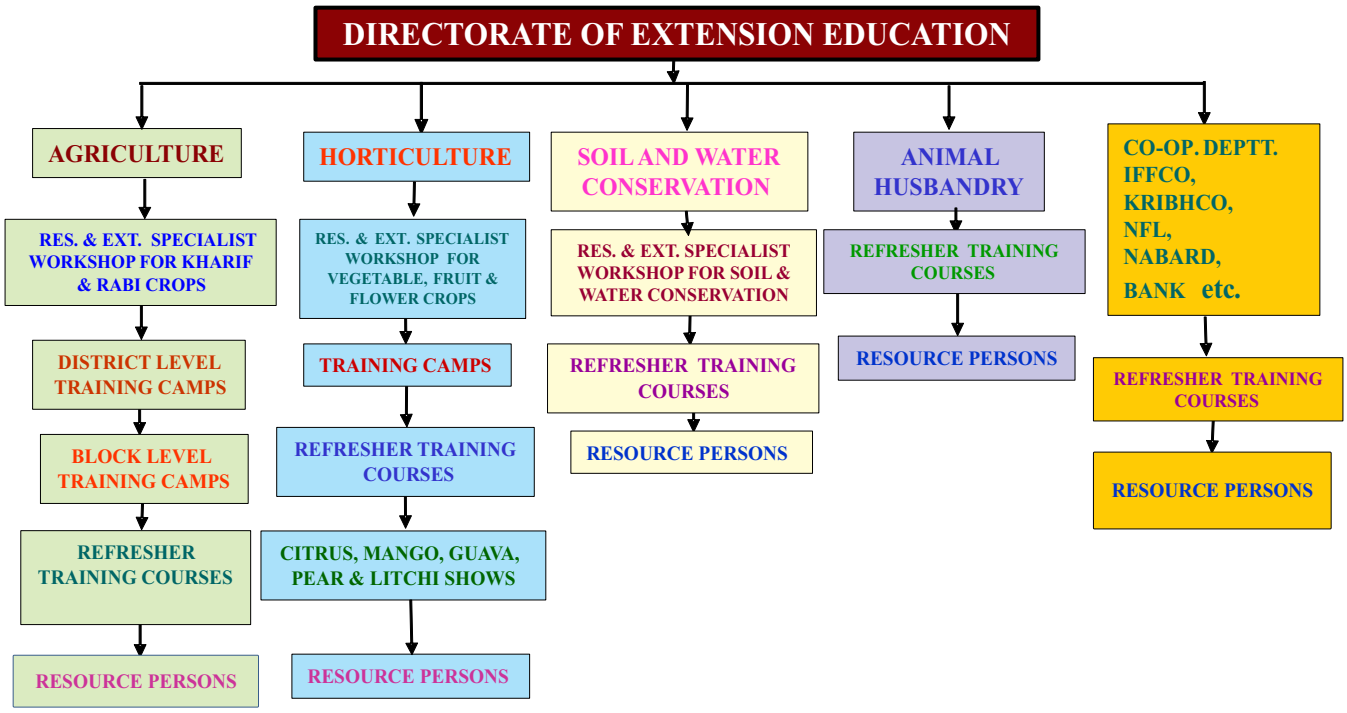


Fig. 4.2: Linkages with line departments and other agencies

COMMITTEES

- PAU Farmers Committee (1970)
- PAU Fruits & Vegetable Growers Committee (1989)
- Agril. Equipment Manufacturer's Committee (1995)

Functions:

1. Regular Meetings
2. Feedback
3. Dissemination of Technology
4. Linkage with Research Scientists

CLUBS

- PAU Kisan Club (1966)
- Farm Women Wing (1983)
- Punjab Naujwan Kisan Sanstha (1983)
- Beekeepers Association (1991)
- Tree Growers Association (2007)
- Seed & Nursery Producers Association (2011)
- PAU Flower Growers Association (2017)
- PAU Soybean Processors Club(2017)
- PAU Organic Farming Club (2017)
- PAU Mushroom Grower Association (2018)
- Crop Residue Management Association (2018)

Fig. 4.3: Farmers committees and clubs

Extension Programmes

A total of 8689 training courses were organized by different KVKs, training units and departments (Table 4.3). In these trainings, 2,01,228 farmers, farm women and field functionaries of the development departments i.e. Agriculture, Horticulture, Soil and Water Conservation participated. Ten courses, 'Young Farmers Trainings' of three months duration were organized at main campus Ludhiana. Fifteen 'Horticultural Supervisor' training courses of one year duration were conducted at Ludhiana, Gurdaspur and Bathinda. The trainings covered various aspects of Agriculture in addition to Home Science aspects like Food & Nutrition, Clothing & Textile and Family Resources Management etc. During the period under report, 18,681 method and result demonstrations were conducted. These demonstrations included method of taking soil and water sample, use of tensiometer in paddy, herbicide spray technology, use of Leaf Colour charts for need based nitrogen application, crop residue management, happy seeder, mechanical paddy transplanter, dyeing of fabric, preparation of soaps & detergents and preparation of soft toys etc. In addition, 11,153 Front Line Demonstrations (FLDs) were also conducted by the Krishi Vigyan Kendra/FASC on summer moong, mash, maize, gram, gobhi sarson and groundnut etc. to demonstrate production and protection technologies.

Extension coordination mechanism: Scientists from KVKs and FASCs also act as resource persons in

Block and district level camps organised by Dept. of Agriculture, Horticulture, and other agencies like IFFCO, KRIBHCO, NFL, etc. The Research & Extension Specialists Workshop for *Rabi, Kharif*, Vegetable, Sericulture and Flower Crops, Fruits, Mushroom and Agro-Forestry are regularly organised each year in which extension personnel of the concerned departments participated. A State Level Training planning is also organised regularly in the month of February to finalise the training programme for 18 KVKs. A total of 30 such workshops were organised during last five years.

Extension and technology dissemination system: Various technologies were disseminated by organising farmers training camps, demonstrations, Kisan melas, Field days, farmers scientist interface, PAU Kisan committee meetings, Fruit and vegetable grower meetings, meetings of PAU Kisan club meeting. The total number of Kisan melas organized during the period is 70. The Kisan Melas are considered as the best tool for technology transfer to the masses. FASCs & KVKs organized exhibitions at Farmers Fair, Workshops, Farmers-Scientists Interface, District, Block and Village level camps and Field days at demonstration sites to motivate the farmers for adoption of latest technologies. During the period under report, 3708 exhibitions were arranged which act as excellent platform for dissemination of information among the visitors. A total of 1092 field days were organized by the extension scientists of the University at various locations throughout the state to educate the farmers about the performance of new varieties, technologies developed by the University at farmers' fields. A total of 2,90,024 farmers participated in these field days.

Adaptive Research Trials (ARTs) were conducted at farmers' fields under different agro-climatic conditions to test the adaptability of new technologies generated by the research system. A total of 4408 ARTs were conducted at different locations to evaluate new crop varieties, production and protection technologies. Some of important ARTs were evaluation of new varieties of rice, basmati rice, wheat, sugarcane, mustard, oats, berseem and rajmash; testing of plant protection technologies including new herbicides, insecticides and fungicides. Based on these trials, a total of 407 new recommendations were made, out of which, 154 were of new varieties, 124 production, 112 protection technologies and 17 post harvest and machinery.

Communication Centre of Directorate of Extension Education serve as a house for providing

Table 4.3: Year-wise details of Extension programmes organised

Year	Kisan melas	Workshops	Trainings	Field Days	Awareness Camps	Exhibition	Demonstrations
2013-14	14	9	1837	155	780	898	2214
2014-15	14	5	2043	175	755	629	3014
2015-16	14	5	1585	232	757	693	3311
2016-17	14	5	1541	230	736	782	4795
2017-18	14	6	1683	300	1009	803	5347
Total	**70**	**30**	**8689**	**1092**	**4037**	**3708**	**18681**







Extension activities

farm information to farmers, stakeholders and public through various channels of communication i.e. publications , television, radio, exhibitions, audio and video cassettes, DVDs, CDs, posters etc. During the period under report, the centre published 94 farm bulletins on different subjects of agriculture and allied fields. The centre also published Package of Practices for crops of Punjab, twice a year, both in English and Punjabi. Centre published 60 issues each of the two farm magazines namely Progressive Farming (English) and *Changi Kheti* (Punjabi) during last 5 years.

6.6.4.3 Extension Planning and Technological Impact

The technologies developed at PAU sometimes may not be applicable as such in the field and needs its assessment and refinement which needs to be done at cultivators' fields. The problems noticed/ observed by the extension staff at the time of field visits and during discussion with the development staff and farmers are passed on to the Directorate of Research for further research. Feedbacks are also provided by the field staff of the state development departments during the Research and Extension Specialist Workshops.

6.6.4.4 Implementation of National Initiatives

National Initiative in Climate Resilient Agriculture (NICRA):

National Initiative on Climate Resilient Agriculture (NICRA) was launched during February 2011 by Indian Council of Agricultural Research (ICAR) with the funding from Ministry of Agriculture, Government of India (Table 4.4). The mega project has three major objectives of strategic research, technology demonstrations and capacity building. Assessment of the impact of climate change with formulation of adaptive strategies is the prime approach under strategic research across all sectors of agriculture, dairying and fisheries. Evolving climate resilient agricultural technologies that would increase farm production and productivity vis-à-vis continuous management of natural and man-made resources constitute an integral part of sustaining agriculture in the era of climate change. The four modules of NICRA i.e. natural resource management, improving soil health, crop production and livestock are aimed by making the farmers self-reliant. Under this project, Faridkot, Bathinda, Fatehgarh Sahib and Ropar districts were selected in Punjab. Each KVK selected one village in their respective district representing the climate vulnerability of the district.

Under NICRA project KVK scientists introduced some interventions for paddy straw management. The area under baler for paddy straw management increased for 12.8 ha (2013-14) to 155 hectares (2017-18). The area under Chopper-cum-Spreader increased upto 100 hectares in 2017-18. The area under wheat sown with happy seeder was increased upto 178 hectares in the adopted & adjoining villages. KVK Bathinda also conducted the demonstrations on resource conservation technologies like Direct Seeding Rice (DSR), Leaf colour chart, tensiometer & green manuring in the village. The farmers of the adopted villages have purchased 20 happy seeders, 15 mulcher/chopper, 22 DSR machines & 2 baler cum knotter at their own level and many farmers of these villages running these machines on custom hiring basis. The demonstrations on tricho cards first time introduced in adopted villages for the control of stem borer & leaf folder in rice which is highly effective and environment friendly technique developed by the PAU, Ludhiana. The Kendra has conducted 160 demonstrations on Uromin licks & 169 demonstrations on mineral mixture for nutritional feeding of dairy animals. To make the availability of vegetables round the year, this KVK conducted 100 demonstrations on nutritional kitchen gardening. Keeping in view the crop diversification, 15 farmers are growing potato crop in the adopted villages and about 100 acres of summer moong was grown during the current year. KVK has motivated the farmers to adopt backyard poultry breeds of RIR, partapdhan, chebbro, karaknath & distributed to the farmers in adopted villages. Under this project, 03 *Gobar* gas plants were constructed in the village.

Outcome of NICRA Project at Faridkot

Due to adoption of RCT viz Straw Baler, ZTD/ Happy seeder straw burning was curtailed to a great extent in the area and this reduced the environmental pollution. Village Pindi Blochan was adjudged as burning free village during 2017 due to efforts of KVK, Faridkot. Green manuring before paddy transplanting not only saved 50% urea

Table 4.4: Budget allocation (Rs. Lakhs) from 2013-14 to 2017-18 in respect of the NICRA scheme

Name of KVK	2013-14	2014-15	2015-16	2016-17	2017-18	Total
Bathinda (Kili Nihal Singh)	4.07	7.70	14.57	13.35	9.10	**49.09**
Faridkot (Pindi Blochan)	7.10	15.50	14.75	16.90	9.70	**63.95**
Fatehgarh Sahib (Badauchhi Kalan)	6.14	13.75	12.01	1.10	7.80	**50.79**
Ropar (Fatehgarh Viran)	5.68	11.38	9.73	10.45	7.88	**45.12**



fertilizer but also helped in improving soil health. Encouraged by the positive outcome of green manuring about 50-60 % farmers have already started growing dhaincha as green manuring crop. Increase in the area of maize fodder in the adopted village helped in regular availability of green fodder round the year. Some farmers have opted for silage making technology in the village due to sufficient amount of green fodder availability. During last two years area under Berseem production has also increased. Kitchen gardening which was practiced only by few big families in the village Pindi Blochan at the initiation of the project, has been adopted by every household in the village. Custom hiring centre established at the village is running successfully and about Rs. 6.5 lakhs has been generated through custom hiring of implements in this village.

Outcome of NICRA Project at Fatehgarh Sahib

Farmers are aware about many new technologies which were adopted by the farmers in NICRA Project. Deworming for young calves reduces internal parasites in animals leading to gained body weight and help to solve the problem of repeated breeding in animals. Adoption of Happy Seeder technology by the village farmers makes an example to the other villages and it helps in reducing residue burning. Crop diversification and green manuring by growing Dhaincha, pulses, maize, summer moong, gobhi sarson and gram proved beneficial for soil health and widely adopted by 45-50% of the farmers. Laser Land Levelling was started since 2011-12 in adopted village and around 90% of land has already been laser levelled in the village. Presently there are 15 laser levellers and other agricultural machinery are operating in these villages through cooperatives society. This technology of laser levelling proved a boon to farmer community and for state agriculture and will motivate other farmers for adopting it. It helps in increasing water use efficiency and significant water saving.

Outcome of NICRA project at KVK, Ropar

This project is working in the villages Fatehgarh viran since 2011. KVK, Ropar has conducted about 30 training programmes with respect to various farm technologies, conducted 8 field days, 10 method demonstrations, 10 awareness camps and covered about 300 ha area using custom hiring centres. KVK Ropar has conducted 200 demonstrations on Happy Seeder covering 90 hectares area. About 405 hectares of area was covered under the 200 demonstrations on Laser Leveller. The farmers were provided with the seed of Dhaincha covering 75 ha area under green manuring and about 125 farmers were benefited. Being the hotspot area of yellow rust disease, yellow rust resistant varieties were demonstrated on fields of farmers in NICRA village, covering around 310 ha area. Elite clones of Poplar namely L-47, L-48 & PL-5 were also demonstrated at farmers' fields on an area of around 55 ha. 125 demonstrations on Quality Fodder (Berseem + Ryegrass) were conducted in these villages, resulting in adoption of the same on 35 ha of land. The farmers were guided to use biofertilizers in wheat and demonstrations were conducted on 400 hectare area. For energy saving component, 15 solar cookers were demonstrated in the households of this village.

Mera Gaon Mera Gaurav (MGMG):

Mera Gaon Mera Gaurav scheme was launched during July, 2015. It is an innovative initiative, which was planned to promote the direct interface of scientists with the farmers to speed up the lab to land process. The overall objective of this scheme is to provide farmers with the required information , knowledge and advisories on regular basis in the adopted villages. Under this scheme, a total 98 villages out of 12 districts have been selected (Table 4.5) and scientists remain in touch with selected villages and providing information to the farmers on technical and other related aspects in a time frame through personal contacts or through media. The teams conducted 313 Interface meetings/ Goshthies in which 6980 farmers participated. In order to motivate farmers to adopt new agricultural technologies/ practices, applicability, economic advantages of new technologies, scientists have conducted 2976 demonstrations at farmers' field on various crops. The literature regarding various aspects was also distributed among farmers so that farmer can use it later. Scientists provided 1355 mobile based advisories to farmers of these adopted villages. Under this scheme, scientists also created linkages with other departments and agencies for the benefit of farmers of their adopted villages. Awareness amongst 115771 farmers was created on various agricultural technologies, practices, schemes of different departments, crop insurance, Swachha Abhiyan, etc.

Table 4.5: List of Villages under Mera Gaon Mera Gaurav (MGMG)

S.No.	Name of District	Name of Village
1	Bathinda	Killi Nihal Singh Wala, Narunana, Kotguru, Ghuda, Bhagwangarh, Malwala, Kotguru
2	Faridkot	Bharthala, Duareana, Pindi Blochan, Romana Albel Singh, Dhilwan Khurd
3	Hoshiarpur	Barapur, Shiwan, Harman, Achalpur
4	Nawanshar	KukarSuha, Adoana, Chandiani, Akliana
5	Ludhiana	Bhagwanpura, Diwala, Gharkhana, Gosalan, Powat, Bhagwanpura, Diwala, Gharkhana, Gosalan, Ayali, Talwara, Jainpur (Zainpur), Baggakhurd, Baggakalan, Humbran, Baran Hara, Malakpur, Ghaunspur, BhathaDhua, Deatwal/Dewatwal, Gahaur, Bains, Jhamat, Rasulpur, Jandi, Kot Mann, Rauwal, Gorsian, Cheemakhurd, Kandolakalan, Ganapind, Dhina, Rajjowal, Bhattian Bet, Issewal, Gahaur, Dakha, Kailpur, Ghulal, Neelon, kalan,Rohla, Chahalan, Ajloud, Birmi, Salampur, Basmi, Fagla
6	Patiala	Jansua
7	Ropar	Chaunta, Jhallian,FatehgarhViran, Rampur Fasse, Mohan majra, Rasidpur, Mahlan
8	Fatehgarh Sahib	Pandrali, Attapur, Panjolikalan, Badaushikalan, Chaurwala
9	Kapurthala	MianiBakarpur,Meripur, Swal, Boolpur,Bhagwanpur
10	Mansa	KotDharmu
11	Mohali	DulwanKhadri, Fathegarh, Baroudi,Barouli, Badanpur
12	Muktsar	Chatteana,Goneana,Maan,Ratta Khera,Guhri Sanghar





Farmers First Scheme

Project entitled "Technology application and upscaling for sustaining natural resources and augmenting farm income: Farmers led market linked approach" under the Farmer FIRST programme is operational since Feb., 2017 under Directorate of Extension Education in two villages namely Taranji Khera and Chatha Nanhera of Sangrur district. There is a team of total 15 members (one PI, seven CoPIs, four Associated scientists, one research fellow and two senior field assistants) in this project. Main objectives of the project are as under:

i) To assemble, integrate and assess technically feasible, economically viable, socially compatible and commercially up scalable technology options for sustainable agriculture.

ii) To design and test suitable technologies, crop choices, networks, linkages and institutional models for marketing and value addition of agricultural produce for enhancing the income of farming families.

iii) To analyze the impact of the technological interventions, identify factors of success/failure, suggest strategy for up-scaling of successful technologies and provide feedback to the research system of un-successful technologies



Activities under Mera Gaon Mera Gaurav

for their modification.

iv) To build capacity of farmers and farm women to sustainable technologies and practices as well as to promote subsidiary enterprises/secondary agriculture for income enhancement.

Project is running in five modules consisted of 10 interventions collectively. Under Natural Resource Management Module first intervention was "Growing of Short duration varieties of rice for efficient water management" in which 300 demonstrations on cultivation of short duration varieties of paddy (PR 126 and PR 121) were conducted during 2017 and repeated during 2018. Second intervention was "Direct Seeded Rice by using Lucky Seed Drill" in which 50 FLDs each on Direct Seeded Rice through Lucky Seed Drill was conducted during 2017 and 2018. Third intervention was "Use of PAU Happy Seeder for wheat sowing for in-situ paddy straw management" in which 66 FLDs were conducted during Nov 2017. Next intervention was "Soil test based nutrient application" where 200 soil samples were taken from the farmers' field and farmers were advised to use fertilizers on soil test basis. Two drip irrigation systems have been installed at the farmers' field. In "Drip irrigated sugarcane with onion as intercrop", second module of the project is Diversification in which different interventions i.e. Growing Summer Moong in Rice-Wheat System (100 demonstrations), Chickpea (50 demonstrations), Rapeseed variety GSC7 (70 demonstrations) were conducted. Third module was on Vegetable Crops in which "New high yielding vegetable varieties/ hybrids" and "Low tunnel cultivation of vegetables" were demonstrated. Under this, demonstrations on cultivation of vegetables both hybrids (chilli) and varieties (peas, onion, tomato) were conducted during November and December, 2017. Apart from this, 200 kitchen gardens in each season were established for healthy food. Fourth module was Value addition in which one primary processing unit was established in the village under "Primary processing unit for oilseeds, pulses and vegetables". Next module was "Subsidiary Enterprises" in which a total of 15 beekeepers and 40 mushroom growers were developed under the project. Sixth module was the Livestock based Module where deworming and feeding of mineral mixture for animals provided to 50 farmers. In Goat Rearing intervention, 4 landless



Activities under Farmer First Project

families were identified and provided with 5 goat kids, (4 females +1 male) in each unit. Apart from these interventions a number of other extension activities like trainings (31), group meetings (71), campaigns (6), method demonstrations (31),surveys (4), etc. has been organized in the adopted villages.

Student Ready and other National Initiatives

The constituent colleges of the university have strictly implemented various national initiatives. The Student Ready Programme launched by the prime minister of the India and implemented as per the fifth dean's committee recommendations in all the undergraduate programmes of the college from the academic session 2016-17. This student ready programme includes the experiential learning programme (ELPs)/ Hands on Training, skill development training, Rural Agricultural Work Experience, In- Plant Training / Industrial attachments and Student's project to inculcate the practical knowledge and skills in the students during their exposure visits and practical training on the parent institute as well as at the government, semi-governments, co-operative agencies and private industries related to agricultural and allied sectors in the state. The *Swachh Bharat Abhiyan* or Clean Indian Mission launched by the Hon'able Prime Minister of India on October 2, 2014 was implemented involving students, staff and faculty.

6.6.4.5 Innovation and Best Practices

The Punjab Agricultural University is playing a pivotal role in transferring the improved agriculture knowledge to the farming community. A number of initiatives have been taken for the use of ICT tools and spread of new agriculture practices. The following ICT tools are regularly used to pass the information among the rural masses.

- **Agricultural Technology Information Centre (ATIC) :** The centre is located in Clock Tower building near Gate No.1 in PAU, Ludhiana and is working under the guidance of Director of Extension Education. Its main objective is to address the field problem, deliver improved agriculture knowledge and inputs under "Single Window Delivery System". Proper remedial measures are conveyed to the farmers after thorough examination of the plant samples by the team of expert scientists. The centre is also



famous among the farmers as Dr Khem Singh Gill Farmer's Service Centre and Plant Clinic. Farmers can also get their problems resolved while sitting at their home through telephone helpline 0161-2401960 Ext. 417, mobile No. (94630-48181) and e-mail plantclinic@pau.edu . The most peculiar and important feature of this Clinic is that these services are being provided to the farmers free of cost by the university.

- **Laminated photographs/Blow ups :** For the dissemination of improved agriculture knowledge to the farmers, the technology developed by the scientists of the university has also been exhibited in the form of coloured blow ups of the live specimen of the disease/insects/ deficiencies/ weeds problems and preserved life samples for the proper understanding of queries of the farmers. Pictures depicting the symptoms of diseases and pests etc. are also available at ATIC for quick diagnosis of problems of the visiting farmers.

- **PAU *Kisan Doots* :** A new service has been introduced for the quick dissemination of agriculture technology in which the farmers having e-mail facility have been enrolled as 'PAU Kisan Doots'. The messages regarding production and protection technology to be followed well in time are regularly communicated through e-mails. So for, PAU has enrolled 6003 farmers called PAU *Kisan Doots* for the quick dissemination of agriculture of knowledge. Two e messages are being sent weekly to these *Doots* regarding agriculture related practices through e-mail. These doots are further requested to spread the information to the fellow farmers through public addresses system of Gurdwaras/Mandirs etc for the faster and timely spread of improved agricultural technologies.

- **Kisan Mobile Advisory Service (KMAS) :** Each KVK/FASC has also initiated the Kisan Mobile Advisory Service (KMAS) in which farmers having mobile number were registered. Flash/alert messages are sent (7-8 messages per month) to the registered farmers (2.43 lac) for timely follow up action regarding agriculture related practices. Such farmers also reciprocate in the same fashion and make queries from the experts as and when required.

- **Mobile Diagnostic-cum-Exhibition Van:** The ATIC is also equipped with Mobile-Diagnostic cum Exhibition Van for dissemination of different technologies of field, fruit and vegetable crops to the farmers with the help of KVKs and Farm Advisory Service Centre (FASCs). It is provided with all kind of audio visual aids, CD's of different crops, LCD, Microscope, Soil and Water Testing Kits and literature for sale so that farmers may be well conversant with the need based technology from time to time. It is being sent to the different districts of Punjab for the benefit of the farming community. For the better understanding of problems, the small documentary movies/video clips are shown to the farmers and inspection and solution to the queries of the farmers are rendered on the spot.

- **Extension Vans:** Six Bolero Vans have been purchased by the University for the Management of crop residue and creating awareness among farmers in the adoption of latest improved agriculture practices. These vans are equipped with audio visual aids, CD's of different crops, LCD, public address system and literature for sale. These vans are being used to create awareness among the farmers for burning crop residue and timely management of weeds, yellow rust in wheat and cotton whitefly.

- **Touch Screen 'Kiosk' (Agriculture Information Booth):** ATIC has a computerized Kiosk called information booth, which depicts the production and protection technology of *rabi* and *kharif* crops from sowing till harvesting. The Kiosk has information stored in its computer on all fields, vegetable and fruit crops. This system operate through internet and any user can know detailed information on varieties, fertilizers, irrigation, plant protection, measures etc. of any crop and other information by just pressing click on the menu and the information is displayed on the screen of the Kiosk.

- **WhatsApp Groups:** About 149 WhatsApp groups having 7000 members have been created for the rapid transfer of agriculture knowledge to the farmers.

- **Farmer Portal:** The University has started a Farmer Portal which has been put on the PAU website (www.pau.edu) for the benefit of the stakeholders in Punjabi language. It includes complete package of practices of the crops including seeds and planting material, production and protection technology, post

harvest management, processing, organic farming, agricultural machinery, agro-forestry, subsidiary occupation, women empowerment etc. It also include diagnostic symptoms of various plant problems along with their remedial measures.

- **PAU Mobile App :** PAU has Prepared a Kisan App which is available on Google Play store and Apple App store for the benefit of farming community. This app includes all the production, protection and post harvest management of various crops, fruits, vegetables and agro-forestry plants.
- ***Kheti Sandesh:*** The university has brought out a weekly digital newspaper "Kheti Sandesh" for the dissemination of important farm information to the farmers of Punjab. It sends the different information to farmers of the state through different WhatsApp groups. It covers diverse aspects of agriculture such as farm advisories; farm operations; information about new/revised agricultural publications and training programmes; weather prediction; articles by scientists; stories about progressive farmers; response to queries by PAU experts, etc. This digital newspaper is being sent to farmers in the form of a photo message on every Wednesday. If any farmer wishes to receive this digital newspaper on his mobile, he/she can give a missed call on mobile no.**1800-180-5100** and become a member of the WhatsApp group.
- **Weather Based Agro- advisory SMS:** Weekly Special Agriculture Bulletin called ***e-bulletin*** is sent to the farmers of the Punjab in English and Punjabi languages through email and mobiles phones. The bulletin includes the weather forecast, weather outlook for the crops and latest Packages of Practices to be followed during the week. As many as 3,03,361 farmers were enrolled for weather based agro –advisory services.
- **PAU website**: The PAU activity and agriculture information is regularly updated and made available on PAU website - www.pau.edu. The Farmer Portal, PAU Mobile App., You Tube, Facebook page are operative through the PAU email.

6.6.4.6 Consultancy/Certification/ Testing

PAU provides free of cost consultancy to farmers and other stakeholders

Agricultural machines testing

Farm Machinery Testing Center, Department of Farm Machinery & Power Engineering, PAU, Ludhiana has tested a total of 183 machines of different types such as seed cum fertilizer drill, rotavator, disc harrow, laser leveller, sub soiler, post hole digger, bed planter, potato planter, rotary weeder, sprayers, threshers, reaper binder, paddy straw chopper, happy seeder, chaff cutter, potato digger, paddy transplanter, forage harvester, rake and diesel engine etc. from 2013-14 to till date. Total revenue generated during this period as a test fee for testing of these machines is Rs. 56.11 lakh and year-wise detail is given in Table 4.6.

Soil testing:

Soil testing facility for farmers is provided at PAU and all the KVK's at a subsidized rate of Rs. 20/- per sample. The revenue generated over the last five years is provided in Table 4.7

Product testing:

The university provided testing facility for different products like agrochemicals, fertilizers, plant growth promoter, etc. The details of number of testing projects over the last five years is given in

Table 4.6: Machines tested and revenue generated

Sr. No.	Year	Test reports released	Revenue generated (Rs. in Lakh)
1.	2013-14	31	6.14
2.	2014-15	30	10.45
3.	2015-16	37	11.96
4.	2016-17	35	10.30
5.	2017-18	36	17.26
Total		**169**	**56.11**



Table 4.7: Revenue generated through testing of soil samples (Rs. in Lakhs)

Station	2013-14	2014-15	2015-16	2016-17	2017-18
PAU Ludhiana	7.83	9.83	8.64	8.25	5.64

Table 4.8 and detailed list annexed (Annexure V).

Consultancy projects:

During the period under report, the consultancy projects undertaken by the faculty and revenue generated are listed below (Table 4.9).

Table 4.8: Number of testing projects and revenue generated (Rs. in Lakhs)

Discipline	2013-14	2014-15	2015-16	2016-17	2017-18
Plant Pathology	9	12	12	17	21
Entomology	7	11	17	12	17
Agronomy	7	8	3	16	8
Soil Science	2	-	1	1	-
RRS Faridkot	-	-	2	-	-
RRS Abohar	-	-	-	1	-
RRS Ballowal Saunkri	-	-	-	1	-
Total	**25**	**31**	**35**	**48**	**46**
Budget (Rs in Lakh)	**58.36**	**70.02**	**61.90**	**126.02**	**89.09**

Table 4.9: Consultancy projects and revenue generated (Rs. in Lakhs)

Year	Name of Consultancy Project	Amount
2013-14	1. Development of Strategic Plan and Guidance 2. Landscaping of Farm House of Mr.Sushil Kumar Periwal	Rs.67,416/- Rs.64,270/-
2014-15	1. Strategic Management 2. Scale up Natural Vinegar Production 3. Pre-project evaluation/feasibility study of Community Micro-irrigation project in Kandi belt of Talwara and Hajipur blocks of District Hoshiarpur converted to solar powered community Micro-Irrigation Project	Rs.67,416/- Rs.61,250/- Rs.1,12,360/-
2015-16	1. Development of Parks (Leisure Valley, Zirakpur) at Municipal Council, Zirakpur 2. Participation in Punjabi Movies 'The return of Sardarji' in abroad	Rs.8,42,700/- Rs.1,71,750/-
2016-17	1. Consultancy Project" Strategy and marketing Consultancy-Director SOB Study 2. Jatt vs Jatt Participation in Consultancy Service 'Participation in Punjabi Movie Jatt vs Jatt	Rs.69,000/- Rs.1,15,000/-
2017-18	1. Carry on Jatta-2 2. Mr & Mrs 420 return	Rs.2,36,000/-

Chapter 5

Faculty & Staff Development

6.6.5 Faculty and Staff Development

Agriculture being the backbone of Indian economy, the human resource needs to meet various activities related to agricultural development which is critical to attain country's goals towards rural development, employment generation and host of related activities leading to sustainable growth and development. The conventional agriculture is rapidly transforming itself to a highly skilled and knowledge intensive occupation for fulfilling growing food demands of increasing human population and to meet emerging challenges of improving yields and product quality, food safety, global competitiveness in marketing, conserving depleting natural resources, withstanding adverse impacts of perceptible climate change and increasing farmer's income in view of escalating production costs. In this scenario, competent human resource is the backbone of any agricultural institution of higher learning to satisfactorily achieve its envisaged aims and objective and continuously improve academic and research excellence. Punjab Agricultural University has well trained, dynamic and highly motivated faculty for effective curriculum delivery and student development.

6.6.5.1 Recruitment and Promotional Avenues

Classification of University employees:

Employees of the University are classified into different categories viz. Administrative, Teaching and Non-Teaching. Administrative cadre includes positions like Vice Chancellor, Registrar, Directors, Deans, Comptroller, Librarian, Estate Officer, and Chief Engineer. The teaching cadre includes Professors, Associate Professors and Assistant Professors and its equivalent cadres in research and extension education as well as includes position like Assistant Librarian. Non-teaching category is divided in to four groups viz. group A, B, C and D according to pay scales under different cadres. Chapter IV of the Act and Statutes of the University provides details about the following

Classification of Teachers

As per Statue 4.1 teachers of the University are classified as:

i) Professor, Associate Professor, Assistant Professors or their equivalents (Scientists, Extension Specialists) responsible for



conducting and guiding teaching, research and research extension programmes.

ii) Any other employee of the University declared as 'teacher' by the Vice Chancellor on the recommendations of the Academic Council

Classification of Non-Teaching Employees

a. Employees of the University other than officers and teachers shall belong to either:

i. The University cadre; or

ii. The cadre of the University officers under whom the post is administratively placed.

b. Each cadre shall consist of:

i. Group A : All the posts in the grade pay of Rs.5000/- and above and all the posts existing in group A (irrespective of the monitory limits of grade pay) will remain in group 'A'.

ii. Group B : All the posts ranging between the grade pay of Rs. 3800-4999.

iii. Group C : All the posts ranging between the grade pay of Rs. 1900-3799.

iv. Group D : All the posts below the grade pay of Rs.1900.

Faculty Strength :

Punjab Agricultural University has four constituent colleges namely College of Agriculture, College of Agricultural Engineering and Technology, College of Home Science and College of Basic Sciences & Humanities awarding degrees at bachelor's, master's and doctoral level. The two Directorates, the Directorate of Research and Directorate of Extension Education coordinate research and extension activities of the University respectively. To achieve its envisaged mandate of imparting quality education in agriculture and its allied branches, undertakes location specific research in priority research areas and transfer of technology to end users through extension network. The University has a total faculty of 779 with 266 Professors/equivalent, 84 Associate Professor/ equivalent and 429 assistant Professor/equivalent (Table 5.1) against approved faculty strength of 1389. Overall, 33.77% of existing faculty in the ranks of Prof./equivalents, 10.9% as Associate Prof./equivalents and 55.32% as Assistant Prof./equivalents.

Faculty distribution across the colleges/ directorates:

College of Agriculture: The College of Agriculture is one of the four constituent colleges of Punjab Agricultural University. This College had its roots in the Punjab Agricultural College and Research institute, Lyallpur (now Faisalabad, Pakistan). In 1963, the College of Agriculture had five departments viz. Agronomy, Extension Education, Horticulture, Plant Breeding and Soils and now there are 12 departments viz., Agronomy, climate change & Agricultural Metrology, Entomology, Extension Education, Floriculture & Landscaping, Food Science & Technology, Forestry & Natural Resources, Fruit Science, Plant Breeding & Genetics, Plant Pathology, Soil Science and Vegetable Science, and two schools viz. Agricultural Biotechnology and Organic Farming. The College of Agriculture imparts resident instructions in different disciplines of agriculture for developing human resources in agriculture. Besides, it lays thrust on carrying out research in agriculture and allied fields and disseminating the research findings among the farmers of the Punjab state for providing the security of sustainable livelihood to them. The college is offering bachelor's degree in four programmes, Master's Programme in 13 disciplines and Doctoral programme in 12 disciplines. At present 2244 students are on the rolls of the college of Agriculture. The college has adopted 5th Deans' Committee curricula from academic session 2016-17. The present faculty strength of the College is 326 including 110 Professors/equivalents, 22 Associate Professor and 194 Assistant Professor.

College of Agricultural Engineering & Technology: The College of Agricultural Engineering & Technology earlier named as College of Agricultural Engineering was established in the year 1964. In addition to imparting education in various aspects of agricultural engineering, the College has also played a leading role in solving the problems of the farmers and the industry by undertaking problem-oriented research and speedy technology transfer. The College has seven departments *viz*. Farm Machinery and Power Engineering, Processing and Food Engineering, Soil and Water Engineering, Civil Engineering and Mechanical Engineering, Electrical Engineering & Information Technology and Renewable Energy Engineering. The college offers B. Tech. (Agril. Engineering) 4-year programme. Besides, it also offers M. Tech. programmes in the disciplines of Farm Machinery and Power Engineering, Processing and Food Engineering, Soil and Water Engineering. Computer Science and Engineering, Remote Sensing and GIS, Civil Engineering (Hydrology and

Water Resources Engineering/ Structural Engineering) and Master in Computer Applications. The college also offers Doctorate programmes in various disciplines including Energy Science and Technology, Farm Machinery and Power Engineering, Processing and Food Engineering, and Soil and Water Engineering. The college has adopted 5th Deans' Committee curricula from academic session 2016-17. The present faculty strength of the College is 77 including 37 Professors/equivalents, 15 Associate Professors and 27 Assistant Professors.

College of Home Science: The College of Home Science was established in 1966 to cater to the need of empowering rural and urban women to contribute to family economy and improve their quality of life. The College houses five departments *viz*. Apparels and Textile science, Family Resource Management, Food & Nutrition, Extension Education & Communication Management, and Human Development & Family studies within position faculty strength of 39 teachers including 20 Professors, 05 Associate Professors and 14 Assistant Professors. Besides qualified faculty in its various fields, the College has Nursery School Teachers, and Crèche Supervisors. The College is currently offering B.Sc Hons. degree in Community Science and in Nutrition and Dietetics, Masters in six disciplines i.e. Apparel & Textile Science, Family Resource Management, Food & Nutrition, Extension Education & Communication Management and Human Development & Family studies.

College of Basic Sciences & Humanities: Keeping in view the significance of basic sciences for proper understanding and development of different areas of agriculture and allied fields, a School of Basic Sciences and Humanities was conceived which subsequently led to the establishment of College of Basic Sciences and Humanities in October, 1965. Close interaction between the basic and the applied sciences has added a new vigour to agricultural education and research. At present, the College has eight departments *viz*., Agricultural Journalism Languages & Culture, Biochemistry, Botany, Chemistry, Agricultural Economics & Sociology, Mathematics, Statistics and Physics, Microbiology, and Zoology apart from a School of Business Studies. The college has 106 faculty members who hold specializations in their respective fields and include 54 Professors, 10 Associate Professors and 42 Assistant Professors

Directorate of Research (DR) The Directorate of Research is headed by the Director of Research who is assisted by four Additional Directors of Research (ADR) in the areas of Crop Improvement, Natural Resource and Plant Health Management, Horticulture and Food Science, and Farm Mechanization and Bio-energy, Director (Farms) and Associate Director (Seeds) apart from Directors/In-Charges of the Research Stations/Seed Farms. In addition to the Research Farm at the main campus at Ludhiana, seven research farms and 3 fruit research stations of the University are located in different districts of the state representing various agro-climatic zones.

Directorate of Extension Education: The Directorate of Extension Education shoulders the

Table 5.1: Current faculty strength College/Directorate wise and Cadre wise

Name of College/ Directorate	Faculty Positions			Total Faculty
	Professor & Equivalent	Associate Professor & equivalent	Assistant Professor & equivalent	
College of Agriculture	110	22	194	326
College of Agricultural Engineering & Technology	37	15	27	79
College of Home Science	20	05	14	39
College of Basic Sciences & Humanities	54	10	42	106
Directorate of Research	21	14	57	92
Directorate of Extension Education	23	15	89	127
Director Student Welfare	01	01	02	04
Estate Office	0	0	01	01
Library	0	02	03	05
Total	**266**	**84**	**429**	**779**



responsibility of planning, implementation and coordination of various extension education programmes of all four constituent colleges and research stations. It has 18 Krishi Vigyan Kendras (KVKs) and 15 Farm Advisory Service Centres (FASCs). It maintains live and intimate links with the research departments one hand and the field level functionaries of different state departments, development agencies and farmers on the other. PAU is engaged in providing agricultural extension services through a network of *Krishi Vigian Kendras* (KVKs) and Farm Advisory Services Centers (FASCs) located in different districts of the State. The Directorate of Extension Education has strong linkages with State Department of Agriculture/ Horticulture/Animal Husbandry, semi-government organizations (KRIBHCO, IFFCO, ETC.), input supplying firms, Banks and many other government and Non Government Organizations(NGOs)/ progressive farmers. The Directorate of Extension Education has the faculty strength of 127 that includes 23 Professors, 15 Associate Professors and 89 Assistant Professors.

Faculty distribution in teaching, research and extension education

The current faculty distribution in teaching, research and extension education domains reflects

Table 5.2: Distribution of current faculty in Teaching, Research and Extension

Name of College/Directorate		Faculty positions			Total
		Teaching	Research	Extension	
College of Agriculture	Professor	20	85	05	110
	Assoc Prof	04	14	04	22
	Assistant Prof.	32	135	27	194
College of Agricultural Engineering & Technology	Professor	15	19	03	37
	Assoc Prof	08	05	02	15
	Assistant Prof.	10	15	02	27
College of Home Science	Professor	17	01	02	20
	Assoc Prof	01	02	02	05
	Assistant Prof.	09	05	0	14
College of Basic Sciences & Humanities	Professor	31	23	0	54
	Assoc Prof	06	01	03	10
	Assistant Prof.	15	25	02	42
Directorate of Research	Professor	0	21	0	21
	Assoc Prof	0	14	0	14
	Assistant Prof.	0	57	0	57
Directorate of Extension Education	Professor	0	0	23	23
	Assoc Prof	0	0	15	15
	Assistant Prof.	0	1	88	89
Directorate of Student Welfare	Professor	01	0	0	1
	Assoc Prof	01	0	0	1
	Assistant Prof.	02	0	0	2
Estate Office	Professor	0	0	0	0
	Assoc Prof	0	0	0	0
	Assistant Prof.	01	0	0	1
Library	Professor	0	0	0	0
	Assoc Prof	2	0	0	2
	Assistant Prof.	3	0	0	3
Grand Total		**178**	**423**	**178**	**779**

that 23% faculty is in teaching, 54% in research and 23% in extension education (Table 5.2). About 54% faculty in the University has the primary duty to conduct research; it includes 33.77% Senior Scientists, 10.9% Scientists and 55.32% Assistant Scientists. Apart from this, the faculty on teaching and extension side also devotes one-third time to research. In addition to this, faculty also guides postgraduate research, irrespective of the fact that he/she belongs to teaching, research or extension position.

Faculty Recruitments and Promotions:

A. Direct recruitment, promotion and retirements of faculty over last 5 years

Most of the faculty in the university were initially recruited through direct selection and later on moved as Associate Professor/equivalents through career advancement scheme (CAS). The recruitments of faculty are being done regularly and promotions under CAS for faculty are being regularly carried on and 171 Faculty promotions including 134 from Associate Professor and 37 from Assistant Professor to Associate Professor were made during this period as given below in Table 5.3.

Recruitment and Promotion Procedures

Details of selection process are given in Sub-section (1) of Section 15 of the University Act

The Appointment of Vice Chancellor

(a) The Board may either take up the matter on its own or elect a Screening Committee of three persons. The Committee shall select its own chairman. The Committee may advertise and/or obtain suggestions from such other persons, institutions and agencies as it may deem fit.

(b) On receipt of applications and/or suggestions mentioned in Clause (a) above, the Committee shall prepare a list of names of candidates for scrutiny. On the basis of this list, the Committee shall recommend at least three names to the Board in order of preference unless the number of eligible candidates is less than three.

Recruitment Process for Academic and other Administrative Officers.

For recruiting the best possible talent, the vacant positions in the University are advertised in the national as well as in regional newspapers and details are given on University website (www.pau.edu). The recruitment of the teachers is done by duly constituted committees by the Vice Chancellor of which he is the chairman. The other members of the committee include the subject matter experts, ICAR nominee etc. The selection is done on the basis of merit as determined by interview and the score card developed for the purpose.

Table 5.3: Year wise Direct Recruitment and Promotions of Faculty and Higher Positions over last 5 Years

Category	Recruitment/ promotion	Year					Year of last recruitment
		2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	
Statutory Officer		3	6	2	4	2	
Director		2	6	1	2	4	
ADR		3	3	3	1	5	
Head		5	11	10	5	6	
Professor/equivalent	Direct	0	0	0	0	0	
	Promotion	5	28	78	6	17	
Assoc.Professor / equivalent	Direct	0	0	5	2	0	Nov. 2017
	Promotion	16	5	4	3	9	
Asstt Professor	Direct	40	27	39	22	50	Dec. 2018
Asstt Prof	Promotion	0	96	97	23	51	
Retired faculty		16	29	29	24	16	



The Deans/Directors/Registrar/Comptroller/ Librarian/Estate Officer/Chief Engineer/ ADRs/ADEE/ ADC/Controller of Examination/HODs are appointed on tenure basis for a period of four years or till retirement which ever happen to be earlier. Head of Departments shall be selected out of the Professors in the concerned discipline of that department as well as Professors of the same discipline working in the University.

Direct recruitment for teachers

a) The detailed recruitment procedure for faculty is as under:-

i) The Vice Chancellor shall have the post advertised with such qualifications as may be laid down by him on the recommendations of the Academic Council.

ii) After advertising the post and receiving the applications, the Vice Chancellor shall appoint a Selection Committee to make recommendations.

iii) The Selection Committee shall have the following composition:-

(i) Vice Chancellor — Chairman

(ii) Academician — Members
(to be nominated by the Chancellor)

(iii) Three outside experts in the concerned subject/field out of the list approved by the Board of Management on the recommendations of the Vice Chancellor

(iv) Dean/Director concerned

(v) Head of the Department concerned

(At least four members including two outside Experts must constitute the quorum)

iv) The Chairman of the Selection Committee or his nominee shall scrutinize all the applications and prepare a list of the candidates who shall be either called for interview or considered in absentia. The reprints of three major publications of the candidates called for interview/to be considered in absentia (to be furnished by the candidate alongwith the application) shall be got assessed from the same three external experts who are to be invited as members of the Selection Committee. The Assessment Report will be placed before the Selection Committee.

v) The Selection Committee shall evaluate the qualifications, experience, report of the outside experts regarding major publications etc. of the candidates. However, weightage of interview shall not exceed 15% of the total marks.

vi) After interviewing the candidates or considering them in absentia, as the case may be, the committee shall recommend, as far as possible, at lease three persons in order of preference.

vii) In the case of appointment of Professors and Associate Professors and other teachers of equivalent rank, the Vice Chancellor shall, on receipt of recommendation of the Selection Committee, consider the same for acceptance. Where the Vice Chancellor decides to accept the recommendation of the Selection Committee, he will on behalf of the Board of Management, approve the appointment. The panel recommended by the Selection Committee shall be valid for a period of six months from the date of interview. Provided that if there is any representation against such appointment, addressed to the Vice Chancellor or when there is lack of unanimity in the meeting of the Selection Committee, only then the matter will be placed before the Board.

Faculty promotion policy:

Career advancement procedure and its implementation for all categories is as per UGC/ICAR guidelines. Academic Performance Indicator (API) scores and its proformae have been developed by the University taking into consideration the nature of job of faculty working in various disciplines and other responsibilities entrusted to them. Career Advancement Scheme (CAS) for Teachers Effective from 1.1.2009. The teachers to be considered for promotion to Assistant Professor, Associate Professor and Professor/equivalent under the new Career Advancement Scheme effective from 1.1.2009 from stage 1 to stage 2, grant of pay scale of Rs.15600-39100+AGP 7000/-; stage 2 to stage 3, grant of pay scale of Rs.15600-39100+AGP 8000/-; stage 3 to stage 4 as Associate Professor in the pay scale of Rs.37400-67000+AGP 9000/- and stage 4 to stage 5 as Professor and equivalent in the pay scale of Rs.37400-67000+AGP Rs.10,000/- respectively, may apply as per the performa of CAS as per under mentioned (Table 5.4) qualifications and service conditions.

Other Human resource (Administrative, technical and supporting)

A. Non teaching staff strength:

Apart from faculty there are 1593 non teaching

Table 5.4: Promotion of teachers under Career Advancement Scheme (CAS)

S.No.	Promotion of teachers through CAS	Service qualifications	Other conditions
1	Assistant Professor/ equivalent with AGP Rs.6000 to Assistant Professor/ equivalent with AGP Rs.7000	Assistant Professor with AGP Rs.6000 and completed 4 years of service with Ph.D. **or** 5 years of service with M.Phil./ M.Tech./ M.Sc.(Agri.), or any professional Master programme with 4 years duration Bachelor's degree. **or** 6 years of service for the rest (not having Ph.D./ M.Phil. degree, etc.)	Two training courses of 2-3 weeks duration.
2	Assistant Professor/ equivalent cadres with AGP Rs.7000 to Assistant Professor/ equivalent with AGP Rs.8000	Assistant Professor with completed service of 5 years in AGP Rs.7000	One training course of 2-3 weeks duration.
3	Assistant Professor/ equivalent with AGP Rs.8000 to Associate Professor / equivalent to Rs.9000	Assistant Professor with 3 years of completed service in AGP Rs.8000.	One training course of one week duration. At least 3 publications since the teacher is placed in AGP Rs.7000/- or equivalent in old pay scale.
4	Associate Professor/ equivalent with AGP Rs.9000 to Professor/ equivalent with AGP Rs.10000	Associate Professor on completion of 3 years service in AGP Rs.9000 and possessing Ph.D. degree in the relevant subject.	At least 5 publications since the teacher is placed in AGP Rs.8000 or equivalent in old pay scale.

staff of different categories against sanctioned strength of 2990 posts working at main university campus and outstations for providing necessary administrative, financial and technical support to the academic, research and extension programmes of the university.

B. Recruitment and Promotion of non-teaching staff:

Direct recruitment and promotions of different categories of non-teaching (administrative, ministerial technical and supporting) staff in the University is governed by Recruitment and Promotion (R&P) Rules for each cadre framed in accordance with the University act and statue. The qualifications for the recruitment to the posts of A, B, C and D category employees, selection procedure and composition of the selection committee shall be as per provisions in chapter 5.7 of PAU Statues and amendments made thereof from time to time. The details of the direct recruitments and promotions over the last 5 years is presented in Table 5.5.

Procedure for promotions/recruitments of non-teaching staff

The appointments by promotion shall be made on the basis of seniority-cum-merit. The appointments by direct recruitment shall be made strictly on merit.

The appointment of group 'A' employees excepting those mentioned in Schedule Part-IV (a & b) shall be made by the Vice Chancellor on behalf of the Board of Management. Seventy five per cent of the posts shall be filled by promotion. If suitable persons are available subject to the requirement of passing the prescribed departmental examination/test, if any, for the post held by the employee concerned, and the rest by direct recruitment from the open market, the employees of the University will also be eligible for appointment."



Table 5.5: Year-wise Direct Recruitment and Promotions of Different Non-Teaching Staff over last 5 years

Category	Mode of appointment	Year					Total	Year of last recruitment
		2013-14	2014-15	2015-16	2016-17	2017-18		
Administrative	Promotion	19	25	13	08	20	85	
	Direct	03	-	-	01	02	06	2018
Ministerial	Promotion	07	116	47	13	17	100	
	Direct	-	03	46	04	10	63	2018
Technical	Promotion	-	02	01	-	01	04	
	Direct	-	-	-	-	-	-	
Supporting	Promotion	43	14	40	50	08	155	
	Direct	36	15	09	24	26	110	2018
Total		**108**	**75**	**156**	**100**	**84**	**523**	

In case of group 'A' employees mentioned in Schedule Part-IV (b), the appointment shall be made by the Vice Chancellor by 100 per cent promotion subject to the requirement of passing the prescribed departmental examination/test, if any, for the post held by the employee concerned.

Manner of appointment by direct recruitment- The following procedure shall be adopted for making appointment to group 'A' posts by direct recruitment.

Ordinarily the selection committee consists of the following:

(a) The Registrar

(b) The Comptroller

(c) The Dean, Postgraduate Studies

(d) Any other person or persons nominated by the Vice Chancellor.

6.6.5.2 Participation of faculty in Symposia/workshops:

As a component of its continual human resource development policy, the University encourages its faculty to participate in national and international conferences, symposiums, workshops, training programmes, review meetings etc. being organized in India and abroad. The University also sponsors its faculty for overseas trainings and participation in international summer and winter schools conducted in reputed institutions and research laboratories abroad to expose them to best research technologies, methodologies, facilities and modern research tools in advanced areas of research. Such trainings not only develop the expertise of University faculty in specific advanced areas of research and technology but also help them to formulate and operate new research projects in emerging fields.

Participation of University faculty in National and International scientific events

During 2013-14 to 2017-18, the university faculty participated in 1223 national and 63 international scientific events organized in India and abroad. The year-wise and college-wise number of each scientific events (National and International seminars/ symposiums/ conferences/ conventions/ trainings/ workshops/ consultancy/ special assignments/ review meetings etc.) in which the University faculty had participated in India and abroad is given in Table 5.6 and a comprehensive list of all such events is given in Annexure VI.

6.6.5.3. Incentives for Excellence/ Faculty Recognition

The university is in the process of formulating fresh rules and regulations as per the ICAR guidelines for adoption of the ICAR-Best Teacher Award in the University. In addition there are different incentives/honour which are in place to duly recognize the faculty for their contributions.

a) ***Vice-Chancellor's Appreciation Certificate:*** The Vice-Chancellor of the University awards appreciation certificate to individual scientists/ group of scientists for the outstanding contributions in academics, research or extension during a particular year

b) ***Dr G S Khush Distinguished Professor Award:*** This award has been instituted by the Gurdev Singh Khush Foundation for Advancement of Agricultural Sciences. The applications for the

Table 5.6: Year and college-wise participation of the university faculty in national and International Seminars/ Symposia/ Conferences/ Trainings/ Workshops/ Conventions/ Consultancy/Special Assignments etc. in India and Abroad

S. No.	Establishment	Place	Year					Total
			2013-14	2014-15	2015-16	2016-17	2017-18	
1	COA	India	100	99	85	74	83	441
		Abroad	15	07	03	11	03	39
2	COAET	India	18	26	23	6	20	93
		Abroad	-	-	01	01	01	03
3	COHS	India	17	17	13	18	24	89
		Abroad	01	02	-	01	-	04
4	COBSH	India	46	32	25	30	44	177
		Abroad	03	01	-	01	-	05
5	DR/Research Stations	India	23	39	26	42	62	192
		Abroad	-	-	07	01	-	08
6	DEE	India	31	69	40	56	35	168
		Abroad	02	02	-	-	-	04
7	Total	India	235	282	212	226	268	1223
		Abroad	21	13	11	15	04	63

award are invited by the Dean, College of Agriculture from the Professors of the University each year. The committee approved by the Worthy Vice Chancellor examines the credentials of the applicants and selects the Distinguished Professor for the award.

c) ***Prof. Manjeet S. Chinnan Distinguished Professor Chair:*** Prof. Manjeet S. Chinnan Distinguished Professor Chair is created and selection is made solely on the basis of merit. The teachers/scientists who have minimum 6 years service as Professor are eligible for the Chair. The selected Professors are given Rs.25,000/- per annum for four years, on the basis of screening and evaluation of the applications by the committee approved by the Vice Chancellor.

d) ***Best Teacher Award in Agricultural Higher Education:*** The award is conferred every year. The applications are invited by the Dean, Postgraduate Studies (Coordinator as per rules). The Coordinator will receive the nomination from all Deans and thereafter, all nominations will be put up to the Judgment Committee for its final recommendation. The Vice Chancellor will approve one name recommended by the Judgment Committee.

e) ***Best Outstation Scientist Award:*** The award is given for outstanding work in teaching/ research/ extension annually. The concerned Director/In-charge of outstation may nominate a teacher in the prescribed proforma. The Director of Research will recommend research teachers/seed producing scientists and Director of Extension Education will recommend the extension teachers and respective Deans will recommend the teachers involved in teaching side at outstations. A core committee is approved by the Vice Chancellor. The recommendations of the said committee are submitted to the Vice Chancellor for approval.

f) ***Dr M. S. Randhawa Best Book Award:*** The entries of the books published during a calendar year are invited among faculty members for this prize by the Additional Director of Communication annually. For judging the best book, the entries are placed before the committee constituted as per rules contained in PAU Calendar. The recommendations of the committee are submitted to the Vice Chancellor for final approval.

g) ***Hans Raj Pahwa Memorial Award:*** The applications for the award are invited by the Dean, College of Agriculture after every two years. The award is open to all faculty members who are actively engaged in teaching, research or extension in breeding, production, protection, nutrition etc. in the discipline of Horticulture (Pomology or vegetable or floriculture). A Core Committee is approved by



the Vice Chancellor for the selection of the award, which is the final authority to finalize the award.

h) ***S. Gurcharan Singh Nihal Singh Wala Award:*** The applications for the award are invited by the Dean, College of Agriculture after every five years. The award is open to all the teachers of PAU (teaching, research or extension) in the discipline of Horticulture (Pomology). A Core Committee is approved by the Vice Chancellor for the selection of the award, which is the final authority to finalize the award.

i) ***Dr Satwant Kaur Memorial Best Extension Worker Award:*** The award is given to a teacher for outstanding contributions in extension education after every four years. A Core Committee was approved by the Vice Chancellor for the selection of the award, which is the final authority to finalize the award.

j) ***Smt. Harpal Kaur Memorial Award:*** The applications for the awardee are invited by the Director of Research in September after every four years. The award is given to the outstanding scientist in the discipline of (i) Vegetable breeding (ii) breeding in other crops (iii) Pomology and vegetable production. A Core Committee is approved by the Vice Chancellor for the selection of the award, which is the final authority to finalize the award.

k) ***Dr Harcharan Singh Sandhu Memorial Award:*** The biennium award is open to all teachers (teaching/ research/extension) in the discipline of Agronomy. The nominations are invited by the Dean, College of Agriculture in the prescribed proforma after every two years. The Award committee recommends one name out of the nominations received. The recommendations of the award committee are submitted to the Vice Chancellor for approval.

l) ***Award of Plaque & Merit Certificate:*** The applications are invited by the Registrar office from the faculty in recognition of their outstanding research, teaching and extension work through the controlling officers every year. A Core Committee is approved by the Vice Chancellor for the selection of the Award, which is the final authority to finalize the award.

6.6.5.4. Capacity Building and Training

For Faculty: The faculty in the University is motivated and encouraged for professional growth by providing an environment conducive to carry on the academic pursuits. The teachers are encouraged to compete for externally funded research projects, provide consultancies to private sector organisations and also for writing books, manuals, etc. Faculty members are also provided the necessary financial assistance for participation at national and international (wherever possible) level academic activities. The in-service faculty can avail study leave to improve their qualifications. A number of MoUs have been signed with national and international agencies for the benefit of faculty to improve their competencies. There is a provision of sabbatical leave for the faculty to work in international laboratories. A complete list of events related to capacity building including summer/ winter schools, CAFT trainings, workshops/seminar, etc. organized at PAU (year wise) has been given in Annexure VII. A total of 109 events were organized during the last five year at PAU which were useful not only for the faculty at PAU but from all parts of the country. The details of faculty participation in all such activities has already been presented in section 6.6.5.3.

For stakeholders

- PAU organizes trainings for the farmers and farm women at its main campus and all its regional KVK's. The details of the trainings are finalized at the start of each year in the form if a training calendar and the details are provided month-wise on its web page.
- A Skill Development Center has been established in 2015 at PAU Campus for imparting vocational trainings for Capacity Building/ Skill up-gradation of farmers and extension functionaries. The trainings were organized for quality seed grower, gardener, organic grower etc. Training of Master Trainers (ToMT) in agriculture and allied subjects i.e. Beekeeper, Organic grower, Agriculture extension service provider, Bulb Crop Cultivator, Solanaceous Crop Cultivator, Gardener, Asstt. Gardener, Nursery worker, Pesticide and fertilizer applicator, Green house operator, Micro Irrigation, Technician tractor operator, Tractor mechanic etc. were organized under Skill Development Centre at PAU. These trainings were provided to farmers, farm women, school dropout and youth of all categories (General/ SC /OBC).

Table 5.7: Capacity building activities organized at PAU (2013-18)

College	Refresher / summer/ winter course	Short Trainings	CAFT Trainings	Workshops /Seminars /Symposia	
				National	International
COA	05	30	10	26	-
COAET	06	41	-	18	-
COHS	05	03	-	28	-
COBSH	06	22	-	07	-

Trainings organized under Skill Development in Agriculture at PAU, Ludhiana:

- Baking Technician (2015)- 20 days duration
- Tractor Operator (2016)- 4 days duration
- Craft Baker (2016)- 52 days duration
- Tractor Operator (2016)- 4 days duration
- Organic Grower (2016) - 3 days duration
- Self employed tailor and hand embroider (2016)

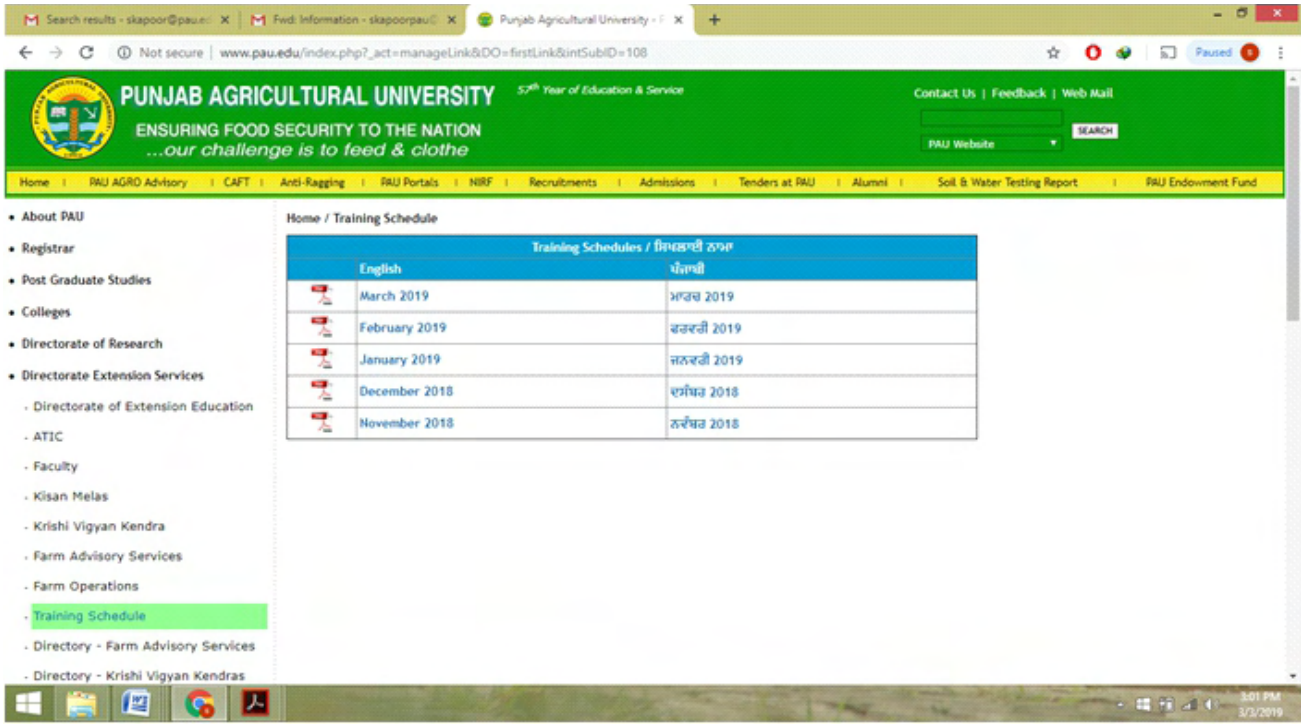


Capacity Building under CAFT Trainings at PAU

- 2 days duration
- Quality Seed Grower (2017) - 3 days duration
- Agriculture Extension service provider (2017) - 3 days duration
- Green House Fitter (2017) - 3 days duration
- Micro irrigation technician (2017) - 3 days duration
- Gardeners (2017) - 3 days duration
- Bee-keeper (2017) - 3 days duration

♦ In addition the following Diploma/ certificate programme have also been provided to intermediate qualified manpower for agriculture and allied fields:

- Ornamental Nursery Production Certificate Course of six months duration at PAU, Ludhiana
- Certificate Course in Floriculture and Landscaping of one year duration at PAU, Ludhiana
- Young Farmers Training Class of three months duration at PAU, Ludhiana
- Gardeners Training Course of six months duration at KVK, Gurdaspur and KVK, Bathinda
- Horticultural Supervisor Training Course of one year duration at PAU, Ludhiana



Screenview of training schedule for PAU and KVK on PAU web page

Chapter 6

Student Development

6.6.6 Student Development

6.6.6.1 Scholarships/Stipends:

PAU awards merit scholarship to one student for every seven students admitted to UG and PG programmes each. These merit scholarships are dispersed on the completion of each semester. In addition to PAU merit scholarships, other scholarships have been instituted by various organisations, industry and alumni for UG and PG programmes. The details of these scholarships are as given below:

University Scholarships: Awarded to meritorious students of undergraduate students programmes on the basis of performance in the entrance examination/ qualifying examination valued at Rs. 500/- p.m. The number of scholarships is determined by the Academic Council from time to time.

Marketing Board Scholarships: The Punjab State Agriculture Marketing Board awards merit-cum-means scholarships at the rate of Rs.750/- p.m. district-wise and for Kandi area for meritorious undergraduate students of the COA and COAET. These scholarships are awarded to the students hailing from rural areas of the Punjab state on fulfilment of prescribed conditions. The scholarship is awarded one each for each of the district of Punjab and Kandi Area.

ICAR Scholarships: The ICAR awards National Talent Scholarships for its nominees, based on AIEEA-UG conducted by the ICAR, for undergraduate programmes for full degree duration subject to fulfilment of prescribed conditions. The value of scholarship is Rs. 1000/- p.m.

Dr G.S. Khush Scholarships: Dr Gurdev Singh Khush Foundation awards scholarships @ Rs. 1200/- per student per month (Rs. 14,400 per annum lumpsum) to the students pursuing various undergraduate degrees. The scholarship is awarded only to the rural students who have passed matric from school located in rural area of Punjab.

Dr S.K. Vasal Scholarship: This scholarship @ 1500/- per month is awarded to one M.Sc. student with the highest OCPA in the discipline of Plant Breeding and Genetics.

Mrs Jaswant Kaur Bindra w/o Dr Onkar Singh Bindra Scholarship: This scholarship @ 3000/- per month plus contingency grant of Rs. 5000/- per annum is awarded to one M.Sc. student with the highest rank in the admission list from the discipline of Entomology.



Shri Bal Krishan Vaid Merit Scholarship: This scholarship @ 1000/- per month is awarded to one meritorious student each from 1st, 2nd, 3rd and 4th year class of B.Sc. Agri. (Hons) 4-year programme.

Sports Scholarships: The University awards sports scholarships @ 500/- p.m. on fulfilment of prescribed conditions. The number of scholarships is four for major games i.e. Hockey, Football, Athletics and Cricket and six for minor games i.e. Basketball, Badminton, Table-Tennis, Cycling, Handball, Volleyball, Lawn Tennis, Kabaddi, Weight Lifting, Power Lifting & Best Physique, Swimming & Shooting.

Punjab Govt. Scholarships*:* The Punjab Govt. also provides assistance to students subject to fulfilment of prescribed conditions under the following schemes: i) Post-Matric Scholarship scheme (Govt. of India); ii) Scholarship scheme for backward class students; iii) Fellowship scheme under State Scheduled Castes Welfare Department; iv) Scholarship for students belonging to Ex-criminal Tribes; v) National merit scholarship scheme; vi) State merit scholarship scheme; vii) Scholarship for Teachers wards; viii) Scholarship scheme for the wards of Terrorists/1984 riots affected families; ix) Grant for the wards of serving/exserviceman; x) Centrally Sponsored Scheme of Post Matric Scholarship to SC students; xi) Post-Matric Scholarships for OBC Students; xii) National Overseas Scholarship Scheme for SC Students for Higher Studies abroad; xiii) Central Sector Scholarship Scheme of Top Class Education for SC Students.

Dr G.S. Grewal Memorial Fellowship:This fellowship @ Rs. 2000/- per month is awarded to two M.Sc. students on merit basis (one each from 1st and 2nd year) from the discipline of Chemistry.

Dr S.S. Guraya Memorial Fellowship: This fellowship @ Rs. 1500/- per month shall be awarded to two M.Sc. students on merit basis (one each from 1st and 2nd year) from the discipline of Zoology.

Mrs Jaswant Kaur Bindra w/o Dr Onkar Singh Bindra Fellowship: This fellowship @ Rs. 4000/- per month plus contingency grant of Rs. 10000/- per annum is awarded to one Ph.D. student with the highest rank in the discipline of entomology.

Shri Amarpal Singh Sandhu Cash Award: Three cash awards have been instituted in the name of Shri Amarpal Singh Sandhu. Cash Award of Rs. 5,000/-, Rs. 3,000/- and Rs. 1,000/- are awarded to first, second and third Best Athlete (M) of University at the time of Annual Athletic Meet of the University.

Lata Mahajan Chinnan Cash Award for 1st, 2nd and 3rd Best Athlete and also a Gold Medal for Best Athlete: Three cash awards have been instituted in the name of Lata Mahajan Chinnan. Cash Award of Rs. 5,000/- Rs. 3,000/- and Rs. 1,000/- are awarded to first, second and third Best Athlete (W) of University at the time of Annual Athletic Meet of the University. Also a Gold Medal is awarded in the name of Lata Mahajan Chinnan to the Best Athlete (W) of the University at the time of Annual Athletic Meet of the University.

Devinder Singh Bansal Memorial Cash Prize: Cash award of Rs.1,000/- instituted in the name of Devinder Singh Bansal. It is given to the Best Cyclist of the year.

Sardar Arjan Singh Bhullar Cash Award: Cash award of Rs. 5,000/- instituted in the name of S Arjan Singh Bhullar is given to the Best Hockey Player of the year.

Lt. Triveni Singh Thakur Cash Award: Two cash awards of Rs. 5000/- instituted in the name of Lt. Triveni Singh Thakur are given to each Men and Women best athlete.

College of Agriculture Alumni Association Scholarships: Alumni Association of the College of Agriculture awards scholarships @ Rs. 1000/-p.m. on merit basis, one each for each of the class of B.Sc. Agri. (Hons) 6-year programme.

Piara Singh Parmar Memorial Society awards: The society has instituted the following Medals, Sports Fellowships and financial aid in the memory of Piara Singh Parmar, a meritorious M.Sc. student of Agronomy and a National Level Handball player.

***Plant Pathology Alumni Medal with Cash Prizes*:** Plant Pathology Alumni Medal with Cash Prize of Rs.25,000/- is awarded to the meritorious student of M.Sc. Plant Pathology for excelling in academics.

***Two Sports Fellowships*:** Two Sports Fellowships of Rs.25,000/- are awarded to Outstanding Sports Persons excelling in any game at the state level or above.

***Financial Aid*:** Nine deserving needy students from the College of Agriculture, College of Basic Sciences & Humanities and College of Agricultural Engineering & Technology are given financial aid of Rs.20,000/- each to facilitate their studies.

Lata Mahajan Chinnan Sports Scholarship for

Women: Scholarship in the name of Lata Mahajan Chinnan for Five Women Best Sportspersons of the University @ Rs. 1000/- per month.

Alumni Gold Medal for Excellence in Academics in Chemistry/Biochemistry: The Medal is instituted by Alumni batch of B.Sc. (Hons) programme (1970-74) of Chemistry/ Biochemistry. It is awarded to the student obtaining highest OCPA in M.Sc./Five Year Integrated M.Sc. (Hons) programme in chemistry/ Biochemistry.

Alumni Cash Award for Excellence in Research in Chemistry/Biochemistry: The Cash Award is instituted by Alumni batch of B.Sc. (Hons) programme (1970-74) of Chemistry/ Biochemistry. It comprises of a certificate and Rs.10,000/- and is awarded to a student showing excellence in research conducted in M.Sc./Five Year Integrated M.Sc. (Hons) programme in Chemistry/ Biochemistry.

Need based financial support is also extended to the students through Students' Aid Fund and Alumni funds available at college and university level. Students are encouraged and prepared to compete for national and international fellowships and funding opportunities to get admissions in other universities. The detail of the various scholarships on by the students is given below (Table 6.1 & 6.2)

6.6.6.2 Extra and Co-curricular Activities:

PAU organises sports and co-curricular activities regularly for the overall development of the students (Table 6.3). Inter college youth festival, athletic meet and game wise tournaments are the regular features in the academic calendar of PAU. Further the university students are prepared to represent in Inter Zonal and National level competitions/ events which are organised by Association of Indian Universities (AIU), Indian Council of Agricultural Research (ICAR), State and National government Youth Welfare departments (Table 6.4, 6.5 & 6.6). Presidents for various club activities like Dance, Drama and Music Club (DDMC), Literary and various sports/games have been appointed at college and university level to organise these activities on regular basis.

NCC/NSS/NSO units

National Sports Organisation (NSO), National Service Scheme (NSS) and National Cadet Corps (NCC) Enrolment

Every student enrolling for Bachelor's degree course in the University is required to participate in any one of the three fold programmes i.e. NSO, NSS and NCC in the first and second year. The foreign nationals are exempted from these programmes.

Table 6.1: Scholarships earned by students (Year-wise 2013-18)

Year	University Merit Scholarship (UG)	NTS	Other scholarships (UG)	University Merit Scholarship (PG)	PG scholarships/ fellowships (ICAR/ CSIR/ UGC/ INSPIRE / ICMR/ others
2013-14	151	39	271	218	142
2014-15	141	38	308	259	161
2015-16	156	34	295	233	154
2016-17	152	89	451	279	161
2017-18	158	94	423	298	154

Table 6.2: Total scholarships earned by students in five years (College wise)

Year	University Merit Scholarship (UG)	NTS	Other scholarships (UG)	University Merit Scholarship (PG)	PG scholarships/ fellowships (ICAR/ CSIR/ UGC/ INSPIRE / ICMR/ others
COA	505	198	1638	661	441
COAET	143	62	75	147	36
COHS	110	4	14	106	119
COBSH	-	34	27	382	136



Table 6.3: Sports events organised at PAU

Sr. No.	Year	EVENT
AIU/ICAR Zonal/National level		
1.	2014-15	North Zone Inter Varsity Hockey (M) Tournament
2.	2017-18	North Zone Inter Varsity Handball (M) Tournament
PAU Inter College events		
1.	2013-14	• 48th Annual Athletic Meet
		• Annual NSO Coaching Camp
2.	2014-15	• 49th Annual Athletic Meet
		• Annual NSO Coaching Camp
3.	2015-16	• 50th Annual Athletic Meet
		• Annual NSO Coaching Camp
4.	2016-17	• 51st Annual Athletic Meet
		• Annual NSO Coaching Camp
		• International Day of Yoga
5.	2017-18	• 52nd Annual Athletic Meet
		• Annual NSO Coaching Camp
		• International Day of Yoga

Table 6.4: Participation and Recognitions of students (ICAR Inter Agri Sports & Games Meets and others)

YEAR	Event	Competition All India Inter-Agricultural University Sports & Games Meet	North Zone Inter-University	All India Inter-University	National	International
2013-14	Shooting	-	-	-	Gold Medal	Participation
	Basketball (M)	Gold Medal	-	-	-	-
	Badminton (M)	Gold Medal	-	-	-	-
	Volleyball (M)	Gold Medal	-	-	-	-
	Table Tennis (W)	Gold Medal	-	-	-	-
	1500 m	1st position	-	-	-	-
	Shot Put	1st position				
	Discus Throw	1st position				
	800M	2nd position				
	4 x 100 m Relay	3rd position				
	High Jump	3rd position				
	100M	3rd position				
		Runner-up trophy in Athletics				

2014-15	Hockey (M)	-	2nd Position	-	-	-
		Trophy Team Games (M)				
	Power Lifting	-	-	3rd Position	-	-
	Shooting	-	-	-	3rd Position	
2015-16	Basketball (M)	Gold Medal	-	-	-	-
	Badminton (M)	Gold Medal	-	-	-	-
	Volleyball (M)	Gold Medal	-	-	3rd position	-
	Badminton (W)	Silver Medal	-	-	-	-
	Shot Put	1st Position	-	-	-	-
	1500M	1st Position				
	800M	2nd Position				
	100M	2nd Position				
	Discus Throw	3rd Position				
	400M	3rd Position				
		Overall Trophy				
2016-17	Power Lifting (M)	-	-	-	-	Participation
	Basketball (M)	Gold Medal	-	-	-	-
	Basketball (W)	Gold Medal	-	-	-	-
	Badminton (M)	Silver Medal	-	-	-	-
	Volleyball (M)	Silver Medal	-	-	-	-
	Shot Put	1st Position	-	-	-	-
	Discus Throw	1st Position				
	High Jump	1st Position				
	110 m Hurdles	1st Position				
	400 m	2nd Position				
	800 m	2nd Position				
	1500 m	2nd Position				
2017-18	Power Lifting (M)	-	-	-	3rd Position	-
	Basketball (M)	Gold Medal	-	-	-	-
	Handball (M)	-	Gold Medal			
	Volleyball (M)	Silver Medal	-	-	-	-
	Discus Throw	1st & 2nd Position	-	-	-	-
	Shot Put	2nd Position				
	High Jump	3rd Position				
	800 m	2nd Position				
	1500 m	2nd Position				
		Runner-up Trophy Team Games (M)				

The Dean/Director Students' Welfare completes the enrolment of students under the particular programme/scheme and forward the same to the Registrar for completing the personal files of the students.







Sports events at PAU

Table 6.5: Cultural activities organised

Sr. No.	Year	EVENT
AIU/ICAR Zonal/National level		
1.	2013-14	ICAR & NAAS North Zone Inter University Extempore Competition on 1st November, 2014
2.	2015-16	AIU North Zone Inter University Youth Festival, January 14 – 18, 2016.
PAU Inter College events		
1.	2013-14	• PAU Inter College Youth Festival, October 21-27, 2013
2.	2014-15	• PAU Inter College Youth Festival, October 30 – November 5, 2014
		• Punjabi Folk Dance (Gidha) Workshop, November 26, 2014
3.	2015-16	• PAU Inter College Youth Festival, November 17 – December 4, 2015
4.	2016-17	• PAU Inter College Youth Festival, November 3-11, 2016
		• Punjabi Folk Dance (Bhangra and Gidha) Workshop, September 1 – 20, 2016
5.	2017-18	• PAU Inter College Youth Festival, October 25 – November 3, 2017



Cultural events at PAU



Yoga Camp by NSS



Table 6.6: Participation and Recognitions of students (ICAR Inter Agri Youth Festivals and others)

YEAR	Event	All India Inter-Agricultural University Youth Festival	AIU North Zone Inter-University Youth Festival	AIU National Inter-University Youth Festival
2013-14	Installation		Silver Medal	Silver Medal
	Group Song & Poster Making		Bronze Medal	
	Group Mime Light Vocal Solo Indian Group Song Folk Dance Bhangra	Gold Medal Silver Medal Bronze Medal 4th Position		
2014-15	Cartooning Clay Modeling	Gold Medal Silver Medal	Bronze Medal	
	Group Song Indian & Light Vocal	Gold Medal		
	Poster Making	4th Position		
2015-16	Installation	Silver Medal	Silver Medal	
	Debate Cartooning Rangoli Clay Modeling	Bronze Medal Bronze Medal Bronze Medal Bronze Medal		
	Group Song Indian Patriotic Group Song Poster Making	Gold Medal Silver Medal Bronze Medal		
2016-17	Light Vocal Solo Cartooning		Bronze Medal	Silver Medal Bronze Medal
	Cultural Procession Skit & Cartooning		Silver Medal Bronze Medal	
	Debate Elocution & One Act Play Group Mime, Rangoli & Collage Patriotic Group Song & Painting	Gold Medal Silver Medal Bronze Medal 4th Position **Overall Trophy**		
2017-18	Group Song Indian Light Vocal Solo Poster Making	Gold Medal Bronze Medal Bronze Medal		

National Service Scheme (NSS)

NSS programme aims to inculcate the idea of social welfare in students, and to provide service to society without bias. In this programme, students work to help the needy people in order to enhance their standard of living. Details of activities carried by NSS group is given in Table 6.7.

- ***Activities Against Social Evils***
  - o The Awareness/knowledge regarding ill effects of burning of paddy, adoption of organic farming, HIV/AIDS awareness, warning against ill effects of drugs, judicious use of ground water, road safety and environmental pollution was spread among masses through banners, posters, distribution of literature, hand bills and interactions with rural as well as urban people at the campus during the *Kisan Melas* held in March and September every year.
  - o NSS volunteers participated in Poster

Table 6.7: Details of activities carried out by NSS students

Year	Total volunteers enrolled	One day Regular Activity Camps	Seven days Special Camps	Extra Camps Under NSS as special events	Blood Donation Camps	NAC	Participation in			
							Pre-RD Parade Camp	RD Parade Camp	BCS	NYF
2013-14	180	20	1	-	-	-	-	-	-	20
2014-15	193	22	1	-	3	-	-	-	-	-
2015-16	218	23	1	2	1	-	-	-	7	-
2016-17	263	30	1	5	3	20	-	-	10	-
2017-18	225	41	1	9	2	39	3	1	10	4

NAC - National Adventure Camp, Pre-RD - Pre-Republic Day Parade Camp, RD Parade Camp - Republic Day Parade Camp, BCS - Bharatiya Chhatra Sansad, NYF - National Youth Festival



Making and Essay Writing Competitions on International Biodiversity Day, World Environment Day and depicted HIV/AIDS awareness, warning against ill effects of drugs etc., judicious use of ground water and environmental pollution.

- Rallies were organized to advocate social evils like drug addiction, child labour, communalism, HIV/AIDS awareness, clean and green environment, etc.

- ***Environment Conservation***
  - Plantation of around 3000 saplings was carried out at University campus and the University Seed Farm, Ladhowal under guidance of Department of Forestry & Natural Resources.
  - Under the national initiative Swachh Bharat Abhiyan, NSS volunteers participated in Swacch Bharat Hackathon at MGSIPA organized by Ministry of Drinking Water and Sanitation and cleaned various places of PAU.

- ***Blood Donation and Health Awareness Activities***
  - Blood Donation Camps were organized in collaboration of Red Cross Society and Civil Hospital, Ludhiana. Blood donation camp was conducted under the Match for bone marrow campaign for Thalassemia and Leukaemia awareness with Mylan group. The NSS volunteers also donated blood to the needy patients in local hospitals as and when needed.
  - Lecture on legal aids, women empowerment and legal rights was delivered by CJM Dr. Gurpreet Kaur.
  - Guest lecture by Youth Peace Foundation on 'celebrate life'.

- ***Training on Traffic Regulation and Educating Citizens***

NSS Volunteers of the University participated in Training on Traffic Regulation





and Educating Citizens of Ludhiana regarding Traffic Rules and Regulations organized by Ludhiana Traffic Administration at Traffic Park, Near Bus Stand, Ludhiana.

- ***National Days Celebrations***

  NSS Day is celebrated on September 24, every year. Lectures were delivered on 'NSS and its Genesis', 'Dr. Radha Krishanan- A Great Philospher – Teacher', 'Mother Teresa : A Noble Peace Laureate', 'Swami Vivekananda : A Youth Icon' and 'Mahatma Gandhi'.

- ***Republic Day and Independence Day Celebrations*:** These national days were celebrated by NSS Volunteers of PAU with great enthusiasm.

- ***Other Activities***
  - Book donation drive with Helping Hands Clubs (3 days) was organized.
  - Signature camp for simple marriage was conducted during Kisan Mela.
  - Candle march was conducted by NSS volunteers for martyrs of India on Martyrs Day and also to abolish Nuclear weapons.
  - Ms. Saachi Chugh and Ms. Kritika Gupta, NSS Volunteers of Punjab Agricultural University were awarded with Swami Vivekananda Youth Award for their contribution to society for the year 2015-16.
  - Mr. Asish Kumar Padhy, NSS volunteer got National Award for his contribution to agricultural society as social worker by AIASA and ICAR 2015-16 and he also got Dr. Dalip Singh Deep Memorial Award (2015-16) and Swami Vivekananda Youth Award for the session 2016-17.

National Cadet Corps (NCC)

- In each semester, 40 hours of parade are held and every student who has opted NCC must participate in minimum of 75% parades. The students undergoing compulsory NCC training must to attend one annual training camp.
- Every year NCC cadets participate in the functions organized by the University on Independence Day and Republic Day, and present a Guard of Honour to the Vice Chancellor the Chief Guest on the occasion. NCC cadets are also deputed on various *Kisan Melas* organized by the University to help and guide the farmers and others who come to visit the University. The cadets also participate in the Annual Athletic Meet of the University every year. Swatch Bharat Abhiyan and National Yoga Day are celebrated by the NCC cadets.
- Mr. Harkirat Singh (L-2013-A-103-BVI) of College of Agriculture has joined as Lieutenant on the basis of 'C' certificate. The accomplishments of NCC cadets are given in Table 6.8.



Table 6.8: Accomplishments of NCC cadets

College	College of Agriculture			College of Agriculture Engineering & Tech			College of Home Science			College of Basic Science			Total no of B and C certificate holders		
Year	Total	'B'	'C'	Total	'B'	'C'	Total	'B'	'C'	Total	'B'	'C'	Total	'B'	'C'
2012-13	23	16	6		-	-		-	-		-	-	23	16	6
2013-14	15	21	6		-	-		-	-		-	-	15	21	6
2014-15	28	15	13	2	-	-	2	-	-	3	-	-	35	15	13
2015-16	37	11	5	2	2	-	7	1	-	8	3	-	54	17	5
2016-17	34	9	8	28	-	2	6	4	1	6	5	-	54	18	11
2017-18	34	14	6	12	4	4		3		4		4	54	18	13





6.6.6.3 Health Facilities:

To meet the medical needs of students, faculty and staff, PAU has University Hospital in the campus on an area of 16604 sq. Ft. Facilities available at PAU hospital are:

OPD facility with 3 medical officers

Clinical laboratory

24 beds

Radiology – X-ray unit

Biochemistry – Autoanalyzer, Cell counter and other biochemistry tests

Ambulance

The Academic Council of the University has approved the personal accident cover for the students under the Students Group Accident Insurance Policy (YUVA RAKSHA).

6.6.6.4 Sports and Cultural Facilities:

The University has excellent facilities for sports and games. Amongst sports infrastructure, Synthetic Hockey surface (Astroturf), Cycling Velodrome and Swimming Pool (21528 sq. ft.) stand out as landmark facilities, which are as per the specifications of international competitions. In addition to these, there are athletics track, courts for Lawn Tennis, Badminton, Volley Ball, Hand Ball, Basket Ball and grounds for Cricket and Soccer (Table 6.9). The University also has a modern gymnasium (39000 sq. ft.) facility with seating capacity of 2000, housing indoor badminton courts, table tennis, body building and weight lifting facilities in addition to other indoor games. These facilities are also provided in hostels for the students.

6.6.6.5 Student Counselling & Placement Cell:

The university Counselling and Placement Guidance Cell provides placement assistance to the students in relevant organizations (Table 6.10). It also takes care of the overall development of the students. In this direction, various activities like guest lectures, mock interview and subject tutorials from corporate personalities are organized from time to time (Table 6.11). On-campus recruitment process/interviews are organised with the employer organizations for providing career opportunities to pre-final/final year students. Liaison with the prospective employers and students' data base are maintained at university and college levels. Exclusive infrastructural facilities like spacious interview rooms, seminar hall and internet are available.

The Mode and Mechanism followed for Counselling are as follows:

- The university has appointed dedicated Placement Coordinators for all the constituent colleges, who act as a liaison between the students and the Placement Cell.
- The university contacts all the prospective companies which have the requirement of agricultural graduates and than an invitation is extended to all those companies to share the job requirements with the eligible students.
- Some companies contact the university directly with their requirements and after getting the details, the same are shared with the students and applications are invited.
- Students are regularly updated about the various opportunities available in the Public Sector organizations and are guided to apply accordingly.
- Frequent Seminars, expert lectures and Interactions are organized for the students to provide them the information on career opportunities.



Table 6.9: Sports and Games Facilities

Sports	Infrastructure			Whether as per Standard Specifications	
	Name	Type	Number	Yes	No
Indoor					
Badminton	Court	Wooden	3	Yes	-
Body Building, Power Lifting & Weight lifting	Stage	Multistation Gym, Single Station exercises + free weights	Separate gym for boys & girls.	Yes	-
Table Tennis	Hall	Cemented	5	Yes	-
Shooting	Hall	Cemented	1	Yes	-
Outdoor					
Athletics	Track	Grass	1	Yes	-
Cricket	Field	Grass	1	Yes	-
Cycling	Velodrome	Cemented International Level	1	Yes	-
Football	Field	Grass	2	Yes	-
Handball	Court	Clay+Grass	2+1	Yes	-
Hockey	Field	Astroturf+Grass	1+2	Yes	-
Kabaddi	Court	Grass	1	Yes	-
Swimming	Pool	Outdoor	1	Yes	
Tennis	Court	Clay + Cemented	2+3	-	-
Water Polo	Pool	Outdoor	1	-	-
Basketball	Court	Cemented	3	Yes	
Volleyball	Court	Clay	3	Yes	





Table 6.10: Campus Placement of students

Year	PSU	Private	RF/TA	Total
2013-14	44	110	171	71
2014-15	39	181	42	262
2015-16	48	150	39	237
2016-17	56	112	24	192
2017-18	68	135	35	238



Students personality development workshops

Table 6.11: Workshops and events organized for the Personality Development of the Students from 2013-14 to 2017-18

S. No	Topics of Sessions / Workshops	Number of Sessions each Year				
		2013-14	2014-15	2015-16	2016-17	2017-18
1	Personality Development	15	6	2	10	4
2	Communication Skills	13	2	3	3	4
3	Team Building	6	2	1	2	4
4	Resume Writing	2	1	1	1	4
5	Vedic Maths	2	1	1	1	-
6	Group Discussion and Mock Interviews	7	1	4	1	4
7	Self Defence for Girls	1	1	1	1	-
8	Entrepreneurship Skills	2	1	3	3	4
9	Social Issues	2	1	4	7	4
10	Yoga and Meditation	1	1	1	2	-
11	Designing Skills (Workshop)	-	-	-	-	1
12	Soft Skills and Grooming (Workshop)	-	-	-	-	1
13	Defense Forces as Career Option (Workshop)	-	-	-	-	1
14	Counseling Session (Workshop)	-	-	-	-	1
Total		**51**	**17**	**21**	**31**	**32**



- All the information is shared with the students through personal contact, electronic media using the batchwise database.

6.6.6.6 Disabled Friendly Facilities:

PAU has deep concern for the comfort of differently abled students, faculty and staff persons and has made proper arrangements to provide facilities in the college premises and other buildings to avoid any inconvenience to them. Ramps are constructed for providing easy access to the multi story buildings. Wheel chairs are made available for the movement in the buildings and sections of the university. Special arrangements are also made in the washrooms for the comfort and convenience of differently abled persons.

Chapter 7

Infrastructure

6.6.7 Infrastructure

PAU main campus is spread across an area of 1221.3 acres at Ludhiana and with an off-campus area of 5557 acres in various parts of the state. The university has four constituent colleges, *viz.* College of Agriculture, College of Agricultural Engineering & Technology, College of Home Science and College of Basic Sciences & Humanities, besides Institutes of Agriculture at Gurdaspur and Bathinda. The university has seven Research Stations, located at Ballowal Saunkhri (Shaheed Bhagat Singh Nagar), Gurdaspur, Faridkot, Bathinda, Abohar, Kapurthala and Dyal Bharang (Amritsar) and three Fruit Research Stations, situated at Gangian (Hoshiarpur), Bahadurgarh (Patiala) and Jallowal & Lesriwal (Jalandhar). For the seed production of new varieties university has five Seed Farms, located at Naraingarh (Fatehgarh Sahib), Ladhowal (Ludhiana), Nabha (Patiala), Usman (Taran Taran) and Birsikhan wala (Faridkot).

6.6.7.1 Physical facilities including administrative building and lands

The physical facilities available with university are given below (Table 7.1):

Table 7.1: Institutional area of the University

Institutional details	Area (Acres)
Total area of the main campus	1221.3
i. Colleges and residential buildings	531.2
ii. Farms	690.1
Total area with Regional Research Stations	1488.95
Total area with KVKs	582.99
Total area with Seed Farms	3360.38
Total area with Fruit Research Stations	124.68
Total Institutional Area	**6778.3**



Administrative Buildings: The main campus at Ludhiana is very well laid out. The main Administrative Building is named after the first Vice Chancellor of the University, Dr P.N. Thapar, ICS. This building has a floor area of 54311 sq. ft. and houses offices of Vice Chancellor, Registrar, Comptroller, Dean of Postgraduate Studies, Director of Research, Estate Officer and the Chief Engineer and their establishments.

The Directorate of Extension Education is established in the Dr Khem Singh Gill Farmers' Service Centre. It has an area of 25992 sq. ft and was established in 1999 with the main objective to provide "Single Window Delivery System." The Centre addresses the field problems of visiting farmers. The other activities include sale of farm literature, quality seed and bio-fertilizers (Rhizobium culture). Similarly, the Directorate of Students Welfare operates from the dedicated building in the campus and exclusively caters to the sports, games, cultural and literary activities of the students as well as providing accommodation facility to the students in university hostels.

The four constituent colleges (Table 7.2) of the university are located on the main campus. The offices of the Deans and their establishments are located in the respective buildings of each college.





Classrooms and Laboratories

Each college is provided with sufficient number of classrooms, teaching and research laboratories, seminar rooms, committee rooms and computer rooms. In addition to well furnished classrooms, there is sufficient number of state-of-the-art Smart Classrooms in each college equipped with multimedia projector, computer with power back-up, interactive board, internet connectivity and recording facilities. There are facilities available to facilitate video-conference in College of Agricultural Engineering & Technology, College of Home Science, and College of Basic Sciences & Humanities. Each classroom can accommodate 60-65 students but each class has 40-50 students with 2 practical groups of 20 – 25 students each. The UG laboratories are usually 24' x 36' or 24' x 48', thus there is sufficient space for each student to carry out the practicals.

Table 7.2: College wise infrastructure

Sr. No.	Name of the College	Building	Area (sq. ft.)
1	College of Agriculture	Main building Departmental and associated buildings	674890 307674
2	College of Agricultural Engineering & Technology	Main Building Implement Shed	165110 17115
3	College of Home Science	Main Building	60480
4	College of Basic Science & Humanities	Main Building New Wing & SBS building	62014 41795

Examination halls: The university has two Examination Halls. The main examination hall can accommodate 400 students. A new examination building has been constructed with five classrooms on first floor (capacity 250) and two examination halls on 2nd and 3rd floor which can accommodate around 500 students during examinations





Examination Hall

Instructional Farms: The University has revised and implemented the course curricula as per the recommendations of V Deans' Committee at undergraduate level and as per the recommendations of National Core Group constituted by ICAR at the postgraduate level. The new curricula have laid more emphasis on practicals; therefore, the University has strengthened/created instructional farms (Table 7.3) in the prioritized areas. The area of Practical Crop Production farm is 42 acres. A group of 4 students is given 1 acre to perform all agronomic practices and is managed by students as "Earn while you Learn".



Earn while you learn

Table 7.3: Research and Instructional Farm Area (acres)

Sr.No.	Name of the department	Research Area	Nursery area/	Teaching Area	Building and Screen houses	Total area
1	Agronomy	42.0	-	-	27.0	78.0
2	Climate Change & Agrometerology	5.0	-	-	0.25	5.25
3	Entomology	6.50	-	-	6.10	12.60
4	Forestry and N.R.	35.0		7.0	-	42.0
5	Fruit Science	78.0	10.0	5.0	7.0	100.0
6	Vegetable Science	28.0	2.0	-	0.5+0.5	31.0
7	Landscape & Floriculture	6.0	-	8.0	-	14.0
8	Plant Breeding & Genetics	205	18.75	-	6.0	229.75
9	Soil Science	55	-	-	2.0	55
10	School of Organic Farming	24.0	-	1.0	-	25.0
11	Farm Machinery & Power engineering	58.0	-	-	-	58.0
12	Soil and Water Engg	14.0	0	1.0	1.55	16.55
13	Genetics and Biotechnology	35.0	-	-	-	35.0
14	Botany	0.75	-	-	-	0.75
	Others	-	-	-	-	83.0
	Total					785.0



Green house, Glass house, Poly house: The university has created infrastructure in the form of green/glass/poly/net houses at the main campus as mentioned in the Table 7.4. In addition the regional research stations and KVKs also have their own facilities for protected cultivation trials and demonstrations.

Table 7.4: Number of Green/glass/poly/net houses

College	Green house	Glass house	Poly house	Net house
College of Agriculture	24	8	18	54
College of Agricultural Engineering				
& Technology	0	0	7	1
College of Basic Sciences & Humanities	0	2	0	0

Auditoria

The University has several auditoria of different capacities suited for various kind of uses (Table 7.5). Each auditorium is equipped with the latest audio-visual equipment, comfortable seating arrangement, air-conditioning, stage lighting and sound systems.

Table 7.5: Seating Capacity of Auditoria at PAU

Name of Auditorium	Capacity (Seats)
Pal Auditorium	630
Shaheed Bhagat Singh Auditorium	110
Jaccob Hall	200
Open Air Theatre	5000
Manmohan Singh Auditorium	933
MS Randhawa Library Auditorium	70
Kulwant Singh Virk auditorium	64
Wheat auditorium	180

Students' Hostels

At present, around 2250 students have been accommodated in the hostels at PAU (Table 7.6). There is one hostel exclusively for international students with all the modern facilities. All the hostels have secured Wi-Fi internet connectivity. Indoor games (table tennis, carom, badminton etc.) are





A view of Poly house





A view of Auditoria at PAU





Boys hostel at PAU

Table 7.6: Hostels at PAU and their capacities

S. No.	Name of Hostel	Capacity	Area (sq. ft.)	Wi-Fi	Number			
					Cubicles	Two seater dorms	Three seater dorms	Four seater dorms
Boys Hostels								
1.	Hostel No. 1	204	48400	Yes	83	-	-	30
2	Hostel No. 2	204	48400	Yes	84	-	-	30
3	Hostel No. 4	213	54754	Yes	54	-	53	-
4	Hostel No. 7 Hostel No.13	155 156	47229 -	Yes No	155 -	- 78	- -	- -
5.	Hostel No. 15 Dr.M.S.Kang Boy's Hostel)	111	1068	No	-	-	37	-
Girls Hostels								
6.	Hostel No. 5	138	-	No	74	32	-	-
7.	Hostel No. 6	218	1100	Yes	-	13	64	-
8.	Hostel No. 10	90	-	Yes	-	-	30	-
9.	Hostel No. 11	457	-	Yes	31	06	124	-
	Girls Hostels (A, B, C, D, E, F and G Block), PGAL, PGB							
10.	Hostel No.12	86	-	No	01	05	15	-
11.	Hostel No. 14 Amrita Pritam's Girl's Hostel	105	-	Yes	-	-	35	-
12.	HostelNo. 16 Dr. Satwant Kaur Mann Girl's Hostel	108	-	Yes	-	-	36	-
Boys and Girls Hostel								
8	International Students Hostel	60	10658	Yes	24	18	-	-
	Total	2,305	-	-	508	148	354	75

available in the hostels. Each hostel has a common room with an LED television (Local cable TV), magazines and newspapers. Adequate housekeeping staff has been provided for proper



cleanliness and upkeep of the hostel premises and rooms.

University Residential Areas –Buildings

Different categories of houses for all classes of the employees available on the campus are given in Table 7.7, but the number is not sufficient and consequently a large number of faculty and staff live out-side the campus.





On-campus residential accommodation at PAU

Guest Houses

The University has well furnished guest houses (Table 7.8) for accommodating national and international visitors. **The *Kairon Kisan Ghar*** is the guest house meant for the accommodation of farmers and trainees who come to the University to attend different training programmes.

Table 7.8: Details of Guest house at PAU

Sr. No.	Name of Guest House	No. of rooms
1	Sutton House	4
2	Parker House	96
3	Dr DS Athwal International Scientist Centre	7
4	Kairon Kisan Ghar	50
5	Sukhdev Singh Bhavan/ Faculty House	2



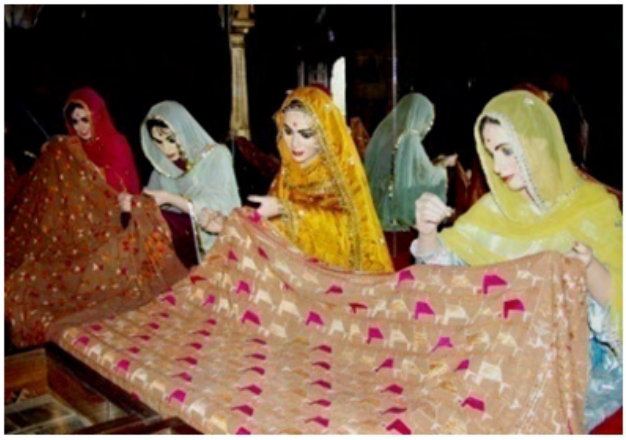
Kairon Kisan Ghar

Table 7.7: Details of Residential accommodation at PAU

Sr. No.	Name of the Building	No. of Units	Plinth area (Sq. Meter)
1	V.C. Residence	1	325
2	House VI Type	14	2851
3	House VII type	14	2905
4	House VIII Type	32	4572
5	House IX Type	52	6700
6	House X Type	126	9392
7	Haathi Complex	90	3020
8	House XII Type	92	4359
9	Flat XII Type	36	1368
10	House XIV Type	120	2174
11	Flat XIV Type	90	1207
12	S.R.F. Quarters	400	1753
13	Farm superintendent quarters	33	46
14	Pavate House	24	2008

Other important facilities

Museum of Rural Life of Punjab – The Museum was conceived by Dr M S Randhawa, ICS and former Vice Chancellor of the University. It has rare collection of articles depicting rich cultural heritage of Punjab. The museum assumes much importance since the rural Punjab is changing fast. The old traditions and customs, which were rampant till the last decade, are now losing their grandeur with the intervention of the technology. Women fetching water in *gaggars* (the bronze pot) from the village well are no more seen. Old bronze utensils are now antique pieces. Spinning is no more done. Women do not embroider *phulkari*. In the fields, with the arrival of advanced technologies, the electric motors and pumps have replaced the *Dhingli* and *Charsa*. All such traditional items, which once lent charm to the Punjabi culture, are now nowhere to be seen. But the Museum preserves them all for those who still want to cherish the old, lovely memories as well as for those who are anxious to know about rural Punjab.





Museum of rural life of Punjab

Dr Uppal Water and Power Resources Museum – The Museum was conceived by Dr H L Uppal, Professor Emeritus, formerly Chief Engineer, Department of Irrigation, Punjab. It was established in 1977. The Uppal Museum depicts the outdoor and



Dr Uppal Water and Power Resources Museum

indoor models of physiographical features of north western India. The Outdoor model is created by the mixture of cement and concrete, which shows the territories of Himalaya surrounded by hills and the passageway of famous rivers like the Ravi, Beas and Sutlej. The Indoor Model is created on scale (Vertical as well as horizontal scales), which shows relatively large area about 7,60,000 sq.km, covering several states of north-west India including Punjab, Haryana, Himachal Pradesh, Jammu and Kashmir, Uttarkhand and parts of Rajasthan and Western Uttar Pradesh. Heights of physical features on the model are marked by enamel paints of different colours and the different features of the model are shown by appropriate arrangements of light (florescent tubes, floodlight, neon light). The museum provides the demonstration of physiographical diversity and offer land and water resources of North West India. This Museum is useful for the students, researchers and planners to get the acquainted with the knowledge of our natural resources.

Off- campus infrastructure

Regional Research Stations & Fruit Research Stations

The off-campus Regional Research Stations (RRS) are a primary component of multi-location testing of the technologies developed under different research programs at the University. The RRS are under the direct administrative control of the Director of Research. The distribution of the Regional Research Stations is such that they collectively represent the different agro-climatic conditions of the state (Table 7.9). All field technologies, be it varieties of different crops, production and protection technologies or machines etc. are tested at the Regional Stations with focus on crop niche areas. The diverse testing



Regional Research Station, Bathinda

Table 7.9: Location and area of Regional Research Stations of PAU

Sr. No.	Location	Area (acres)
1	Ballowal Saunkhri (Shaheed Bhagat Singh Nagar)	338.60
2	Gurdaspur	172.88
3	Faridkot	63.33
4	Bathinda	256.69
5	Abohar	207.25
6.	Kapurthala	401
7	Amritsar	49.2

environments reveal the potential of any technology to be recommended for a specific area/agro-climate or its wider adaptability across the state.

Crop specific focus of the Regional Research Stations is apparent from the fact that the core breeding, agronomic and protection technologies of that crop are carried out at the off-campus station. RRS Faridkot and Bathinda cater to research on cotton, Kapurthala on sugarcane, Gurdaspur on lentil, urdbean, mango & litchi. RRS Ballowal Saunkri, located in the foothills of the Shivalik hills focuses on development / testing of varieties and matching production and protection technologies for the arid climate of that zone.Regional Fruit Research Stations (Table 7.10) focus on specific fruit species of their region/zone. Well realizing the importance of the Regional Research Stations, they have been strengthened in terms of scientific manpower from all relevant subjects for a multidisciplinary approach.

***University Seed Farms*:** The university has seed farms well distributed throughout the state (Table 7.11). Seed being the most critical component of the adoption and success of a variety, the seed farms have been equipped with adequate staff, machinery and equipment to produce quality seed which is the Hallmark of PAU. The farms are under the administrative control of the Associate Director (Seeds), who reports to the Director of Research. The seed crops at the USF's are regularly monitored by the breeders of different crops and monitoring teams of the Assoc. Director (Seeds).

Table 7.10: Location and area of Fruit Research stations of PAU

Sr. No.	Location	Area (acres)
1	Gangian (Hoshiarpur)	47.88
2	Bahadurgarh (Patiala)	51.8
3	Jallowal & Lesriwal (Jalandhar)	25.0

Table 7.11: Location and area of Seed farms of PAU

Sr. No.	Location of the University Seed Farms	Area (acres)
1	Faridkot	1200
2	Ladhowal	1250
3	Nabha	493.78
4	Naraingarh	371.6
5	Usman – Taran taran	45.0

Krishi Vigyan Kendras (KVKs): First KVK was established at Gurdaspur during 1982-83 and presently, 18 KVKs are being run by PAU in different districts of the State (Table 7.12). Each KVK has been provided with a Project Coordinator along with six Subject Matter Specialists (SMSs). The SMS from the discipline of Animal Science, Home Science and Agricultural Engineering are mandatory for every KVK. Other three SMSs are deployed from the disciplines of Agronomy, Soil Science, Plant Pathology, Entomology, Fruits Science, Vegetable Science, Agroforestry, Food Science, Technology, Agricultural Extension and Agricultural Economics depending on specific requirement of the district.

KVKs are fully financed by the Indian Council of Agricultural Research (ICAR), New Delhi and are working as per the objectives and guidelines of the ICAR. The mandate of KVK's is to impart training to the farmers and unemployed rural youth in agriculture and allied disciplines; to impart training to the farmers and unemployed rural youth with the objective of increasing agricultural productivity and bringing youth in subsidiary occupations to supplement the family income; to organize frontline demonstrations in various crops to generate production data and feed-back information and to collaborate with scientists of Regional Research Stations and the State Extension Personnel in 'On-Farm testing", refining and documenting technologies for developing region specific sustainable land use system. On the whole, the KVKs act as front line extension agency rather than

Table 7.12: Location and area of KVKs of PAU

Sr No	Location	Area (acre)
1	Amritsar	19.5
2	Bathinda	24.7
3	Faridkot	13.78
4	Ferozepur	30.68
5	Fatehgarh Sahib	20.32
6	Gurdaspur	12.4
7	Bahowal, Hoshiarpur	48.83
8	Noormahal, Jalandhar	25.0
9	Kapurthala	79.60
10	Samrala, Ludhiana	29.06
11	Mansa	21.09
12	Budh Singh wala, Moga	26.05
13	Goniana, Sri Mukatsar Sahib	49.98
14	Langroya, Nawa Shahar	42.21
15	Rauni, Patiala	38.25
16	Ropar	25.0
17	Kheri, Sangrur	50.88
18	Pathankot	25.66





Krishi Vigyan Kendras of PAU

ground level extension agency. These *kendras* are largely engaged with on-campus activities and have limited outreach to farmers.

Each KVK has a farm area utilized for raising foundation/certified seed and provides live field demonstrations for the trainees. At present, KVKs impart practical oriented trainings ("Learning by Doing") in diversified areas of agriculture, hybrid seed production, cultivation of aromatic and medical plants, dairy, poultry, bee-keeping, vermicompost, fishery, piggery, mushroom growing, integrated pest management, nursery raising (horticultural, vegetables and flower plants), repair and maintenance of farm machinery, self employment of rural youth etc. Besides, training to rural women in income generating programmes like stitching, embroidery, knitting, soft toy making, soap and detergent making, fruit & vegetable preservation, food and nutrition is also provided at these centres.

6.6.7.2 IT Infrastructure

PAU has well established network of internet and Wifi facilities in the colleges, offices, hostels, guest houses and administrative buildings (Fig. 7.1). PAU has university data centre (UDC) to cater IT services in the campus. UDC is hosting core engine for the fibre network of around 20 kilometers. Earlier HP-1000 System was in use but presently the work is done on Personal Computers. The infrastructure of erstwhile computer centre, was upgraded and now it is part of Department of Electrical Engineering & Information Technology. The present set up includes thin client nodes for virus free internet zone. University Data Centre is providing and maintaining the essential IT services viz. distribution of internet, e-mail and web server. Secured and smooth Wi-Fi connectivity is also provided to all hostels and departments through this centre. IT services are regulated with back-up power supply to ensure maximum uptime.

6.6.7.3 Students and Staff Amenities

In addition to the infrastructural facilities for sports and cultural activities available in the campus. PAU has also developed the facilities for recreation

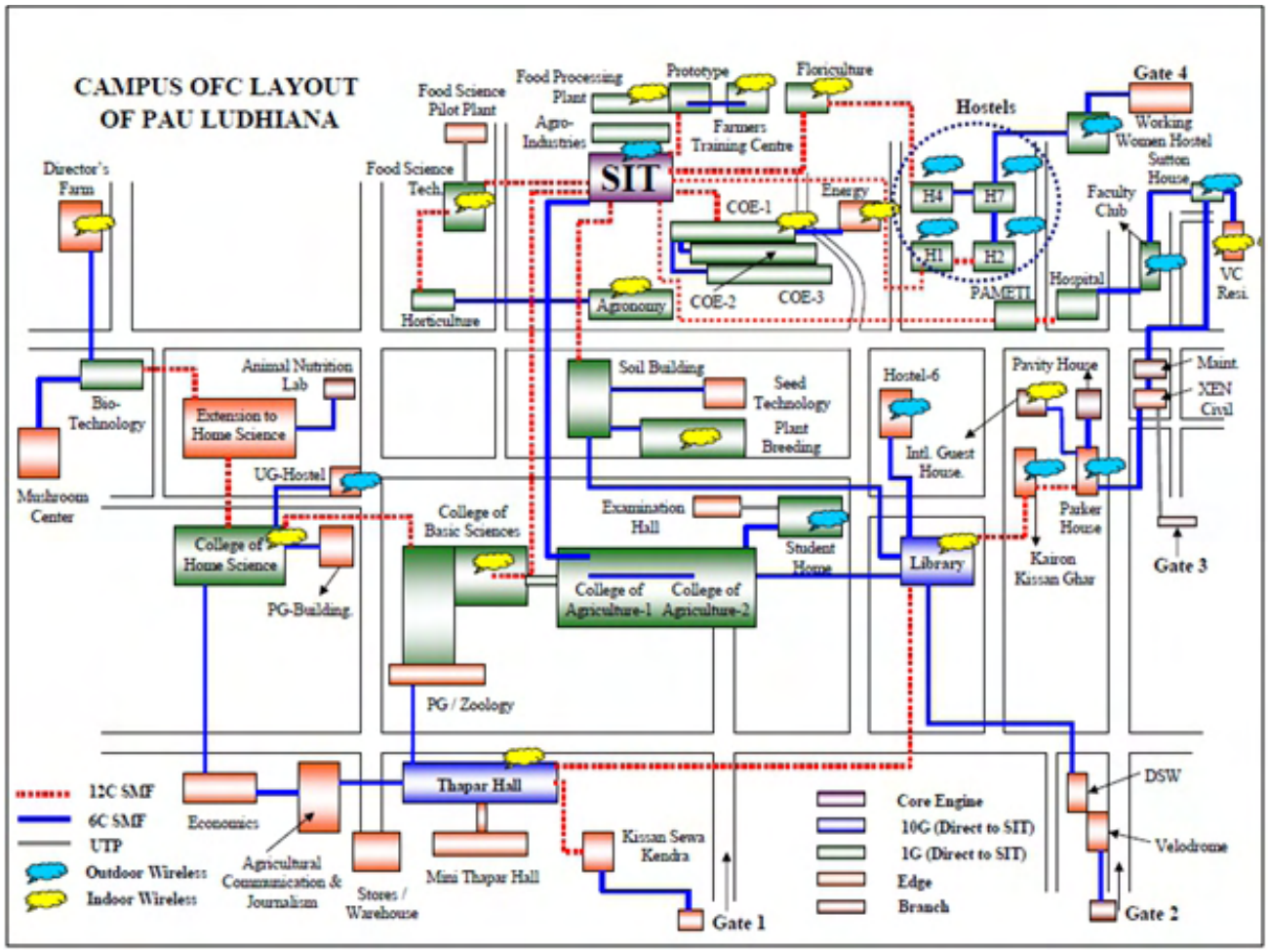


Fig. 7.1: Layout of campus wide Local Area Network

and entertainment of the students, faculty and staff members.

***Students' Home*:** The Students' Home building developed as a fully fledged central hub of activities for the students of PAU. The primary objective of the Students' Home is to utilize spare time of the students in the best possible manner by providing various facilities for their knowledge, comfort and relaxation. The Building of Students Home consist of a large glazed reading room with comfortable sofas and tables for the sitting arrangement and latest magazines and news papers in English, Punjabi and Hindi. It has an auditorium with sitting capacity of 110 persons for organizing functions, seminars and parties of students and staff members. Art exhibitions are also arranged for students and staff from time to time. Two canteens cater to the needs of the students, staff members and their guests by providing them hot and cold drinks, sweets and snacks at reasonable rates. Stationary items and photostat machines are also provide within the complex. A free of cost internet facility is also available for the students.

Faculty Club: Also known as Dr Sukhdev Singh Bhawan, it houses recreation rooms furnished with indoor games, physical fitness rooms for men and women separately, a billiards/ snooker room, a reception lounge and two furnished retiring rooms, a banquet hall and a cafeteria.

Staff Club: It is located in the building of Parker House, a University Guest House. It is furnished with a recreational hall, dining hall, a canteen-cum-cafeteria and a reception room.

Community Centre for Staff: It is located near the staff quarters. It is primarily used by the staff for organizing social functions like marriages of wards and also to celebrate religious festivals, like *Lohri,* etc. It has a hall with a capacity to accommodate about 200 – 250 individuals and also a kitchen. It also has lawns to organize bigger functions.

University Petrol Pump: PAU has a petrol pump within the campus allotted by Indian Oil Corporation which operates from 7am to 7pm throughout the year. This facilitates the easy availability of petrol, diesel and lubricants required for the university vehicles, tractors and farm machinery. In addition faculty and students can also avail the facility for their personal vehicles.





Student's Home at PAU





Faculty Club at PAU



On-campus Banks: The university has the branches of two nationalised banks (State Bank of India and Bank of Baroda) operating on campus. Both these banks also have two ATMs each within the campus. These facilitate financial transactions for faculty, staff and students as well as provide additional facilities such as loan facility, bank lockers and insurance.

On-campus post office: The availability of a post office on-campus, allows the students and staff as well as families residing at PAU to avail easy access of postage facility, post office bank, etc.

Child care centre: The university has three child care centres i) Early childhood care centre ii) Day care centre and iii) Nursery school for optimum development of children of PAU staff. Along with providing support to working mothers, these centres provide conducive and stimulating environment to toddlers.

In addition to the above, amenities relating to university hospital, sports infrastructure, workshop, maintenance units, etc. have been described in section 6.6.1.5. PAU also has a mini market with shops catering to daily needs of the staff and students and various other facilities listed below (Table 7.13).

Table 7.13: Details of other amenities at PAU

Sr. No.	Name of the Building
1	Cafeterias (University cafeteria, Sunny's Cafe etc.) and Canteens
2	Recreational and sporting facilities (Clubs, gym, playground, swimming pool etc.)
3	Market/Banks/Post office
4	Gurudwara Sahib
5	Hospital
6	Landscape nursery
7	Herbal garden

Chapter 8

Financial Resource

6.6.8 Financial Resource Management

6.6.8.1 Sources of Funds

The source of fund for University has increased from Rs 440.34 crores in 2013-14 to Rs 556.33 crores in 2017-18, depicting an increase of 26.34% (Table 8.1). The increase is mainly on account of state funding which has increased from Rs 287.06 crores in 2013-14 to Rs 364.95 crores in 2017-18 (an increase of 27.33%). The average of last five years (2013-14 to 2017-18) depicts that 65.74% funding is on account of state schemes (both plan and non plan). In addition, 13.95% funding is from ICAR schemes followed by 13.46% from internal resource generation. Rest 6.86% is sourced from centrally sponsored / UGC / Misc schemes. The grants from State Government, ICAR, CSS, UGC and other Miscellaneous funding agencies is utilized towards the payments of Salary, Contingency, TA etc.

Table 8.2 depicts the expenditure incurred from 2013-14 to 2017-18 by University. The overall expenditure incurred has increased from Rs 425.76 crores to 529.46 crores (an increase of 24.35%). The major expenditure heads are salary, recurring contingency, non-recurring contingency, travelling allowance and civil works. Analysis of expenditure reveals that 80.95% on an average in last 5 years has been incurred on salary, followed by 15.78% on recurring contingency. Rest 3.3% is incurred among heads of non-recurring contingency, TA and civil works.

Table 8.1: Source of Funds (2013-14 to 2017-18) (Rs in Crores)

Year	State	University Income	ICAR	CSS / UGC / Misc	Total Funds
2013-14	287.06	58.41	56.37	38.50	440.34
2014-15	328.31	58.27	56.10	29.87	472.55
2015-16	301.43	68.27	72.03	32.73	474.46
2016-17	317.87	65.56	73.05	33.00	489.48
2017-18	364.95	76.89	81.79	32.70	556.33
Average per cent (last 5 years)	65.74	13.46	13.95	6.86	

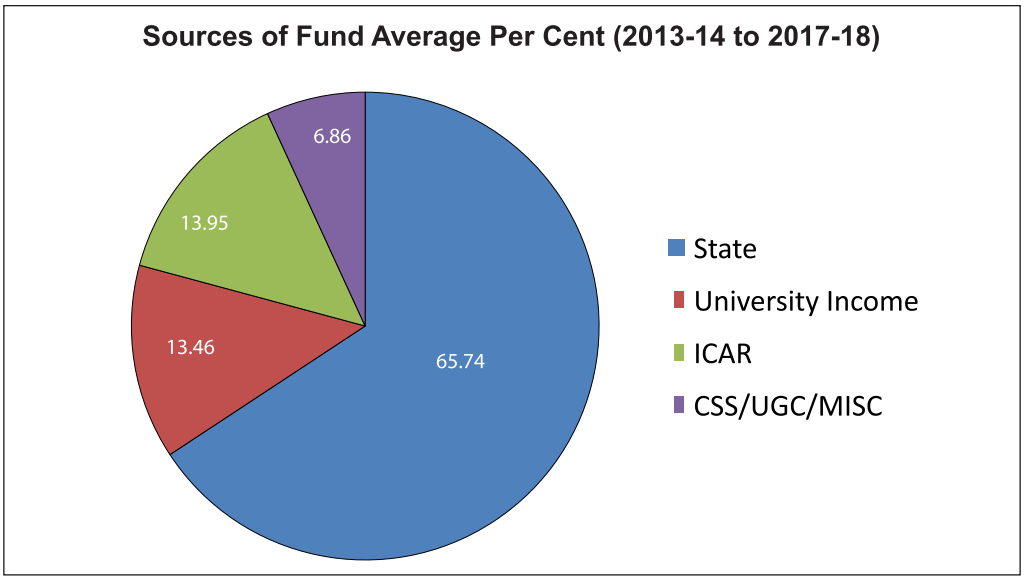
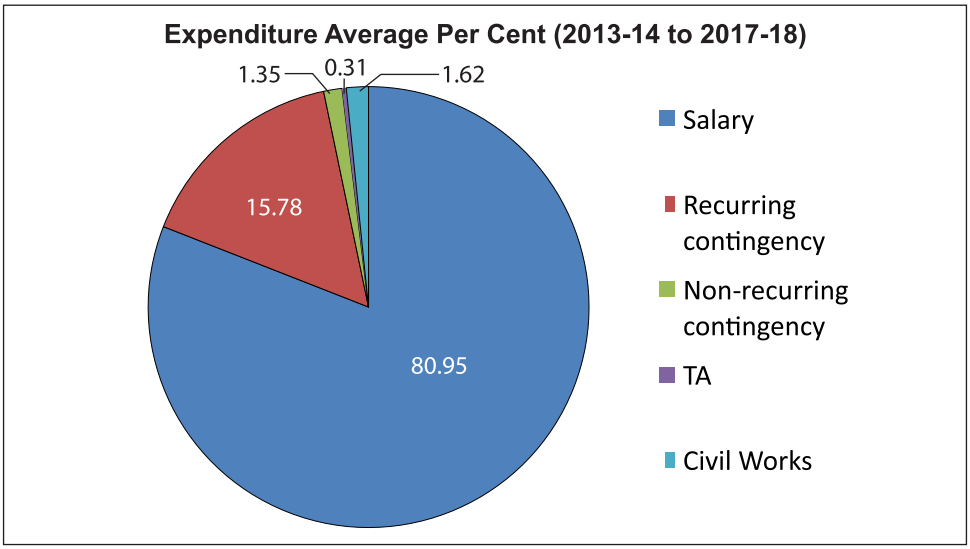


Table 8.2: Expenditure Details (2013-14 to 2017-18) (Rs in Crores)

Year	Salary	Recurring Contingency	Non-Recurring Contingency	TA	Civil Works	Total Expenditure
2013-14	348.36	65.89	6.15	1.56	3.80	425.76
2014-15	403.47	69.42	3.38	1.28	5.49	483.04
2015-16	381.69	82.77	3.16	1.68	10.11	479.41
2016-17	406.17	82.50	11.13	1.51	9.15	510.46
2017-18	425.64	82.51	8.87	1.40	10.84	529.46
Average per cent (last 5 years)	80.95	15.78	1.35	0.31	1.62	



6.6.8.2 Finance Committee

Schedule of Meetings of Finance committee is provided in Table 8.3

6.6.8.3 Internal Resource Generation

Punjab Agricultural University realizes income from different sources (Table 8.4) which mainly include fees (application fees, tuition fees and examination fees); books and publications; other fees (including consultancy and day care fees); hospital and museum income; kisan mela rent; license fees, bank interest; shops rent; sale of scrap / trees and vehicles; sale of products (farm products, vegetables, fruit, livestock, seeds etc); testing fees; training fees and miscellaneous income. The

Table 8.3: Finance Committee Meeting

Year	Finance Meeting	Date of Meeting
2013	197th	28.02.2013
	198th	25.03.2013
	199th	06.06.2013
	200th	29.08.2013
	201st	15.11.2013
2014	202nd	14.01.2014
	203rd	27.03.2014
	204th	27.06.2014
	205th	28.07.2014
	206th	28.10.2014
2015	207th	23.01.2015
	208th	30.03.2015
	209th	09.07.2015
	210th	09.11.2015
2016	211th	19.01.2016
	212th	28.03.2016
	213th	27.04.2016
	214th	12.07.2016
	215th	10.11.2016
2017	216th	29.03.2017
	217th	30.05.2017
	218th	24.11.2017
2018	219th	26.03.2018
	220th	06.07.2018
	221st	12.10.2018

Table 8.4: Internal Resource Generation (Rs in Crores)

Year	Internal Resources Generation
2013-14	58.41
2014-15	58.27
2015-16	68.27
2016-17	65.56
2017-18	76.89

generation of internal resources has increased from Rs 58.41 crores in 2013-14 to Rs 76.89 crores in 2017-18, depicting an increase of 31.64%.

The income realized from different sources is utilized for seed production, nursery plants and publication of literature for extension activities and other emergent needs of the University. The funds generated by various activities in different colleges are deposited with the central facility of the University and are further utilized for the conduct of different activities of undergraduate and postgraduate research and especially for the conduct of research experiments in the fields and laboratories. These funds are further utilized for academic purposes, maintenance and smooth working of different analytical instruments, purchase of consumables etc. Some funds are also utilized for the transfer of technologies during the various activities of students' viz., conduct of educational tours, teaching aids and for capacity building etc.

6.6.8.4 External Funding

The Scientists of the University regularly compete for projects both from international and national funding agencies. Most of these projects are inter disciplinary and in collaborative mode with other departments within the University and national and international institutes. The number of externally funded projects (national and international) under progress in different years is given in the table 8.5.

University gets external funding in the form of Ad-Hoc projects from various sources (Table 8.6). The external funding has increased from Rs 94.86 crores in 2013-14 to Rs 114.48 crores in 2017-18, an increase of 20.67%. The most significant contributors are ICAR schemes and CSS. The support from ICAR Ad-Hoc schemes has increased from Rs 56.37 crores in 2013-14 to 81.79 crores in 2017-18.

6.6.8.5 Financial Powers Delegation to Deans / Heads

To improve the system efficiency adequate financial autonomy has been provided down the hierarchy. The detais of delegation of financial powers is s given in the annexure VIII.

Table 8.5: Adhoc Projects Under Progress (2013-14 to 2017-18)

Year	National Projects	International Projects	Total Projects
2013-14	181	21	202
2014-15	185	14	199
2015-16	216	13	229
2016-17	181	10	191
2017-181	471	01	57



Table 8.6: External Funding (in Rs)

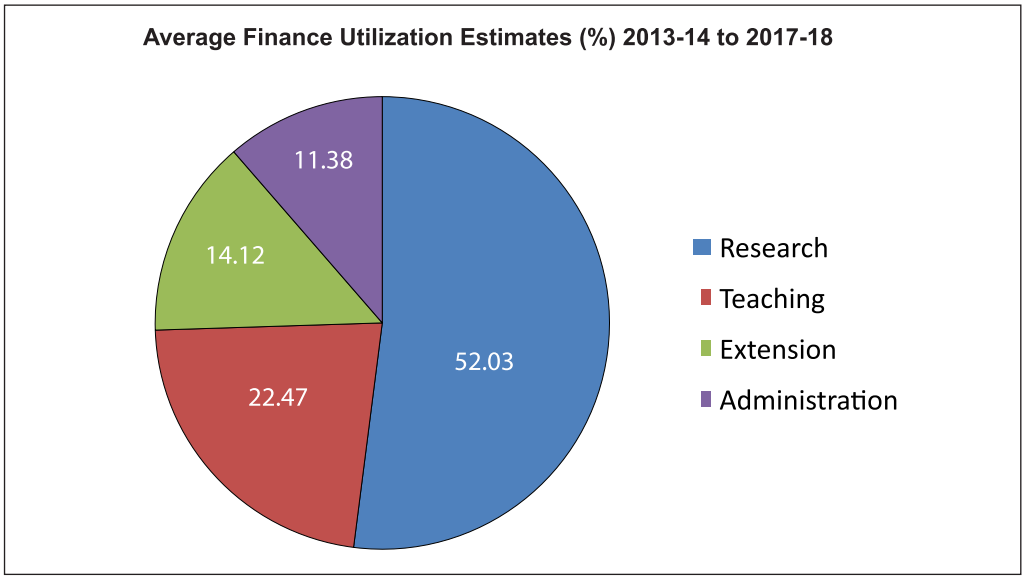
Schemes	2013-14	2014-15	2015-16	2016-17	2017-18
UGC	1,46,89,100	41,74,960	1,02,80,372	1,26,10,314	22,01,768
CSS	18,20,58,581	13,53,29,745	16,66,02,465	16,47,36,580	20,15,31,470
MISC	15,02,73,984	10,57,91,007	11,78,60,558	14,06,31,123	10,77,44,621
MISC FC	3,32,35,871	2,00,16,916	1,94,15,067	92,25,673	98,96,127
SRTT	5,00,000	6,04,449	6,96,700	1,00,000	3,01,000
NBRTT	42,35,850	20,99,000	25,00,000	-	10,00,000
ICAR	56,36,77,285	56,10,11,475	72,03,15,132	73,05,02,789	81,79,23,728
NHM	-	3,06,84,000	99,85,000	24,44,410	42,87,500
Total	**94,86,70,671**	**85,97,11,552**	**1,04,76,55,924**	**1,06,02,50,889**	**1,14,48,86,214**

6.6.8.6 Finance Utilization (Per Cent utilization in last 5 years)

As per activity wise expenditure, University spends heavily on Research activities (Table 8.7). In last five years that is from 2013-14 to 2017-18, the expenditure has been mainly employed for research (52.03%) and teaching (22.47%) followed by extension (14.12%). Only 11.38% funds have been provided as general estate and administrative expenses. The budgetary estimates for research have been increased from 52.28% in 2013-14 to 53.98% in 2017-18 and support has also increased to teaching from 20.37% in 2013-14 to 22.90% in 2017-18. Estimates of finance utilization for carrying out general administration have decreased from 12.15% in 2013-14 to 10.12% in 2017-18.

Table 8.7: Activity wise budget estimates (in %)

S.No.	Budget allocation to Activity	2013-14	2014-15	2015-16	2016-17	2017-18	Average of last 5 years (2013-14 to 2017-18)
1	Research	52.28	49.66	48.98	54.78	53.98	52.03
2	Teaching	20.37	23.36	24.43	21.25	22.90	22.47
3	Extension	15.20	14.31	14.95	13.40	13.00	14.12
4	General Administration, Estate and Others	12.15	12.67	11.64	10.57	10.12	11.38
	Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**



Chapter 9
Accomplishments

6.6.9 Accomplishments

6.6.9.1 Awards to the University

- Sardar Patel Outstanding ICAR Institution Award -2017
- "Agricultural Leadership Award 2015" for its pivotal role in heralding Green Revolution, developing high yielding varieties, producing quality human resource and for efficient transfer of technology.
- Honoured for 'Developing the highest number of landmark varieties among all the State Agricultural Universities and ICAR Institutes' by the Indian Society of Genetics and Plant Breeding (ISGPB) at its Platinum Jubilee meet in March 2017.
- Shortlisted as 'Institution of Excellence' by UGC under the Institute of Eminence Awards
- Adjudged as 'One of the Icons of Modern India" by India Today Magazine in its special issue on 70 years of Independence (August 2017). Under the title "Harvest of Riches" PAU was acknowledged for "its pivotal role in ringing in the Green Revolution that made India self-sufficient in food grains."

Awards to the colleges of the University

- College of Agricultural Engineering and Technology, PAU was adjudged as an "Institute of Excellence" by the National Institute of Technical Teachers Training and Research in 2017.

Punjab Agricultural University has the distinction of producing eminent scientists who have excelled in their respective fields both at the national and international level. The contributions of its faculty members in research, teaching and extension have been recognized in the form of following awards during the past five years (Table 9.1 & 9.2).

Table 9.1: Awards and honours in the last five years

National	114
International	32
State	3
Internal (Recognition by University)	32

Student Awards

ICAR Jawahar Lal Nehru Award for best Ph. D thesis

- 2013 – Zahoor Ahmed Bhat (Horticulture)



Awards and Honours

Table 9.2: Best Centre Awards (AICRP/KVK)

Crop/ Discipline	Name of Award	Year
Rice	Agronomy and Entomology teams of AICRP (Rice) of PAU centre adjudged as Best	2013
Rice	Plant Pathology team of AICRP (Rice) of PAU Centre adjudged as Best	2014
Chickpea	Best Centre performance award for Chickpea	2014
Operational Research	Best Operational Research Project (ORP) Centre award	2014
Agronomy	Best Centre of AICRP on Weed Management	2015
Rice	Golden Jubilee Best AICRP Centre Award	2015
Maize	Certificate of Appreciation for Outstanding performance in Maize Research and Development	2016
Maize	Certificate for Best Performance in Breeder Seed Production of Maize during 1995-2015	2016
Soil Science	"Chaudhary Devi Lal Outstanding AICRP Award 2016" from ICAR for micronutrient and pollutant elements scheme	2016
Honey Bee	All India Coordinated Research Project – Honey Bee team, PAU, bagged the Best the "Best Honey Bee Centre Award	2016
Fodder Crops	All India Coordinated Research Project – Fodder Crops team, PAU, bagged the Best the "Best Fodder Crops and Utilization Centre Award	2016
KVK, Bathinda	The Krishi Vigyan Kendra, Bathinda won the "Best KVK Award 2015" from ICAR	2016
Agro-forestry	Best All India Coordinated Research Project Centre Award	2017
Rice	Breeding team of AICRP (Rice) of PAU centre adjudged as Best	2017
Sugarcane	Best All India Coordinated Research Centre on Sugarcane	2017
Seed Production	Best Performance in Breeder Seed Production under ACRIP- NSP (Crops)	2018
Vegetable Science	Best AICRP Centre Award for Onion and Garlic under (IX AINRPOG-2018)	2018

- 2014- Samanpreet Kaur (Natural Resource Management)
- 2015- Rimaljit Kaur (Biochemistry)
- 2016- Mehak Gupta (Plant Breeding and Genetics)
- 2016- Manpreet Singh (Agronomy)

Monsanto Beachell-Borlaug International Scholars Fellowship

- 2013- Palvi Malik (School of Agricultural Biotechnology)
- 2014- Simranjit Kaur (Entomology)
- 2016- Karminderbir Kaur (School of Agril. Biotechnology)

US AID Fund

- 2014- Amina Ahmad (Food Science & Technology)
- 2014- Meshack Tegeya (Food Science & Technology)
- 2014- Ashura Dulazi (Soil Science)

6.6.9.2 Accreditation Report from ICAR/Other Agencies

Recognizing excellence of the University in education, research and extension, the PAU was accredited by the ICAR in the year 2014 till 2019 and appreciating continuance of excellence by PAU, the accreditation was further extended. PAU submitted report in this month and peer review team visited University in December 2013 for continuation of accreditation. The detailed action taken report of the accreditation is as per Annexure X.

6.6.9.3 Inter Institutional Ranking

- During the report period, PAU has ranked among the top State Agricultural Universities in India. The rankings released by ICAR and MHRD and by Indian Citation Index are summarized in Table 9.3.
- One of the only two agricultural institutes which made it to the list of top 300 world universities in 2016 and top 500 world universities in the ranking done by the National Taiwan University in 2017.

Sports/Cultural Activities

2013-14

- Overall Champion (fifth time in a row) in the XV All India Inter-Agricultural University Sports & Games Meet for the session 2013-14 organized at Assam Agricultural University, Jorhat from 24th to 28th March, 2014.
- During the meet, PAU also bagged the Runner-up trophy in Athletics.

2015-16

- Overall Champion in games (Men) team championship in the XVI All India Inter-Agricultural University Sports & Games Meet for the session 2015-16 organized at Tamil Nadu Agricultural University, Coimbatore from 22nd to 26th February, 2016.

2016-17

- Overall Champion in team games (Men) in the XVII All India Inter-Agricultural University Sports & Games Meet for the session 2016-17 organized at CCS Haryana Agricultural University, Hisar from 25th to 29th March, 2017.

2017-18

- Runner-up in team games (Men) in the XVIII All India Inter-Agricultural University Sports & Games Meet for the session 2017-18 organized at University of Agricultural Sciences, Bangalore from 30th January to 3rd February, 2018.

Table 9.3: Ranking of PAU at national level

Ranking Agency	Rank	
	2016	2017
ICAR		
♦ Among all Agricultural Institutes	3	5
♦ Among SAU's	11	
MHRD (NIRF)		
♦ Among all Educational Institutions	40	60
♦ Among all Agricultural Institutes	3	5
Indian Citation Index	1	1



ICAR

INDIAN COUNCIL OF AGRICULTURAL RESEARCH
NEW DELHI

NATIONAL AGRICULTURAL EDUCATION ACCREDITATION BOARD

CERTIFICATE OF ACCREDITATION

On the recommendations of the ICAR Peer Review Team, the National Agricultural Education Accreditation Board, ICAR, New Delhi hereby grants accreditation to the Punjab Agricultural University, Ludhiana (Punjab) and its following constituent colleges upto March 10, 2019.

- College of Agriculture, Ludhiana
- College of Agricultural Engineering and Technology, Ludhiana
- College of Home Science, Ludhiana
- College of Basic Sciences and Humanities, Ludhiana

The accredited academic programmes are listed overleaf.

March, 2017
New Delhi

(Narendra Singh Rathore)
Deputy Director General (Agril. Edn.), ICAR
and Vice-Chairman, NAEAB

(Trilochan Mohapatra)
Secretary, DARE & Director General, ICAR
and Chairman, NAEAB

PAU Certificate of Accreditation 2014-19

6.6.9.4 Socio economic impact

Punjab, an agrarian state, has taken big strides forward in agriculture and is considered as one of the most developed and productive state having around 85 per cent of its geographical area under highly intensive and mechanized agriculture with high cropping intensity.

i) **Crop diversification:** Different multiple crop sequences *viz.*, rice-wheat-summer moong, maize-potato-onion, summer groundnut-potato-bajra (fodder), maize-potato-summer mungbean, maize-wheat-summer mungbean, maize-potato-spring maize, maize-vegetable peas- spring maize etc. recommended at large scale for diversification of rice-wheat in Punjab increased the cropping intensity from 190% in 2013-14 to 204% in 2017-18. Diversification of rice-wheat cropping system with some remunerative and feasible cereals, Bt cotton, pulses and oilseeds based alternative cropping systems generated more employment along with higher profits and sustainability of natural resources. Maize based cropping systems increased net returns to the tune of Rs 8000 to 50000 per hectare than rice-wheat cropping system. Basmati rice based cropping systems further improve the socio-economic condition of the farmers as these systems provide more economic returns and also earn foreign

exchange. The total production of fodder has been increased to the level of 71.9 million tonnes in Punjab. On the basis of the present fodder production level, we have been able to provide 31.58 kg of green fodder per animal daily.

The release of 37 varieties / hybrids of vegetables and the adoption of production technologies in vegetable crops led to increase in area from 1.97 lakh hectare to 2.43 lakh hectare and production from 38.5 lakh MT to 48.21 lakh MT during the last five years in the state. Since, fruit crops have lesser demand for water & other inputs and improve micro-climate and soil health besides being very remunerative, comes as the most viable venture of all farming activities even for small and marginal farms, as it provides sufficient employment opportunities and scope to raise the income of the farming community in the country. Economically weaker or resource-poor sections of the society are increasingly using their skills in horticulture as a means to increase income and more broadly to improve their livelihoods by supplying fruits and vegetables, fresh or processed, to high-value local and urban markets. The rising demand for horticultural produce creates opportunities for generating income activities for small-scale farmers and entrepreneurs in rural and peri-urban and urban settings. Besides, developing new varieties and technologies for sustainable horticulture production in the state and also provides quality nursery plants to the growers, the university also imparts training to unemployed youth to enhance their skill and get employed in the horticulture sector.

The diversification of agriculture through agroforestry i.e. tree farming on /around farmlands helps in integration of tree species with agricultural crops, will not only help in conservation of precious natural resources like ground water and soil and increasing the tree cover which is presently 3.22% of its total geographical area but will also prove to be an alternate, sustainable and economically viable land use system as compared to sole agricultural crops especially rice and wheat. Furthermore, the possibility of linking the environmental amelioration services of agroforestry under the international protocols in the field of conservation of natural resources and global warming have to be explored to take the advantage of flow of technology and money from one corner to another by setting up equitable market system for these goods and services. The success of two important exotics (eucalyptus and poplar) on private lands is the result of efforts by this university and farmers. With the production of quality planting material for the farmers and strong extension linkages with the stakeholders, agroforestry has become the popular land use system in Punjab. Fast growing clones of eucalypts and poplar are grown on large scale along with other traditional tree species and the university is also working on new potential tree species (toon, sohanjana, jortor, ghamar, neem, etc.) which can be grown on agricultural landscape of Punjab.

Farmers are made aware about latest PAU technologies through conduct of FLDs, ARTs, trainings, group meetings and campaigns regarding sale of recommended varieties in the villages. Adoption of new varieties directly benefits the farmers in terms of increased productivity.

ii) **Resource conservation**: Sustainable management of natural resources is imperative for agricultural growth and healthy natural resource base is required for long term sustainability. Among such technologies, Zero tillage technology helped to save applied irrigation water during first irrigation by 25%, increase the monetory gains by Rs 3400/ha, saving of diesel up to 50 litre/ha along with CO_2 emission reduction by 130 kg/ha. Incorporation of about 11.8 MT rice straw otherwise used to be burnt will save 59.0, 17.7 and 295 thousand tonnes of N, P and K, respectively, in addition to this the production of about 17.23 MT of CO_2 will be avoided which is a great ecological hazard. Application of 2 tonnes of biochar (*Parali Char*) prepared from rice straw to rice will save 16 kg of N (35 kg urea) and improve soil health along with 10 per cent increase in grain yield. This technology is one of the options for paddy straw management and will reduce the environmental pollution occurring due to paddy straw burning. Revised application of 42 kg N (90 kg urea) per acre through *neem* coated urea in rice helps in fertilizer N saving while sustaining crop yield due to its higher efficiency. PAU-Leaf Colour Chart based fertilizer nitrogen



management further saves 30-60 kg N/ha in cotton and 15-50 kg N/ha in direct seeded rice. Drip irrigation and fertigation schedules in spring sunflower, turmeric, menthol mint, spring maize and cotton resulted in 25% higher economic yield with saving of 30-40% in irrigation water and 20% in nutrients. Enriching zinc in wheat grain through foliar application of zinc sulphate will help in maintaining the zinc nutrition of the populace.

iii) **Crop protection:** Weeds reduce crop yields to the tune of 20 to 50 per cent or even more depending upon their intensity and type. At present about 95 per cent of rice sown area in the state is treated with herbicides resulting in a net gain of approximately Rs 9.95 crores per annum. Apart from huge monetary benefits, the technologies also result in huge labour savings. The availability of non-chemical approaches like crop rotation, adjusting date of sowing, selection of quick growing cultivars, closer spacings, straw mulch encourages farmers toward adoption of organic farming and intervention of more profitable crops like vegetables in their cropping systems.

For insect pest management in agricultural crops, the use of new green and blue chemistry chemicals recommended by the university ensures better safety towards the non-target organisms including the humans and natural enemies of the pests, in addition to reduction in soil, water and environmental contamination caused by conventional insecticides. The use of biological control agents for insect pests management like *Trichogramma chilonis* in maize helps minimize the insecticide usage on crop, thereby, reducing the adverse affects of chemicals on soil, water and environment. The mechanical control of insect pests like passing of jute/coir rope over rice helps preserve the natural enemy fauna in rice ecosystem. The natural enemies provide an effective control of insect pests during the early stages of crop, thereby reducing the pesticide load on the crop. Skilled labour is not required for its execution; even, the farmers' family members can practice it successfully. The recommendations regarding management of plant diseases enhanced the production of various field crops which in turn raised the economic level of the farmers and ultimately helped in improving the buying capacity which conclusively lead to improved socio-economic status.

Tissue culture unit of the university produces elite disease free planting material *in vitro* for commercial purpose. The unit has *in vitro* plant production capacity of approximately five lac plants around the year. The micropropagation protocols for banana, sugarcane, potato etc can be used for mass multiplication of plant material. The feasibility of proposed model has been demonstrated by producing more than one lac sugarcane plants that were readily accepted by sugar mills and farmers from across North India. The facility provides excellent opportunity as a start-up unit for entrepreneurs' who are interested in production of breeder seed.

iv) **Climate change resilient crop production:** The University also focuses on research related with the impact of climate change on crop productivity. The experiments are planned to manage and alleviate the effect of heat and water stress on different field crops. It has also created an inventory on agromet data for use in the research of different disciplines to improve research quality under changing climatic conditions. It also provides crop specific pre-harvest yield forecast every *kharif* and *rabi* season. These research efforts are of great help to improve the crop production technologies and sustain crop productivity in the region. It also provides weather forecast and agro-advisory for timely management of agricultural operations to save crops from adverse weather conditions. SMS alerts are disseminated for use by the farming community for timely decision making in view of impending weather conditions.

v) **Processing and value addition:** For skill development in the processing and value addition, 15-20 trainings are given every year and approximately 450-500 trainees get acquaintance with this skill and some of them start their own small scale business. Through strengthening of linkages of institute with industry through institute- industry interaction and establishment of Backward and Forward linkages between industry institute and farmers, the university has commercialized around 23 technologies to around 31 stakeholders including industry and farmers for their commercial ventures. Consultancy is also

being given to farmers, Self Help groups, NGOs, MSMES and Industries like (PAIC, Bonn Bread, Field Fresh, Golden Grains).

Social Issues: Weddings in Punjab are lavish and the scale of expenses keeps on touching new highs every season. From décor to dishes to dresses, suddenly every aspect acquires a heightened social significance. The wastefulness is more an act of societal pressure than a conscious choice.

'*Saade Viah, Saade Bhog, Na Karza, Na Chinta Rog*' (Simple Weddings, Simple Ceremonies; No debt, No worries) --- the message given by the Department of Agricultural Journalism, Languages and Culture, PAU has evinced massive response from farmers of the state. About 200 village panchayats mainly in cotton belt of Punjab have adopted resolutions not to splurge on weddings and other social ceremonies.

6.6.9.5 International Collaboration

The university has inked 13 new MoUs with various international institutions and research organizations in the last 5 years (Annexure XI).

Academics

- PAU has adopted a unique system of including Co-Major advisors from other universities/institutions or foreign universities. At present, 33 faculty members from International institutes are Co-major advisors for Master's and Doctoral students.
- Students of PAU have bagged the prestigious Monsanto's Beachell-Borlaug International Scholarship for Ph.D. Programme; the fifth award in a row for PAU during the last 5 years which is a rare distinction.
- A Dual Degree Programme between PAU and Kansas State University, USA allows B. Tech Food Technology students to complete two years study at Kansas State University, USA and earn two degrees i.e. B. Tech. Food Technology from PAU and Bachelors in Bakery Science and Management from KSU.

Research

- PAU has been a member of the "International Wheat Genome Sequencing Consortium" for physical mapping and sequencing of wheat chromosome 2A. It was the lead centre in the country.
- Twenty three international collaborative research projects were sanctioned/ implemented during the report period (Detailed list given in Annexure IV).

6.6.9.6 Fund Raising through CSR

PAU has well established linkages with the industrial organisations. Collaborative project activities as mentioned below (Table 9.4) have been carried out with industry partners under their CSR initiatives.

Further, to enhance the scope of project activities and collaborations with the industry under CSR initiatives, an office of Corporate Relations and International Linkages has also been established at university level. A collaborative project "*Shodhan*" of approx. Rs. 25.0 lakh between PAU and Birla Soft company was undertaken on *No Residue Burning* in which around 1100 acres were covered in two selected villages in Patiala districts under CSR in the year 2017. After the successful completion of CSR project with Birla Soft, the Confederation of Indian Industries (CII) also worked in collaboration with PAU for their Project on Clean Air aiming paddy straw management without burning. The university is in process to execute the CSR projects on development of model village, skill development of rural youth, adoption of environmental friendly farm technologies etc.

6.6.9.7 Alumni Support

PAU has strong bonding with its Alumni settled in India and all over the world. PAU alumni are working in the leading organisations at various

Table 9.4: Details of CSR activities

Company Name	Work/Infrastructure	Amount (approx.)
M/s. Jain Irrigation Systems Limited	Installation of landscape irrigation system	Rs. 12.50 Lac
M/s. Trident Group, Ludhiana	Repair of PAU roads	Rs. 3.50 Lac
M/s Oswal Foundation, Ludhiana	Repair of PAU Roads	Rs. 4.00 Lac
M/s Ludhiana Beverages Ltd.	Construction of rain water harvesting systems	Rs. 2.50 Lac
M/s Avon Cycles Ltd	Two e-rickshaws for use in campus	Rs. 2.50 Lac




CSR Project activities with Birla Soft

levels and have brought many laurels to their Alma Mater. PAU has active Alumni Associations at university and college level. The alumni meets are being organised on regular basis to get valuable inputs from the alumni members to build the institution and deliver our duties. Alumni data base is updated regularly through online web portals developed, personal contacts and using other IT tools. The active participation and contributions (financial and in any manner) made by the alumni members in achieving the professional excellence at PAU are acknowledged at every level to motivate other alumni members to get connected with the institution.

Two foundations namely "Dr Khush Foundation" and "Chinnan Foundation" have been established by Alumni at university level to carry out institutional development activities including research contingency, travel grants, merit scholarships for proficiency in academics and sports, creating facilities for the students etc. Grants of Rs. 350 lakhs and Rs. 40.51 lakhs have been received under Dr Khush Foundation and Chinnan Foundation respectively. Another Aluminus, Dr. O.S. Bindra has contributed Rs. 33.36 lakhs. The alumni members have also made significant contributions in the PAU Endowment Fund.

Funds are also raised by the alumni associations to carry out the following activities for the development of students and institution.

- Scholarship/financial aids to the needy students
- Merit scholarships
- Travel grants
- Hostel developments
- Research contingency
- Alumni lectures
- Campus upkeep







Glimpses of alumni meets at PAU

6.6.10 Certificate

I, Rajinder Singh Sidhu, the Registrar of the Punjab Agricultural University, Ludhiana hereby certify that the information contained in the sections 6.4, 6.5 and 6.6.1 to 6.6.9.7 are furnished as per the records available in the University.

Signature of the Registrar

Date:

Annexures

Annexure-I

Details of Statues and Regulations : Chapters and Sections

Chapter – I	The Haryana and Punjab Agricultural Universities Act, 1970	
	Short title commencement and Definitions	
Chapter – II	Powers and Duties of the Authorities of the University	
	Board of Management	Powers and Duties
	Academic Council	Selection of a member under clause (f) of sub-section (3) of Section 23 of the Act and Powers and Duties
	Research Council	Constitution and functions
	Extension Council/ Extension Education Council	Constitution and functions
	Board of Studies	Constitution, Powers and Duties
Chapter-III	The Designation, the Manner of Appointment, powers and duties of the Officers of the University	
	Vice-Chancellor	
	Deans of the Colleges	Powers and Duties
	Director of Research	Powers and Duties
	Director, Extension Education	Powers and Duties
	Director, Students Welfare	Powers and Duties
	Registrar	Powers and Duties
	Comptroller	Powers and Duties
	Chief Engineer	Powers and Duties
	Estate Officer	Powers and Duties
	Librarian	Powers and Duties
	Dean Postgraduate Studies	Powers and Duties
Chapter-IV.	Classification, the Manner of Appointments, Powers and Duties of the Teachers of the University	
	Classification	Classification of teachers
	Appointments	Manner of Appointment
	Appointment of Additional Director of Research/Additional Director of Extension Education	Manner of Appointment, Responsibilities, Powers and Duties
	Appointment of Heads of Departments	Manner of Appointment, Responsibilities, Powers and Duties
	Appointment of Director (Seeds)	Manner of Appointment, Responsibilities, Powers and Duties
	Appointment of Director School of Energy Studies for Agriculture	Manner of Appointment, Responsibilities, Powers and Duties
	Appointment of Professors, Associate professors and other teachers of equivalent rank	Manner of Appointment, Responsibilities, Powers and Duties
	Appointment of Joint Director (Sports & Cultural Activities)	Manner of Appointment, Responsibilities, Powers and Duties
	Appointment of Assistant Professor and other teachers of equivalent ranks	Manner of Appointment, Responsibilities, Powers and Duties



Chapter-IV-A	Appointment of Teachers by promotion Based on Merit	
		Abolished w.e.f. 03-03-99 as per notification No. Acad.I.AU.2001/300 Dt. 1-3-2001.
Chapter-IV-B	Career Advancement of Teachers	
Chapter-IV-C	Career Advancement of Teachers w.e.f. 27-7-1998	
Chapter-V	Appointments of Employees of The University other than Officers and Teachers	
Chapter-VI	Number, Qualifications, Emoluments and Other Conditions of Service of Officers and Other Employees of The University Not Being Teachers and The Preparation and Maintenance of Record of their Service and Activities. (Part-A)	
Chapter-VII	Number, Qualifications, Emoluments and other Conditions of Service of Teachers of the University and the Preparation and Maintenance of Record of their Service and Activities (Part-B)	
Chapter-VIII	Pension and Provident Funds	
Chapter- IX	Institution of Degrees and Diplomas and On ferment of Honorary Degrees	
Chapter-X	The Courses of Study to be Laid Down for Degrees and Diplomas of University	
Chapter-XI	The Institution of Fellowships, Scholarships, Medals and Prizes	
Chapter-XII	The Conditions for The Award of Fellowships, Scholarships, Medals and Prizes, Stipends and Fee Concessions	
Chapter-XIII.	The Admission of Students to The University and Their Enrolment and Continuance as such	
Chapter-XIV	The Conditions Under Which Students Shall be Admitted to The Degree, Diploma or Other Courses and The Manner in Which the Examinations Are to be Held and The Eligibility for The Award of The Degrees and Diplomas	
Chapter-XV	The Conditions of Residence of The Students of The University and The Levying of Fees for Residence in Hostels Maintained by The University	
Chapter-XVI	The Establishment and The Abolition of Hostels Maintained by The University	
Chapter-XVII	The Recognition and Supervision of Hostels Not Maintained by The University	
Chapter-XVIII	The Establishment, Amalgamation, Sub-Division and Abolition of Departments	
Chapter-XIX	Levying of Fees by The University for Any Purpose Excluding Hostel Fees Governed by The Statutes (Chapter XV)	
Chapter-XX.	Remuneration and Allowances, Including Travelling and Daily Allowances to be Paid to Persons Employed on The Business of The University	
Chapter-XXI	Persons who Are Declared as Officers of The University	
Chapter-XXII	The Exercise of Financial and Administrative Powers by The Officers, Teachers and Other Employees of The University	
Chapter-XXIII	Administrative and Financial Powers by The Board of Management to The Officers/Employees of The University	
Chapter-XXIV	Statement showing delegation of administrative and financial powers by the Vice-Chancellor in exercise of powers conferred on him vide clause 4 of the Statues issued under section 31(u) of the Haryana and Punjab Agricultural Universities Act, 1970 and relating to the delegation of administrative and financial powers by the Board of Management to the officers/employees of the University (Issued vide Notification No. Acad-II (AU)-66-9333 dated 29 March, 1966 and amended from time to time).	
Chapter-XXV	The Conferment of Emeritus Professorship, Payment of Honorarium to Emeritus Professors and Other Conditions of Appointment	
Chapter-XXVI	The Grant of Travelling and Daily Allowances to Members of The Board of Management	

Annexure II

Details of collaborative schemes (2013-2018) with industries/organizations

Sr. No.	Name of the scheme	Funding agency	Budget allotment (Rs.)
1.	Rural livelihood and communities organization of IPM scouts as PAU Doots for transfer of technology in agriculture under reviving the green revolution	Nabajbai Rattan Tata Trust, Mumbai	12,00,000/-
2.	Training of category-II & III Officers of Food Corporation of India	FCI, New Delhi	30,03,760/-
3.	Training of secretaries of multi-purpose cooperative societies in Punjab on efficient use of inputs, machinery and agro-service centres	NABARD, Chandigarh	3,17,000/-
4.	Accelerating direct seeded rice adoption in Punjab	M/s P I Industries, Gurgaon	5,85,200/-
5.	Popularizing the cultivation of direct seeded rice/ basmati at farmers field	M/s Bayer Crop science Ltd., Mumbai	85,203/-
6.	Celebration of international bio-diversity day 2014	Punjab State Council for Science & Technology, Chandigarh	34,750/-
7.	Training of category-II & III Officers of Food Corporation of India	FCI, New Delhi	25,53,196/-
8.	Enhancing pre and post emergent herbicide efficacy by spray technologies for weed management in rice wheat production system in Punjab under private partnership mode	M/s UPL Limited, Mumbai	5,50,000/-
9.	Accelerating Direct Seeded Rice Adoption in Punjab	M/s P I Industries Ltd	11,70,400/-
10.	Technology transfer for PAU fruit fly traps among fruit growers of Fatehgarh Sahib through on farm demonstration	NABARD	9,99,300/-
11.	Dissemination of Integrated Pest Management strategies for whitefly on cotton in Punjab	M/s P I Industries Ltd	26,52,000/-
12.	Sustainable Rice Production with Conservation of Natural Resources through Direct Seeded Rice	M/s P I Industries Ltd	18,32,500/-
13.	Enhancing cotton production through International crop solution under PPP mode	M/s Bayer Crop Science Ltd	31,18,200/-
14.	Enhancing basmati rice productivity through integrated crop solution under PPP mode	M/s Bayer Crop Science Ltd	16,68,000/-
15.	Dissemination of integrated pest management strategies for whitefly on cotton in Punjab	M/s P.I. Industries Ltd. Gurgaon	12,95,000/-
16.	Enhancing pre and post emergent herbicide efficacy by spray technologies for weed management in rice wheat production system in Punjab under private partnership mode	M/s U P L Mumbai	5,50,000/-
17.	Sustainable rice production with conservation of natural resources through direct seeded rice	M/s P I Industries	9,16,250/-
18.	Enhancing cotton productivity through integrated crop solutions under public private partnership mode	M/s Bayer Crop Science Ltd. Ludhiana	8,70,000/-



19.	Enhancing basmati rice productivity through integrated crop solutions under public private partnership mode	M/s Bayer Crop Science Ltd. Ludhiana	3,47,000/-
20.	Mass awareness campaign to halt paddy straw burning – 10 districts of Punjab	P. H.D Chamber of Commerce and Industry	1,86,200/-
21.	Enhancing diffusion of paddy straw management technologies in Ludhiana and Moga Districts of Punjab	NABARD, Chandigarh	7,78,000/-
22.	Gardeners training course on skill development in horticulture	Hindustan Insecticides Ltd. Chandigarh	7,99,500/-
23.	Organization of training camp for the benefit of farmers	Hindustan Insecticides Ltd. Chandigarh	2,50,000/-
24.	Management of cotton whitefly through crop surveillance and dissemination of IPM Technology in 4 villages of Mansa district	NABARD Chandigarh	5,50,000/-
25.	Gardeners training course on skill development in horticulture	Hindustan Insecticides Ltd. Chandigarh	7,99,825/-
26.	Training programme on protected cultivation of vegetables	M/s Blue Stallion Equipment Pvt. Ltd. Ludhiana	19,124/-

Annexure III

List of Publications 2013-2018

Sr. No.	Publication	NAAS score
2013		
1	Anand T., Sharma S.R., Mahajan G., Chand T. (2013). Effect of transplanting times on the milling, cooking and textural characteristics of different rice cultivars. *Ecology, Environment and Conservation*. **19**: 829-834.	5.02
2	Ansari M.J., Al-Ghamdi A., Kumar R., Usmani S., Al-Attal Y., Nuru A., Mohamed A.A., Singh K., Dhaliwal H.S. (2013). Characterization and gene mapping of a chlorophyll-deficient mutant clm1 of *Triticum monococcum* L. *Biologia Plantarum*. **57**: 442-448.	7.69
3	Ansari M.J., Al-Ghamdi A., Usmani S., Kumar R., Nuru A., Singh K., Dhaliwal H.S. (2013). Characterization and gene mapping of a brittle culm mutant of diploid wheat (*Triticum monococcum* L.) with irregular xylem vessels development. *Acta Physiologia Plantarum*. **35**: 2407-2419.	7.31
4	Arora V.K., Nath J.C., Singh C.B. (2013). Analyzing potato response to irrigation and nitrogen regimes in a sub-tropical environment using SUBSTOR-Potato model. *Agricultural Water Management*. **124**: 69-76.	8.20
5	Asthir B., Bala S., Bains N. (2013). Metabolic profiling of grain carbon and nitrogen in wheat as influenced by high temperature. *Cereal Research Communications*. **41**: 230-242.	6.55
6	Asthir B., Thapar R., Farooq M., Bains N.S. (2013). Exogenous application of thiourea improves the performance of late sown wheat by inducing terminal heat resistance. *International Journal of Agriculture and Biology*. **15**: 1337-1342.	6.81
7	Aulakh C.S., Singh H., Walia S.S., Phutela R.P., Singh G. (2013). Evaluation of microbial culture (Jeevamrit) preparation and its effect on productivity of field crops. *Indian Journal of Agronomy*. **58**: 182-186.	5.00
8	Bector V., Singh S., Gupta P.K. (2013). Predicting tractor power requirements using decision support system - A tool for farm machinery management. AMA, *Agricultural Mechanization in Asia, Africa and Latin America*. **44**: 63-69.	6.06
9	Benbi D.K. (2013). Greenhouse Gas Emissions from Agricultural Soils: Sources and Mitigation Potential. *Journal of Crop Improvement*. **27**: 752-772.	5.12
10	Bhagat S., Thakur A., Dhaliwal H.S. (2013). Organic amendments influence growth, buddability and budding success in rough lemon (*Citrus jambhiri* Lush.). *Biological Agriculture and Horticulture*. **29**: 46-57.	6.38
11	Bhagi P., Zhawar V.K., Gupta A.K. (2013). Antioxidant response and Lea genes expression under salt stress and combined salt plus water stress in two wheat cultivars contrasting in drought tolerance. *Indian Journal of Experimental Biology*. **51**: 746-757.	7.20
12	Bhat Z.A., Dhillon W.S., Singh K. (2013). Genetic diversity studies on some pear genotypes using simple sequence repeats (SSRs) derived from apple and pear. *Indian Journal of Horticulture*. **70**: 1-6.	6.13
13	Bhullar M.S., Kaur S., Kaur T., Singh T., Singh M., Jhala A.J. (2013). Control of broadleaf weeds with post-emergence herbicides in four barley (*Hordeum* spp.) cultivars. *Crop Protection*. **43**: 216-222.	7.30
14	Brar A.S., Mahal S.S., Buttar G.S., Deol J.S. (2013). Production potential and water productivity of basmati rice (*Oryza sativa*)-wheat (*Triticum aestivum*) sequence as influenced by irrigation termination of basmati rice and irrigation scheduling of succeeding wheat. *Indian Journal of Agricultural Sciences*. **83**: 31-36.	6.18
15	Brar A.S., Sarlach R.S., Sohu R.S., Rathore P. (2013). Response of American cotton (*Gossypium hirsutum* L.) genotypes to varying plant densities and graded levels of fertilizers. *Vegetos*. **26**: 145-147.	6.02

16	Brar B.S., Singh K., Dheri G.S., Balwinder-Kumar (2013). Carbon sequestration and soil carbon pools in a rice-wheat cropping system: Effect of long-term use of inorganic fertilizers and organic manure. *Soil and Tillage Research*. **128**: 30-36.	8.37
17	Brar J.K., Rai D.R., Singh A., Kaur N. (2013). Biochemical and physiological changes in Fenugreek (*Trigonella foenum- graecum* L.) leaves during storage under modified atmosphere packaging. *Journal of Food Science and Technology*. **50**: 696-704.	7.12
18	Buttar G.S., Sidhu H.S., Singh V., Jat M.L., Gupta R., Singh Y., Singh B. (2013). Relay planting of wheat in cotton: An innovative technology for enhancing productivity and profitability of wheat in cotton-wheat production system of South Asia. *Experimental Agriculture*. **49**: 19-30.	7.06
19	Chen H.-M., Ku H.-M., Schafleitner R., Bains T.S., George Kuo C., Liu C.-A., Nair R.M. (2013). The major quantitative trait locus for mungbean yellow mosaic Indian virus resistance is tightly linked in repulsion phase to the major bruchid resistance locus in a cross between mungbean (*Vigna radiata* (L.) Wilczek) and its wild relative *Vigna radiata* ssp. sublobata. *Euphytica*. **192**: 205-216.	7.64
20	Choudhary O.P., Gill J.K., Bijay-Singh (2013). Water-extractable carbon pools and microbial biomass carbon in sodic water-irrigated soils amended with gypsum and organic manures. *Pedosphere*. **23**: 88-97.	7.23
21	Chugh V., Kaur N., Grewal M.S., Gupta A.K. (2013). Differential antioxidative response of tolerant and sensitive maize (*zea mays* L.) genotypes to drought stress at reproductive stage. *Indian Journal of Biochemistry and Biophysics*. **50**: 150-158.	7.03
22	Dalal R.P.S., Sangwan A.K., Beniwal B.S., Sharma S. (2013). Effect of planting density on canopy parameter, yield and water use efficiency of Kinnow Mandarin. *Indian Journal of Horticulture*. **70**: 587-590.	6.13
23	Devi R., Dhaliwal M.S., Gosal S.S. (2013). In vitro direct plant regeneration protocol for tomato genotypes. *Indian Journal of Horticulture*. **70**: 369-372.	6.13
24	Devi Y L, Singh J, Vatta K and Kumar S (2013).Dynamics of labour demand and its determinants in Punjab agriculture. Agril Econ Res Rev, 26: 267-73.	5.68
25	Dogra B., Dogra R., Mahal J.S. (2013). Performance of a modified commercially available wheat thresher for threshing Lentil (Lens Culinaris). AMA, *Agricultural Mechanization in Asia, Africa and Latin America*. **44**:149-54.	6.06
26	Dubey R.K., Simrat-Singh, Kukal S.S., Kalsi H.S. (2013). Evaluation of Different Organic Growing Media for Growth and Flowering of Petunia. *Communications in Soil Science and Plant Analysis*. **44**: 1777-1785	6.42
27	Gangwar M., Kataria H. (2013). Diversity, antifungal and plant growth promoting activity of actinomycetes from rhizosphere soils of medicinal plants. *Indian Journal of Agricultural Sciences*. **83**: 1289-1294.	6.18
28	Ghai K, Batta S K, Kocher G S and Gupta A K (2013). Production, partial purification and kinetic characterization of dextran sucrose from *Leuconostoc mesenteroides* in relation to dextran problem in sugarcane. *Sugar Tech* DOI 10. 1007/s12355-013-0297-7.	5.01
29	Gill J.S., Walia S.S. (2013). Effect of establishment methods and nitrogen levels on basmati rice (*Oryza sativa*). *Indian Journal of Agronomy*. **58**: 506-511.	5.00
30	Gill J.S., Walia S.S. (2013). Effect of foliar feeding of micronutrients on yield and quality of direct-seeded basmati rice. *Research on Crops*. **14**:1001-1006.	6.10
31	Gupta M.K., Sehgal V.K., Arora S. (2013). Optimization of drying process parameters for cauliflower drying. *Journal of Food Science and Technology*. **50**:162-69	7.12
32	Gurpreet-Kaur, Sharma B.D., Sharma S. (2013). Effects of Organic Matter and Ionic Strength of Supporting Electrolyte on Zinc Adsorption in Benchmark Soils of Punjab in Northwest India. *Communications in Soil Science and Plant Analysis*. **44**.5922-5938.	6.42
33	He X., Li Y., Pandey S., Yandell B.S., Pathak M., Weng Y. (2013). QTL mapping of powdery mildew resistance in WI 2757 cucumber (*Cucumis sativus* L.). *Theoretical and Applied Genetics*. **126**: 2149-2161.	9.66
34	Hundal H.S., Singh K., Singh D., Kumar R. (2013). Arsenic mobilization in alluvial soils of Punjab, North-West India under flood irrigation practices. *Environmental Earth Sciences*. **69**:1637.1648.	7.45

35	Hussain S.Z., Singh B. (2013). Effect of extrusion conditions on pasting behavior and microstructure of refabricated rice: A response surface analysis. *Cereal Chemistry*. **90**.5480-5489.	7.25
36	Jaiswal P., Prasanna R., Singh P.K. (2013). Physiological characterization and molecular profiling of toxic and non-toxic isolates of *Cyanobacterium microcystis*. *Journal of Environmental Biology*. **34**:3555-3560.	6.68
37	Jalota S.K., Kaur H., Kaur S., Vashisht B.B. (2013). Impact of climate change scenarios on yield, water and nitrogen-balance and -use efficiency of rice-wheat cropping system. *Agricultural Water Management*. **116**: 29-38.	8.20
38	Jalota S.K., Kaur H., Ray S.S., Tripathy R., Vashisht B.B., Bal S.K. (2013). Past and General circulation Modeldriven future trends of climate change in Central Indian Punjab: Ensuing yield of rice-wheat cropping system. *Current Science*. **104**: 105-110.	6.91
39	Jaswal R.K., Sodhi H.S., Kapoor S., Khanna P.K. (2013). Development of high yielding morphologically improved strains of pleurotus through interspecific hybridization. *Indian Journal of Agricultural Sciences*. **83**:4374-4379.	6.18
40	Jhanji S., Sadana U.S., Sekhon N.K., Khurana M.P.S., Sharma A., Shukla A.K. (2013). Screening diverse wheat genotypes for manganese efficiency based on high yield and uptake efficiency. *Field Crops Research*. **154**:127-132.	8.47
41	Jyot G., Mandal K., Battu R.S., Singh B. (2013). Estimation of chlorpyriphos and cypermethrin residues in chilli (*Capsicum annuum* L.) by gas-liquid chromatography. Environmental Monitoring and Assessment. **185**:5703-5714.	7.59
42	Kar A., Mandal K., Kumar R., Sahoo S.K., Singh B. (2013). Qualitative and quantitative analysis of chlorantraniliprole and flubendiamide in soluble concentrate formulations by high performance thin layer chromatography. *Journal of Liquid Chromatography and Related Technologies*. **36**: 124-134.	6.57
43	Kar A., Mandal K., Singh B. (2013). Environmental fate of chlorantraniliprole residues on cauliflower using QuEChERS technique. *Environmental Monitoring and Assessment*. **185**:1255-1263	7.59
44	Kataria D., Chahal K.K. (2013). Chemistry and antifungal potential of Alantolides from *Inula racemosa* H. *Journal of Chemical Sciences*. **125**.1187.191. 1	7.30
45	Kathuria L.M., Gill P. (2013). Purchase of branded commodity food products: Empirical evidence from India. British Food Journal. 115:1255-1280.	6.61
46	Kaur G., Sharma S., Nagi H.P.S., Ranote P.S. (2013). Enrichment of pasta with different plant proteins. *Journal of Food Science and Technology*. **50**: 1005-7	7.12
47	Kaur H., Mohan C. (2013). Management of post flowering stalk rot of maize (Zea mays) caused by *Fusarium moniliforme* with native biocontrol agents. *Indian Journal of Agricultural Sciences*. **83**: 1165-1172	6.18
48	Kaur K., Dhillon W.S., Mahajan B.V.C. (2013). Effect of different packaging materials and storage intervals on physical and biochemical characteristics of pear. *Journal of Food Science and Technology*. **50**: 147-152.	7.12
49	Kaur K., Kaur N., Gupta A.K., Singh I. (2013). Exploration of the antioxidative defense system to characterize chickpea genotypes showing differential response towards water deficit conditions. *Plant Growth Regulation*. **70**: 149.60.	7.67
50	Kaur L., Sirari A., Kumar D., Singh Sandhu J., Singh S., Kapoor K., Singh I., Gowda C.L.L., Pande S., Gaur P., Sharma M., Imtiaz M., Siddique K.H.M. (2013). Combining Ascochyta blight and Botrytis grey mould resistance in chickpea through interspecific hybridization. *Phytopathologia Mediterranea*. **52**: 1157-1165.	6.79
51	Kaur M., Randhawa B.S., Tarsikka P.S. (2013). Synthesis of Mg0.3Zn0.7Fe2O4 nanops from thermolysis of magnesium zinc tris(maleato)ferrate(III) heptahydrate. *Indian Journal of Engineering and Materials Sciences*. **20**: 325-328	6.36
52	Kaur R., Mahey R.K., Kingra P.K. (2013). Production potential of wheat (*Triticum aestivum*) as affected by varying population densities of wild oat (*Avena ludoviciana*). *Indian Journal of Agronomy*. **58**:529-533.	5.00

53	Kaur S., Sharma S., Kaur J., Sharma P. (2013). Conventional as well as microwave assisted synthesis and microbial effect of some new acrylamides. *Indian Journal of Chemistry - Section B Organic and Medicinal Chemistry.***52**: 1513-1520	6.69
54	Kaushal M., Kumar L., Gill M.I.S., Choudhary O.P., Bali S.K. (2013). Effect of salinity on survival and growth performance of in vitro grown rough lemon (*Citrus jambhiri* Lush.) seeds. *Indian Journal of Biotechnology*. **12**:284-286.	6.48
55	Keshav A., Shera P.S., Singh J. (2013). Morphological basis of resistance to spotted bollworm, *Earias vittella* (Fabricius) in Asiatic cotton. *Phytoparasitica.***41**: 235-240.	6.72
56	Kingra P.K., Mahey R.K. (2013). Moisture extraction pattern and ET-yield models in wheat under different management practices in central Punjab. *Journal of Agrometeorology*. **15**: 51-57.	6.15
57	Kitsanachandee R., Somta P., Chatchawankanphanich O., Akhtar K.P., Shah T.M., Nair R.M., Bains T.S., Sirari A., Kaur L., Srinives P. (2013). Detection of quantitative trait loci for mungbean yellow mosaic India virus (MYMIV) resistance in mungbean (*Vigna radiata* (L.) Wilczek) in India and Pakistan. *Breeding Science*. **63**: 367-373.	7.04
58	Kocher G S, Phutela R P, Dhillon H K, Uppal S K, Arora J K and Bakshi D (2013). Standardization of an economical bioprocess for production of natural vinegar from sugarcane. *Sugar Tech***16** : 15-21.	5.01
59	Kocher G.S., Dhillon H.K. (2013). Fermentative Production of Sugarcane Vinegar by Immobilized Cells of *Acetobacter aceti* Under Packed Bed conditions. *Sugar Tech*. **15**: 71-76.	5.01
60	Kocher G.S., Uppal S. (2013). Fermentation variables for the fermentation of glucose and xylose using *Saccharomyces cerevisiae* Y-2034 and *Pachysolan tannophilus* Y-2460. *Indian Journal of Biotechnology*. **12**:531-536	6.48
61	Kumar A., Chhuneja P., Jain S., Kaur S., Balyan H.S., Gupta P.K. (2013). Mapping main effect QTL and epistatic interactions for leaf rust and yellow rust using high density ITMI linkage map. *Australian Journal of Crop Science.***7**: 492-499.	6.00
62	Kumar A., Singh M., Singh G. (2013). Effect of different pretreatments on the quality of mushrooms during solar drying. *Journal of Food Science and Technology*. **50**: 165-170.	7.12
63	Kumar B., -Singh Y., Ram H., Sarlach R.S. (2013). Enhancing seed yield and quality of Egyptian clover (*Trifolium alexandrinum* L.) with foliar application of bio-regulators. *Field Crops Research*. **14**: 25-30.	8.47
64	Kumar D., Sidhu S.S. (2013). Response of Soybean To Soil Applied Sulfur And Boron In A Calcareous Soil. *Journal of Plant Nutrition*. **36**: 1795-1807.	6.53
65	Kumar D., Singh A., Tarsikka P.S. (2013). Interrelationship between viscosity and electrical properties for edible oils. *Journal of Food Science and Technology*. **50**: 549-554.	7.12
66	Kumar D, Singh J, Rai D R, Kumar M and Bhatia S (2013) Effect of modified atmosphere packaging on keeping quality of jaggery. *Sugar Tech***15** :203–208.	5.01
67	Kumar K., Jindal N., Sharma S., Nanda V. (2013). Physico-chemical and antioxidant properties of extrudates developed from honey and barley. *International Journal of Food Science and Technology*. **48**:1750-1761.	7.24
68	Kumar R., Singh B. (2013). Persistence and metabolism of fipronil in rice (Oryza sativa Linnaeus) field. *Bulletin of Environmental Contamination and Toxicology*. **90**: 482-488.	7.11
69	Kumar R., Singh B., Mandal K., Kar A., Sarao P.S. (2013). Bioefficacy and fate of fipronil and its metabolites in basmati rice under sub-tropical climatic conditions. *Crop Protection*. **45**: 41-48.	7.30
70	Kumar S., Bains N.S. (2013). Heterosis in wheat hybrids derived from *Triticum timopheevi* based cytoplasmic male sterility system. *Indian Journal of Agricultural Sciences*. **83**: 1392-1395.	6.18
71	Kumar S., Sangha M.K. (2013). Biochemical mechanism of resistance in some Brassica genotypes against *Lipaphis Erysimi* (Kaltenbach) (homoptera: Aphidiae). *Vegetos*. **26**: 387-395.	6.02
72	Kumar S., Singh K.G., Singla C. (2013). Development and evaluation of low head and minimum pressure drop equipment for fertilizer application through drip irrigation system. *Indian Journal of Agricultural Sciences*. **83**: 189-192.	6.18
73	Kumar S.S., Kaur A. (2013). Genotype independent tissue culture base line for high regeneration of japonica and indica rice. *Research Journal of Biotechnology*. **8**: 96-101.	6.29
74	Lobell D.B., Ortiz-Monasterio J.I., Sibley A.M., Sohu V.S. (2013). Satellite detection of earlier wheat sowing in India and implications for yield trends. *Agricultural Systems*. **115**:137-143.	8.50

75	Lore J.S., Hunjan M.S., Singh P., Willocquet L., Sri S., Savary S. (2013). Phenotyping of Partial Physiological Resistance to Rice Sheath Blight. *Journal of Phytopathology*. **161**: 224-229	7.00
76	Madaan G., Gosal S.K., Gosal S.S., Saroa G.S., Gill M.I.S. (2013). Effect of microbial inoculants on the growth and yield of micropropagated banana (*Musa indica*) cv. Grand Naine. *Journal of Horticultural Science and Biotechnology*. **88**: 643-649.	6.51
77	Mahajan B.V.C., Kumar D., Dhillon W.S. (2013). Effect of different polymeric films on shelf-life and quality of pear fruits under supermarket conditions. *Indian Journal of Horticulture***70**:309-312.	6.13
78	Mahajan G., Chauhan B.S. (2013). Herbicide options for weed control in dry-seeded aromatic rice in India. *Weed Technology*. **27**:682-689.	7.11
79	Mahajan G., Chauhan B.S., Gill M.S. (2013). Dry-seeded rice culture in Punjab State of India: Lessons learned from farmers. *Field Crops Research*. **144**: 89.99.	8.47
80	Manan J., Singh D., Manhas S.S. (2013). Winter maize as affected by preceding rainy-season crops, farmyard manure and nitrogen levels. *Indian Journal of Agronomy*. **58**: 539-542.	5.00
81	Mandal K., Singh B. (2013). Persistence of fipronil and its metabolites in sandy loam and clay loam soils under laboratory conditions. *Chemosphere*. **91**: 1596-1603	9.14
82	Mandal K., Singh B. (2013). Dissipation of fipronil granule formulation in sugarcane field soil. *Ecotoxicology and Environmental Safety*. **88**:142-147.	8.20
83	Mandal K., Singh B., Jariyal M., Gupta V.K. (2013). Microbial degradation of fipronil by Bacillus thuringiensis. *Ecotoxicology and Environmental Safety*. **93**: 87-92.	8.20
84	Mandal K., Singh S., Battu R.S., Singh B. (2013). An overview of persistence of spinosad in biotic and abiotic components of the environment and advances in its estimation techniques. *Bulletin of Environmental Contamination and Toxicology*. **90**: 405-413.	7.11
85	Manes G.S., Dixit A., Singh A., Mahal J.S., Mahajan G. (2013). Feasibility of mechanical transplanter for paddy transplanting in Punjab. AMA, *Agricultural Mechanization in Asia, Africa and Latin America*. **44**: 314-317.	6.06
86	Manikantan M.R., Sharma R., Arulselvam T., Varadharaju N. (2013). Development, characterization and evaluation of low density polyethylene based nanocomposite films for food packaging. *Journal of Polymer Materials*. **30**: 485-502.	6.13
87	Meena P.D., Gour R.B., Gupta J.C., Singh H.K., Awasthi R.P., Netam R.S., Godika S., Sandhu P.S., Prasad R., Rathi A.S., Rai D., Thomas L., Patel G.A., Chattopadhyay C. (2013). Non-chemical agents provide tenable, eco-friendly alternatives for the management of the major diseases devastating indian mustard (*Brassica juncea*) in india. *Crop Protection*. **53**: 169-174.	7.30
88	Mondal S., Singh R.P., Crossa J., Huerta-Espino J., Sharma I., Chatrath R., Singh G.P., Sohu V.S., Mavi G.S., Sukaru V.S.P., Kalappanavarg I.K., Mishra V.K., Hussain M., Gautam N.R., Uddin J., Barma N.C.D., Hakim A., Joshi A.K. (2013). Earliness in wheat: A key to adaptation under terminal and continual high temperature stress in South Asia. *Field Crops Research*. **15**: 19-26.	8.47
89	Neelam K., Rawat N., Tiwari V.K., Ghandhi N., Arun P.C., Kumar S., Tripathi S.K., Randhawa G.S., Prasad R., Dhaliwal H.S. (2013). Development and molecular characterization of wheat- *Aegilops longissima* derivatives with high grain micronutrients. *Australian Journal of Crop Science*. **7**: 508.514.	6.00
90	Nishi K., Hundal S.S. (2013). Chlorpyrifos induced toxicity in reproductive organs of female Wistar rats. *Food and Chemical Toxicology*. **62**: 732-738	9.01
91	Pahwa K., Ghai N., Kaur J., Singh S. (2013). Physiological evaluation of pigeonpea genotypes (*Cajanus cajan* L.) for flowering and pod set. *Research on Crops*. **14**: 478-482.	6.10
92	Pande S., Sharma M., Gaur P.M., Basandrai A.K., Kaur L., Hooda K.S., Basandrai D., Kiran Babu T., Jain S.K., Rathore A. (2013). Biplot analysis of genotype × environment interactions and identification of stable sources of resistance to Ascochyta blight in chickpea (*Cicer arietinum* L.). *Australasian Plant Pathology*. **42**: 561-571.	7.02
93	Pandove G., Sahota P., Vikal Y., Kaur B. (2013). Multiplex PCR water testing kit for rapid, economic and simultaneous detection of Escherichia coli, *Yersinia enterocolitica* and *Aeromonas hydrophila* from drinking water. *Current Science*. **104**: 352-358.	6.91

94	Parija B., Kumar M., Sharma S. (2013). Influence of farmyard manure and nitrogen levels on quality parameters and yield of maize. *Ecology, Environment and Conservation*. **19**.41045.1048. 1	5.02
95	Phutela U.G., Sahni N. (2013). Microscopic Structural Changes in Paddy Straw Pretreated with *Trichoderma reesei* MTCC 164 and *Coriolus versicolor* MTCC 138. *Indian Journal of Microbiology*. **53**:227-231.	6.46
96	Priya S., Kumar S., Kaur N., Gupta A.K. (2013). Specificity of α-amylase and trypsin inhibitor proteins in wheat against insect pests. *New Zealand Journal of Crop and Horticultural Science*. **41**: 49-56	6.48
97	Raina D., Dhillon W.S., Gill P.P.S. (2013). Molecular marker-based characterization and genetic diversity of pomegranate genotypes. Indian *Journal of Horticulture*. **70**: 469-474.	6.13
98	Ram H., Dadhwal V., Vashist K.K., Kaur H. (2013). Grain yield and water use efficiency of wheat (*Triticum aestivum* L.) in relation to irrigation levels and rice straw mulching in North West India. *Agricultural Water Management*. **128**: 92-102.	8.20
99	Ram H., Singh Y., Saini K.S., Kler D.S., Timsina J. (2013). Tillage and planting methods effects on yield, water use efficiency and profitability of soybean-wheat system on a loamy sand soil. *Experimental Agriculture*. **49**:524-542.	7.06
100	Rani R., Sharma V.K., Rattan G.S., Singh B., Sharma N. (2013). Dissipation of residues of mancozeb and metalaxyl in tomato (*Solanum lycopersicum* L.). *Bulletin of Environmental Contamination and Toxicology*. **90**:248-251.	7.11
101	Sabbavarapu M.M., Sharma M., Chamarthi S.K., Swapna N., Rathore A., Thudi M., Gaur P.M., Pande S., Singh S., Kaur L., Varshney R.K. (2013). Molecular mapping of QTLs for resistance to Fusarium wilt (race 1) and Ascochyta blight in chickpea (*Cicer arieti*num L.). *Euphytica*. **193**: 121-133.	7.64
102	Sahoo S.K., Mandal K., Kaur R., Battu R.S., Singh B. (2013). Persistence of thiacloprid residues on brinjal (*Solanum melongena* L.). *Environmental Monitoring and Assessment*. **185**: 7935-7943.	7.59
103	Sahoo S.K., Mandal K., Singh G., Kumar R., Chahil G.S., Battu R.S., Singh B. (2013). Residual behavior of quizalofop ethyl on onion (*Allium cepa* L.). *Environmental Monitoring and Assessment*. **185**:1711-1718.	7.59
104	Saini P., Khanna V. (2013). Preliminary screening for ACC-deaminase production by plant growth promoting rhizobacteria. *Journal of Pure and Applied Microbiology*. **7**: 573-576.	6.05
105	Sandhu J.S., Singh I., Singh S., Gupta S.K., Bains T.S., Kumar A., Rathore P., Singh P. (2013). L 555 - A new medium bold seeded variety of kabuli chickpea. *Indian Journal of Genetics and Plant Breeding*. **73**: 229-230.	6.20
106	Sangha G.K., Kaur K., Khera K.S. (2013). Cypermethrin induced pathological and biochemical changes in reproductive organs of female rats. *Journal of Environmental Biology*. **34**: 99-105.	6.68
107	Sarlach R.S., Kaur G. (2013). Control of parawilt in different bt cotton hybrids in Punjab, India. *Ecology, Environment and Conservation*. **19**: 521-523.	5.02
108	Sarlach R.S., Sharma A., Bains N.S., Gill M.S. (2013). Effect of foliar application of osmoprotectants and ethylene inhibitor to enhance heat tolerance in wheat (*Triticum aestivum* L.). *Vegetos*. **26**: 266-271.	6.02
109	Satpute S.T., Singh M., Khanna M., Singh A.K., Ahmad T. (2013). Response of drip irrigated onion crop to irrigation intervals and fertigation strategies. *Indian Journal of Horticulture*. **70**: 293-295.	6.13
110	Saxena A.K., Sharma S., Sandhu J.S., Gupta S.K., Kaur J. (2013). Variability and correlation studies for nutritional and cooking quality traits in chickpea (*Cicer arietinum* L.). *Indian Journal of Genetics and Plant Breeding*. **73**:151-56.	6.20
111	Sekhon B.S., Bhumbla D.K. (2013). Competitive effect of organic anions on phosphorus attenuation capacity of acid mine drainage floc. *Environmental Earth Sciences*. **70**: 651-660.	7.45
112	Sekhon B.S., Bhumbla D.K. (2013). Phosphorus remediation by acid mine drainage floc and its implications for phosphorus environmental indices. *Journal of Soils and Sediments*. **13**:336-343.	7.97
113	Sekhon K.S., Buttar G.S., Kaur A., Sidhu B.S. (2013). Water productivity and fruit yield of brinjal (*Solanum melongena* L.) as influenced by various levels of nitrogen and irrigation methods. *Research on Crops*. **14**: 876- 881.	6.10
114	Sethi V.P., Sumathy K., Lee C., Pal D.S. (2013). Thermal modeling aspects of solar greenhouse microclimate control: A review on heating technologies. *Solar Energy*. **96**: 56-82.	8.95

115	Shankar A., Sadana U.S., Jhanji S. (2013). Mechanisms of differential manganese uptake efficiency in winter cereals at generative phase. *Proceedings of the National Academy of Sciences India Section B - Biological Sciences*. **83**: 525-531.	6.00
116	Sharma M., Kiran Babu T., Ghosh R., Telangre R., Rathore A., Kaur L., Kushwaha K.P.S., Das R., Pande S. (2013). Multi-environment field testing for identification and validation of genetic resistance to Botrytis cinerea causing Botrytis grey mold in chickpea (*Cicer arietinum* L.). *Crop Protection*. **54**:106-113.	7.30
117	Sharma P., Sardana V., Banga S.S. (2013). Effect of salicylic acid on growth and seed filling in Indian mustard (*Brassica juncea* L.) under high temperature stress. *Vegetos*. **26**: 243-248	6.02
118	Sharma P., Singh G. (2013). Cold tolerance during reproductive growth of chickpea (*Cicer arietinum*): Genetic variation in flower production and pod set. *Vegetos*. **26**: 223-228.	6.02
119	Sharma S., Chander G., Verma T.S., Verma S. (2013). Soil potassium fractions in rice-wheat cropping system after twelve years of lantana residue incorporation in a northwest himalayan acid alfisol. *Journal of Plant Nutrition*.**36**:1809-1820.	6.53
120	Sharma S., Kaur A., Bansal A., Gill B.S. (2013). Positional effects on soybean seed composition during storage. *Journal of Food Science and Technology*. **50**: 353-359.	7.12
121	Sharma V., Sharma K.N. (2013). Influence of Accompanying Anions on Potassium Retention and Leaching in Potato Growing Alluvial Soils. *Pedosphere*. **23**: 464-471.	7.23
122	Sheoran P., Sardana V., Singh S., Sheoran O.P., Raj D. (2013). Optimizing sulphur application in sunflower (*Helianthus annuus*) under irrigated semi-arid tropical conditions. *Indian Journal of Agronomy*. **58**: 384-390.	5.00
123	Singh B., Sharma A., Joshi N., Mittal P., Singh S. (2013). Combining ability analysis for grain yield and its components in malt barley (*Hordeum vulgare*). *Indian Journal of Agricultural Sciences*. **83**: 96-98.	6.18
124	Singh G., Chahil G.S., Jyot G., Battu R.S., Singh B. (2013). Degradation dynamics of emamectin benzoate on cabbage under subtropical conditions of Punjab, India. *Bulletin of Environmental Contamination and Toxicology*. **91**:129-133.	7.11
125	Singh G., Kaur H., Aggarwal N., Ram H., Gill K.K., Khanna V. (2013). Symbiotic efficiency, thermal requirement and yield of blackgram (*Vigna mungo*) genotypes as influenced by sowing time. *Indian Journal of Agricultural Sciences*. **83**: 953-958.	6.18
126	Singh G., Kumar A., Kumbhar B.K., Dar B.N. (2013). Optimization of processing parameters and ingredients for development of low-fat fibre-supplemented paneer. *Journal of Food Science and Technology*. **52**: 709-719.	7.12
127	Singh H., Singh P., Singh D. (2013). Direct, Residual, and Cumulative Effects of Mixed Sludge Generated by Coca-cola Soft-Drink Industry on Crop Yield, Soil Fertility, and Heavy-Metal Uptake in Rice-Wheat Cropping Sequence. *Communications in Soil Science and Plant Analysis*. **44**: 3483-3505.	6.42
128	Singh I., Sandhu J.S., Gupta S.K., Singh S. (2013). Introgression of productivity and other desirable traits from ricebean (*Vigna umbellata*) into black gram (*Vigna mungo*). *Plant Breeding*. **132**: 401-406.	7.18
129	Singh J., Mahal S.S., Singh A. (2013). Yield and quality of malt barley (*Hordeum vulgare*) as influenced by irrigation, nitrogen and methods of sowing. *Indian Journal of Agronomy*. **58**: 354-362.	5.00
130	Singh J., Mahal S.S., Singh A. (2013). Productivity and quality of malt barley (*Hordeum vulgare*) as affected by sowing date, rate and stage of nitrogen application. *Indian Journal of Agronomy*. **58**: 72-80.	5.00
131	Singh J., Vatta K. (2013). Rise in food prices and changing consumption pattern in rural punjab. *Current Science*. **104**: 1022-1027.	6.91
132	Singh K., Singh A., Choudhary O.P., Gill M.S., Uppal S.K., Singh D. (2013). Productivity, Profitability and Soil Properties Influenced by Planting Methods and Band Application of FYM in Autumn Sugarcane. *Sugar Tech*. **15**: 145-151.	5.01
133	Singh K, Singh D, Hundal H.S., Khurana M.P.S. (2013). An appraisal of groundwater quality for drinking and irrigation purposes in southern part of Bathinda district of Punjab, northwest India. *Environmental Earth Sciences*. **70**: 1841-1851.	7.45

134	Singh M., Garg A., Sidhu A., Kumar V. (2013). Synthesis of quarternary ammonium salts with dithiocarbamate moiety and their antifungal activities against *Helminthosporium oryzae*. *Journal of Chemical Sciences*. **125**: 567-573.	7.30
135	Singh M., Ghanshyam C., Mishra P.K., Chak R. (2013). Current status of electrostatic spraying technology for efficient crop protection. AMA, *Agricultural Mechanization in Asia, Africa and Latin America*. **44**: 46-53.	6.06
136	Singh R., Bassi G., Singh D. (2013). Influence of sowing time and leaf cuttings on the seed yield and quality components of palak (*Beta vulgaris* var bengalensis). *Indian Journal of Agricultural Sciences*. **83**:410-414.	6.18
137	Singh S., Sharma D.R. (2013). Management of fruit flies in rainy season guava through male annihilation technique using methyl eugenol based traps. *Indian Journal of Horticulture*. **70**: 512-518.	6.13
138	Singh S., Sharma D.R. (2013). Biology and morphometry of *Bactrocera dorsalis* and *Bactrocera zonata* on different fruit crops. *Indian Journal of Agricultural Sciences*.**83**: 1423-1425.	6.18
139	Singh S.R., Dalal S., Singh R., Dhawan A.K., Kalia R.K. (2013). Ascertaining clonal fidelity of micropropagated plants of *Dendrocalamus hamiltonii* Nees et Arn. ex Munro using molecular markers. *In Vitro Cellular and Developmental Biology - Plant*.**49**: 572-583.	7.14
140	Singla N., Garg M. (2013). Effect of crude cottonseed oil containing gossypol on fertility of male and estrous cycle of female *Bandicota bengalensis* Gray and Hardwicke. *Journal of Applied Animal Research*. **41**:156-165.	6.12
141	Singla N., Kaur G., Babbar B.K., Sandhu B.S. (2013). Potential of triptolide in reproductive management of the house rat, *Rattus rattus*. *Integrative Zoology*.**8**: 260-276.	7.29
142	Soni R., Deol G.S., Singh S. (2013). Seasonal dynamics of wheat aphid complex and predator *Coccinella septempunctata* in relation to abiotic and biotic factors. *Journal of Environmental Biology*. **34**: 689- 694.	6.68
143	Suryawanshi V., Thakur S.S., Sharma A. (2013). Performance evaluation of experimental seif-propelled double row sugarcane harvester. AMA, *Agricultural Mechanization in Asia, Africa and Latin America*. **44**: 80-88.	6.06
144	Thakur A., Singh Z. (2013). Deficit Irrigation in Nectarine: Fruit Quality, Return Bloom and Incidence of double fruits. *European Journal of Horticultural Science*. **78**: 67-75.	6.38
145	Toor H.K., Sangha G.K., Khera K.S. (2013). Imidacloprid induced histological and biochemical alterations in liver of female albino rats. *Pesticide Biochemistry and Physiology*. **105**: 1-4.	8.11
146	Uloth M., You M.P., Finnegan P.M., Banga S.S., Yi H., Barbetti M.J. (2013). Seedling resistance to *Sclerotinia sclerotiorum* as expressed across diverse cruciferous species. *Plant Disease*. **98**.2184.190. 12	8.46
147	Uloth M.B., You M.P., Finnegan P.M., Banga S.S., Banga S.K., Sandhu P.S., Yi H., Salisbury P.A., Barbetti M.J. (2013). New sources of resistance to *Sclerotinia sclerotiorum* for crucifer crops. *Field Crops Research*. 154.40.52. 20	8.47
148	Vashisht A.K., Shakya Prof. S.K. (2013). Hydraulics of a multi-section screened well while draining ponded land in a leaky aquifer. *ISH Journal of Hydraulic Engineering*. **19**: 164-178	7.28
149	Vashisht B.B., Mulla D.J., Jalota S.K., Kaur S., Kaur H., Singh S. (2013). Productivity of rainfed wheat as affected by climate change scenario in northeastern Punjab, India. *Regional Environmental Change*. **13**: 989-998.	7.95
150	Yadav K., Dhillon D.S., Bhardwaj N. (2013). Factors affecting the job satisfaction of agricultural scientists of State Agricultural Universities. *Indian Journal of Agricultural Sciences*. **83**: 862-865.	6.18
151	Yuvraj, Kaur R., Uppal S.K., Sharma P., Oberoi H.S. (2013). Chemical Composition of Sweet Sorghum Juice and its Comparative Potential of Different Fermentation Processes for Enhanced Ethanol Production. *Sugar Tech*. **15**: 305-310.	5.01
2014		
152	Aggarwal N., Singh G., Ram H., Khanna V. (2014). Effect of post-emergence application of imazethapyr on symbiotic activities, growth and yield of blackgram (Vignamungo) cultivars and its efficacy against weeds. *Indian Journal of Agronomy*.**59:** 421-426.	5.00

153	Akoijam R., Singh B. (2014). Metabolic degradation of imidacloprid in paddy field soil. *Environmental Monitoring and Assessment*. **186**:5977-5984.	7.59
154	Akoijam R., Singh B. (2014). Persistence and metabolism of imidacloprid in rice. *Bulletin of Environmental Contamination and Toxicology*. **92:** 609-615.	7.11
155	Ali A.M., Thind H.S., Sharma S., Varinderpal-Singh (2014). Prediction of dry direct-seeded rice yields using chlorophyll meter, leaf color chart and GreenSeeker optical sensor in northwestern India. *Field Crops Research.***161**: 11-15	8.47
156	Ansari M.J., Kumar R., Singh K., Dhaliwal H.S. (2014). Characterization and molecular mapping of a soft glume mutant in diploid wheat (Triticummonococcum L.). *Cereal Research Communications*. **42**: 209-217.	6.56
157	Arora S., Chahal D.S. (2014). Forms of Boron in Alkaline Alluvial Soils in Relation to Soil Properties and Their Contribution to Available and Total Boron Pool. *Communications in Soil Science and Plant Analysis*. **45**: 2247-2257.	6.42
158	Asthir B., Bhatia S. (2014). In vivo studies on artificial induction of thermotolerance to detached panicles of wheat (Triticumaestivum L) cultivars under heat stress. *Journal of Food Science and Technology.***51**: 118.123.	7.24
159	Bains K., Uppal V., Kaur H. (2014). Optimization of germination time and heat treatments for enhanced availability of minerals from leguminous sprouts. *Journal of Food Science and Technology*. **51:** 1016-1020.	7.24
160	Banga S.S., Kang M.S. (2014). Developing Climate-Resilient Crops. *Journal of Crop Improvement*. **28**: 87.	5.12
161	Bansal U.K., Kazi A.G., Singh B., Hare R.A., Bariana H.S. (2014). Mapping of durable stripe rust resistance in a durum wheat cultivar Wollaroi. *Molecular Breeding*. **33**:151-159.	9.25
162	Barbetti M.J., Banga S.K., Fu T.D., Li Y.C., Singh D., Liu S.Y., Ge X.T., Banga S.S. (2014). Comparative genotype reactions to Sclerotiniasclerotiorum within breeding populations of Brassica napus and B. juncea from India and China. *Euphytica*. **197:** 147-159.	7.64
163	Benbi D.K., Boparai A.K., Brar K. (2014). Decomposition of particulate organic matter is more sensitive to temperature than the mineral associated organic matter. *Soil Biology and Biochemistry.***70**: 183-192.	9.65
164	Benbi D.K., Khosa M.K. (2014). Effects of Temperature, Moisture, and Chemical Composition of Organic Substrates on C Mineralization in Soils. *Communications in Soil Science and Plant Analysis.***45**: 2734-2753.	6.42
165	Benbi D.K., Sektion B.S. (2014). Soil test based fertilizer calibrations in pressmud amended rice-wheat sequence in alluvial soils of India. *Ecology, Environment and Conservation.***20:** 937-1943.	5.02
166	Bhise S., Kaur A. (2014). Baking quality, sensory properties and shelf life of bread with polyols. *Journal of Food Science and Technology*. **51**: 2054-2061.	7.24
167	Brar S.K., Gill B.S., Brar A.S., Kaur T. (2014). Planting Date and Straw Mulch Affect Biomass Yield, Oil Yield and Oil Quality of Japanese mint (Menthaarvensis L.) Harvested at Successive Intervals. *Journal of Essential Oil-Bearing Plants*. **17**: 467-695.	6.00
168	Buttar G.S., Thind H.S., Sekhon K.S., Kaur A. (2014). Agronomic strategies for sustainable use of poor quality water in wheat (Triticumaestivum) and hybrid Bt cotton (Gossypiumhirsutum) in a calcareous soil. *Indian Journal of Agronomy*. **59:** 568-574.	5.00
169	Chahil G.S., Mandal K., Sahoo S.K., Battu R.S., Singh B. (2014). Risk assessment of β-cyfluthrin and imidacloprid in chickpea pods and leaves. *Ecotoxicology and Environmental Safety.***101**: 177-183.	8.20
170	Champa W.A.H., Gill M.I.S., Mahajan B.V.C., Arora N.K. (2014). Postharvest treatment of polyamines maintains quality and extends shelf-life of table grapes (Vitisvinifera L.) cv. Flame Seedless. *Postharvest Biology and Technology*. **91**: 57-63.	8.45
171	Chauhan B.S., Prabhjyot K., Mahajan G., Randhawa R.K., Singh H., Kang M.S. (2014). Global Warming and Its Possible Impact on Agriculture in India. *Advances in Agronomy*. **123**: 65-121.	11.06
172	Choudhary M., Grover K., Javed M. (2014). Nutritional Profiles of Urban and Rural Men of Punjab with Regard to Dietary Fat Intake. *Ecology of Food and Nutrition.***53:** 436-452.	6.80

173	Choudhary M., Kochhar A., Sangha J. (2014). Hypoglycemic and hypolipidemic effect of Aloe vera L. in non-insulin dependent diabetics. *Journal of Food Science and Technology.***51**: 90-96.	7.24
174	Debasish-Saha, Kukal S.S., Bawa S.S. (2014). Soil organic carbon stock and fractions in relation to land use and soil depth in the degraded Shiwaliks hills of lower Himalayas. *Land Degradation and Development.***25**: 407-416.	7.99
175	Dhaliwal G.S., Gupta N., Kukal S.S., Meetpal-Singh (2014). Standardization of Automated Vario EL III CHNS Analyzer for Total Carbon and Nitrogen Determination in Plants. *Communications in Soil Science and Plant Analysis*. **45:** 1316-1324.	6.42
176	Dhaliwal M.S. (2014). Induction and exploitation of nuclear and cytoplasmic male sterility in pepper (capsicum spp.): A review. *Journal of Horticultural Science and Biotechnology.***89**: 471-479.	6.51
177	Dhaliwal S.S., Shukla A.K., Manchanda J.S., Kumar D. (2014). Screening of wheat cultivars and fertifortification with zinc, manganese and iron in low fertility soils of Punjab. *Vegetos.***27**: 139-145.	6.02
178	Dhall R.K., Sharma S.R., Mahajan B.V.C. (2014). Development of post-harvest protocol of okra for export marketing. *Journal of Food Science and Technology.***51**: 1622-1625.	7.24
179	Dhar P., Singla N. (2014). Effect of triptolide on reproduction of female lesser bandicoot rat, Bandicotabengalensis. *Drug and Chemical Toxicology*. **37**: 448-458.	7.29
180	Dhar P., Singla N. (2014). Histomorphological and biochemical changes induced by triptolide treatment in male lesser bandicoot rat, Bandicotabengalensis. *Pesticide Biochemistry and Physiology.***116**:49-55.	8.11
181	Dhillon K.S., Dhillon S.K. (2014). Development and mapping of seleniferous soils in northwestern India. *Chemosphere*. **99**:56-63.	9.14
182	Dhingra H.S. (2014). Study on Sinkage and rolling resistance of various tractors in the soil. *AMA, Agricultural Mechanization in Asia, Africa and Latin America*. **45**: 160-165.	6.06
183	Dogra B., Dogra R., Singh S., Manes G.S. (2014). Performance of modified spike tooth thresher for pigeonpea (CajanusCajan). *Legume Research.***37**: 628-634.	6.09
184	Dogra R., Ahuja S.S., Dogra B., Virk M.S. (2014). Effect of blade width and spading frequency of spading machine on specific soil resistance and pulverisation. *AMA, Agricultural Mechanization in Asia, Africa and Latin America.***45:**12-17.	6.06
185	Ekta, Utreja D., Dhillon N.K. (2014). Synthesis of metal complexes of schiff bases and their nematicidal activity against root knot nematode meloidogyne incognita. *Letters in Organic Chemistry*. **11**: 116-125.	6.67
186	Gaikwad K.B., Singh N., Bhatia D., Kaur R., Bains N.S., Bharaj T.S., Singh K. (2014). Yield-enhancing heterotic QTL transferred from wild species to cultivated rice Oryzasativa L. *PLoS ONE.* **9**: e96939.	9.73
187	Garg M., Kumar R., Singh R.P., Tsujimoto H. (2014). Development of an aegilopslongissima substitution line with improved bread-making quality. *Journal of Cereal Science.* 60: 389-396.	8.09
188	Gill J.S., Walia S.S. (2014). Effect of foliar application of iron, zinc and manganese on direct seeded aromatic rice (Oryzasativa). *Indian Journal of Agronomy*. **59**: 180-185.	5.00
189	Gill P.P.S., Pannu H.S., Singh N.P. (2014). Impact of pre-bloom air temperature on leaf, flower progression and yield of pear strains in North-Western plains of India. *Ecology, Environment and Conservation.* **20:** 551-554.	5.02
190	Gill R.K., Singh I., Singh S., Singh P. (2014). Studies on combining ability for grain yield and component traits in Kharifurdbean. *Legume Research.* **37:** 575-579.	6.09
191	Grewal G.K., Gill R.I.S., Dhillon G.P.S., Vikal Y. (2014). Molecular characterisation and genetic diversity analysis of PopulusdeltoidesBartr. ex Marsh. clones using SSR markers. *Indian Journal of Biotechnology.* **13:** 388-397.	6.48
192	Grover D.K. (2014). Rapporteur's report on labour scarcity in agriculture and farm mechanisation. *Indian Journal of Agricultural Economics.***69**: 438-449.	5.04
193	Grover D.K., Upadhya D. (2014). Changing climate pattern and its impact on paddy productivity in Ludhiana district of Punjab. *Indian Journal of Agricultural Economics.***69**: 150-162.	5.04

194	Gunasinghe N., You M.P., Banga S.S., Barbetti M.J. (2014). High level resistance to Pseudocercosporellacapsellae offers new opportunities to deploy host resistance to effectively manage white leaf spot disease across major cruciferous crops. *European Journal of Plant Pathology.***138**: 873-890.	7.61
195	Gupta M., Gupta S., Kumar H., Kumar N., Banga S.S. (2014). Population structure and breeding value of a new type of Brassica juncea created by combining A and B genomes from related allotetraploids. *Theoretical and Applied Genetics.***128**: 221-234.	9.66
196	Gupta N., Thind S.K., Bains N.S. (2014). Glycine betaine application modifies biochemical attributes of osmotic adjustment in drought stressed wheat. *Plant Growth Regulation*. **72:** 221-228.	7.67
197	Gupta R.K., Singh A., Singh Y., Thind H.S., Singh B., Singh V. (2014). Effects of Rice Husk Ash and Bagasse Ash on Phosphorus Adsorption and Desorption in an Alkaline Soil under Wheat-Rice System. *Communications in Soil Science and Plant Analysis*. **45:** 1385-1398.	6.42
198	Hundal J.S., Kumar B., Wadhwa M., Bakshi M.P.S., Ram H. (2014). Nutritional evaluation of dual purpose barley as fodder. *Indian Journal of Animal Sciences*. **84:** 298-301.	6.13
199	Hussain S.Z., Singh B., Naik H.R. (2014). Viscous and thermal behaviour of vitamin A and iron-fortified reconstituted rice. *International Journal of Food Science and Technology*. **49:** 1324-1329.	7.24
200	Jalota S.K., Vashisht B.B., Kaur H., Kaur S., Kaur P. (2014). Location specific climate change scenario and its impact on rice and wheat in Central Indian Punjab. *Agricultural Systems*. **131**: 77-86.	8.50
201	Jariyal M., Gupta V.K., Mandal K., Jindal V., Banta G., Singh B. (2014). Isolation and characterization of novel phorate-degrading bacterial species from agricultural soil. *Environmental Science and Pollution Research*. **21:** 2214-2222.	8.62
202	Jaswal R.K., Sodhi H.S., Sharma S. (2014). Characterization of interspecific hybrid dikaryons of the oyster mushrooms, pleurotusflorida PAU-5 and p. sajor-caju PAU-3 (higher basidiomycetes) from India. *International Journal of Medicinal Mushrooms.* **16**: 355-364.	6.84
203	Jat M.L., Bijay-Singh, Gerard B. (2014). Nutrient Management and Use Efficiency in Wheat Systems of South Asia. *Advances in Agronomy*. **125**: 171-259.	11.06
204	Jawandha S.K., Singh H., Thakur A., Gill P.P.S., Arora A. (2014). Effect of low temperature and calcium applications on the post harvest quality of peach. *Ecology, Environment and Conservation*. **20**: 1153-1157.	5.02
205	Jhanji S., Sadana U.S. (2014). Genotypic variation in partitioning of dry matter and manganese between source and sink organs of rice under manganese stress. *Plant Cell Reports.***33**: 1227.1238.	8.51
206	Jhanji S., Sadana U.S., Shankar A., Shukla A.K. (2014). Manganese influx and its utilization efficiency in wheat. *Indian Journal of Experimental Biology*. **52:** 650-657.	7.20
207	Jyot G., Mandal K., Chahil G.S., Singh B. (2014). Persistence and risk assessment of emamectin benzoate residues on okra fruits and soil. *Environmental Technology* (United Kingdom). **35**: 1736-1743.	7.61
208	Katoch R., Singh S.K., Thakur N., Dutt S., Yadav S.K., Shukle R. (2014). Cloning, characterization, expression analysis and inhibition studies of a novel gene encoding Bowman-Birk type protease inhibitor from rice bean. *Gene*. **546**: 342-351.	8.20
209	Kaur G., Ghai N. (2014). Mineral nutrient element transporter proteins in plants. *Ecology, Environment and Conservation*. **20**: 167.-172.	5.02
210	Kaur G., Sharma I., Sharma R.C. (2014). Characterization of Ustilagosegetumtritici causing loose smut of wheat in northwestern India. *Canadian Journal of Plant Pathology*. **36**: 360-366.	7.12
211	Kaur G., Sharma S., Singh B. (2014). Response surface analysis for preparation of modified flours using twin screw extrusion cooking. *International Journal of Food Engineering.***10**: 503-510.	6.00
212	Kaur H., Banga S.S. (2014). Discovery and mapping of Brassica juncea Sdt1 gene associated with determinate plant growth habit. *Theoretical and Applied Genetics*. **128**: 235-245.	9.66
213	Kaur H., Gupta S., Kumar N., Akhatar J., Banga S.S. (2014). Progression of molecular and phenotypic diversification in resynthesized Brassica juncea (L) gene pool with determinate inflorescence. *Euphytica.***199**: 325-338.	7.64

214	Kaur H., Mohan C., Vikal Y., Singh M. (2014). Pathogenic and molecular characterization of Fusariummoniliformesheld, the incitant of fusarium maize stalk rot in the Punjab State of India. Maydica. **59:** 290-297.	6.37
215	Kaur H., Sharma P., Kaur N., Gill B.S. (2014). Tapping of native bradyrhizobium and ensifer sp. Diversity for functional traits in soybean [Glycine max (L.) Merrill]. *Legume Research*. **37:** 651-657.	6.09
216	Kaur J., Kaur A., Ahluwalia P. (2014). Effect of pre-dehulling treatments on chemical composition, functional and pasting properties of whole oat flour. Carpathian *Journal of Food Science and Technology*.**6**: 283-291.	7.12
217	Kaur M., Gupta A.K., Zhawar V.K. (2014). Antioxidant response and Lea genes expression under exogenous ABA and water deficit stress in wheat cultivars contrasting in drought tolerance. *Journal of Plant Biochemistry and Biotechnology*.**23**: 118-130.	6.41
218	Kaur P., Banga S., Kumar N., Gupta S., Akhatar J., Banga S.S. (2014). Polyphyletic origin of Brassica juncea with B. rapa and B. nigra (Brassicaceae) participating as cytoplasm donor parents in independent hybridization events. *American Journal of Botany*. **101:** 1157-1166.	8.59
219	Kaur P., Kaur K., Bhullar M.S. (2014). Quantification of penoxsulam in soil and rice samples by matrix solid phase extraction and liquid-liquid extraction followed by HPLC-UV method. *Environmental Monitoring and Assessment*. **186**: 7555-7563.	7.59
220	Kaur R., Gupta A.K., Taggar G.K. (2014). Nitrate reductase and nitrite as additional components of defense system in pigeonpea (Cajanuscajan L.) against Helicoverpaarmigera herbivory. *Pesticide Biochemistry and Physiology*.**115**: 39-47.	8.11
221	Kaur R., Gupta A.K., Taggar G.K. (2014). Zinc as an important factor determining resistance against Helicoverpaarmigera herbivory in pigeon pea (Cajanuscajan L.). *Current Science*.**107**: 11871-1875.	6.91
222	Kaur R., Jaidka M. (2014). Spectral reflectance characteristics to distinguish malvaneglecta in wheat (TriticumAestivum). *Indian Journal of Agricultural Sciences*. **84**: 1243-1249.	6.18
223	Kaur R., Jaidka M., Kingra P.K. (2014). Study of optimum time span for distinguishing Rumexspinosus in wheat crop through spectral reflectance characteristics. *Proceedings of the National Academy of Sciences India Section B - Biological Sciences*.**84**: 625-633.	6.00
224	Kaur S., Aggarwal R., Jalota S.K., Vashisht B.B., Lubana P.P.S. (2014). Estimation of groundwater balance using soil-water-vegetation model and GIS. *Water Resources Management*.**28**: 4359-4371.	8.26
225	Kaur S., Arora N.K., Gill M.I.S., Boora R.S., Mahajan B.V.C., Dhaliwal H.S. (2014). Effect of perforated and non-perforated films on quality and storage life of guava fruits. *Indian Journal of Horticulture*. **71:** 390-396.	6.13
226	Kaur S., Devi R., Bains N.S., Chhuneja P. (2014). Comparison of DNA profiles of traditional and modern bread wheat varieties of India. *Indian Journal of Genetics and Plant Breeding*. **74**: 371-373.	6.20
227	Kaur S., Kaur S., Gupta A.K., Kaur N., Javed M. (2014). Biochemical and nutritional characterization of chickpea (Cicerarietinum) cultivars. *Indian Journal of Agricultural Sciences*.**84**: 479-486.	6.18
228	Kaur S., Sharma B., Gupta A.K., Kaur S., Kaur J. (2014). Nodule metabolism in cold stress tolerant and susceptible chickpea cultivars. *Symbiosis*. **64:** 33-42.	6.68
229	Khurana M.P.S., Jhanji S. (2014). Influence of cadmium on dry matter yield, micronutrient content and its uptake in some crops. *Journal of Environmental Biology*. **35**: 865-870.	6.68
230	Khurana M.P.S., Kansal B.D. (2014). Effect of farm yard manure on chemical fractionation of cadmium and its bio-availability to maize crop grown on sewage irrigated coarse textured soil. *Journal of Environmental Biology*. **35:** 431-437.	6.68
231	Kim D.H., Kaashyap M., Rathore A., Das R.R., Parupalli S., Upadhyaya H.D., Gopalakrishnan S., Gaur P.M., Singh S., Kaur J., Yasin M., Varshney R.K. (2014). Phylogenetic diversity of Mesorhizobium in chickpea. *Journal of Biosciences*. **39**: 513-517.	7.76
232	Kocher G.S., Dhillon H.K., Joshi N. (2014). Scale up of sugarcane vinegar production by recycling of successive fermentation batches and its organoleptic evaluation. *Journal of Food Processing and Preservation*.**38:** 955-963.	6.45
233	Kocher G.S., Phutela R.P., Dhillon H.K., Uppal S.K., Arora J.K., Bakshi D. (2014). Standardization of an Economical Bioprocess for Production of Natural Vinegar from Sugarcane. *Sugar Tech*.**16:** 15-21.	5.01

234	Kukal S.S., Yadvinder-Singh, Jat M.L., Sidhu H.S. (2014). Improving Water Productivity of Wheat-Based Cropping Systems in South Asia for Sustained Productivity. *Advances in Agronomy*. **127**: 157-258.	11.06
235	Kulkarni K.P., Vishwakarma C., Sahoo S.P., Lima J.M., Nath M., Dokku P., Gacche R.N., Mohapatra T., Robin S., Sarla N., Seshashayee M., Singh A.K., Singh K., Singh N.K., Sharma R.P. (2014). A substitution mutation in OsCCD7 cosegregates with dwarf and increased tillering phenotype in rice. *Journal of Genetics*. **93**: 389-401.	6.88
236	Kumar R., Singh K., Singh B., Aulakh S.S. (2014). Mapping groundwater quality for irrigation in Punjab, North-West India, using geographical information system. *Environmental Earth Sciences***. 71:** 147-161.	7.45
237	Kumar V., Mahajan G., Sharma N. (2014). Influence of rate and time of nitrogen application on the yield and quality characteristics of basmati rice (Oryzasativa L.). *Ecology, Environment and Conservation*. **20**: 1723-1729.	5.02
238	Lore J.S., Jain J., Mangat G.S. (2014). Evaluation of rice germplasm for multiple disease resistance under artificial inoculation conditions. *Indian Journal of Genetics and Plant Breeding*.**74**: 670-673.	6.20
239	Lukaszewski A.J., Alberti A., Sharpe A., Kilian A., Chhuneja P. *et al.* (2014). A chromosome-based draft sequence of the hexaploid bread wheat (Triticumaestivum) genome. *Science*.**345**.619412517	20.00
240	Mahajan G., Khurana M.P.S. (2014). Enhancing productivity of dry-seeded rice (Oryzasativa L.) in North-West India through foliar application of iron and potassium nitrate. *Vegetos*.**27**: 301-306.	6.02
241	Mahajan G., Poonia V., Chauhan B.S. (2014). Integrated weed management using planting pattern, cultivar, and herbicide in dry-seeded rice in Northwest India. *Weed Science*.**62**: 350-359.	7.76
242	Mahajan G., Ramesha M.S., Chauhan B.S. (2014). Response of rice genotypes to weed competition in dry direct-seeded rice in India. *Scientific World Journal*. (2014)641589.	7.73
243	Malik A.A., Vashisht V.K., Singh K., Sharma A., Singh D.K., Singh H., Monforte A.J., McCreight J.D., Dhillon N.P.S. (2014). Diversity among melon (Cucumismelo L.) landraces from the Indo-Gangetic plains of India and their genetic relationship with USA melon cultivars. *Genetic Resources and Crop Evolution*. **61**: 1189-1208.	7.59
244	Manchanda P., Kaur A., Kumar P., Choudhary O.P., Gosal S.S. (2014). In vitro selection for drought tolerance in two elite sugarcane (Saccharum spp.) genotypes. *Indian Journal of Agricultural Sciences*. **84:** 1513-1516.	6.18
245	Mandal K., Kaur R., Sahoo S.K., Arora R., Singh B. (2014). Degradation pattern and risk assessment of chlorantraniliprole on berseem (Trifoliumalexandrinum L.) using high performance liquid chromatography. *Chemosphere*. **112**: 100-104.	9.14
246	Mandal K., Kaur R., Singh B. (2014). Development of thin layer chromatographic technique for qualitative and quantitative analysis of fipronil in different formulations. *Journal of Liquid Chromatography and Related Technologies***. 37:** 2746-2755.	6.57
247	Mandal K., Sahoo S.K., Battu R.S., Singh B. (2014). Estimation of quizalofop ethyl residues in black gram (vignamungo L.) by gas liquid chromatography. *Bulletin of Environmental Contamination and Toxicology*. **92:** 115-118.	7.11
248	Mandal K., Singh B. (2014). Persistence and metabolism of fipronil in sugarcane leaves and juice. *Bulletin of Environmental Contamination and Toxicology*.**92:** 220-224.	7.11
249	Mandal K., Singh B., Jariyal M., Gupta V.K. (2014). Bioremediation of fipronil by a Bacillus firmus isolate from soil. *Chemosphere*.**101**: 55-60.	9.14
250	Mandge H.M., Sharma S., Dar B.N. (2014). Instant multigrain porridge: Effect of cooking treatment on physicochemical and functional properties. *Journal of Food Science and Technology*.**51**: 97-103.	7.12
251	Mangal M., Bansal S., Sharma M. (2014). Macro and micromorphological characterization of different Aspergillusisolates. *Legume Research*.**37:** 372-378.	6.09
252	Meena H., Kumar A., Sharma R., Chauhan S.K., Bhargava K.M. (2014). Genetic variation for growth and yield parameters in half-sib progenies of Meliaazedarach (Linn.). *Turkish Journal of Agriculture and Forestry*. **38:** 531-539.	6.71
253	Mittal S., Bajwa U. (2014). Effect of heat treatment on the storage stability of low calorie milk drinks. *Journal of Food Science and Technology*. **51**: 1875-1883.	7.12

254	Mukherjee J., Singh G., Bal S.K. (2014). Radiation use efficiency and instantaneous photosynthesis at different growth stages of wheat (Triticumaestivum L.) in semi arid ecosystem of Central Punjab, India. *Journal of Agrometeorology*. **16**: 69-77.	6.15
255	Naik H.R., Sekhon K.S. (2014). Influence of defatted soy flour addition on the quality and stability of pretzel type product. *Journal of Food Science and Technology*. **51**: 571-576.	7.12
256	Nasir A., Toor M.S., Vatta K. (2014). Composite index for measuring sustainability of food systems in Punjab. *Current Science*. **106**: 170-175.	6.91
257	Navprem, Gill M.S., Gill P.P.S. (2014). Characterization of sucking type mango genotypes under sub-tropics of Punjab. *Indian Journal of Horticulture*. **71**: 11	6.13
258	Pask A., Joshi A.K., Manès Y., Sharma I., Chatrath R., Singh G.P., Sohu V.S., Mavi G.S., Sakuru V.S.P., Kalappanavar I.K., V.K.Mishra, Arun B., Mujahid M.Y., Hussain M., Gautam N.R., Barma N.C.D., Hakim A., Hoppitt W., Trethowan R., Reynolds M.P. (2014). A wheat phenotyping network to incorporate physiological traits for climate change in South Asia. *Field Crops Research*. **168:** 1-39.	8.47
259	Phutela U.G., Kaur J. (2014). Process Optimization for Ethanol Production from Sweet Sorghum Juice Using Saccharomyces cerevisiae Strain NRRL Y-2034 by Response Surface Methodology. *Sugar Tech*. **16**: 411-421.	5.01
260	Pooja, Kocher G.S., Gill M.I.S., Arora N.K. (2014). Evaluation of local guava varieties for quality wine production. *Indian Journal of Horticulture*. **71:** 554-559.	6.13
261	Rai J., Gosal S.K., Sharma S., Thind S.K. (2014). Isolation, Identification and oil quality of different algal strains. *Ecology, Environment and Conservation*. **20**: 1597-1604.	5.02
262	Rai S., Kaur A., Singh B. (2014). Quality characteristics of gluten free cookies prepared from different flour combinations. *Journal of Food Science and Technology*. **51**: 785-789.	7.12
263	Raliya R., Tarafdar J.C., Mahawar H., Kumar R., Gupta P., Mathur T., Kaul R.K., Praveen-Kumar, Kalia A., Gautam R., Singh S.K., Gehlot H.S. (2014). ZnOnanops induced exopolysaccharide production by B. subtilis strain JCT1 for arid soil applications. *International Journal of Biological Macromolecules*. **65:** 362-368.	8.60
264	Ram H., Singh G., Aggarwal N. (2014). Grain yield, nutrient uptake, quality and economics of soybean (Glycine max) under different sulphur and boron levels in Punjab. *Indian Journal of Agronomy*. **59:** 101-105.	5.00
265	Roy R., Singh A., Kang J.S. (2014). Yield and quality of Chickpea (CicerAerietinum) varieties as influenced by different planting techniques. *Legume Research*. **37**: 294-299.	6.09
266	Sahoo S.K., Mandal K., Kumar R., Singh B. (2014). Analysis of Fluopicolide and Propamocarb Residues on Tomato and Soil Using QuEChERS Sample Preparation Method in Combination with GLC and GCMS. *Food Analytical Methods*.**7:** 1032-1042.	7.97
267	Saijpaul S., Chandrahas, Saini A.L., Gangwar M. (2014). Effect of probiotic supplementation on growth, nutrient utilization and economics of feeding in beetal kids under stall-fed conditions. *Animal Nutrition and Feed Technology*.**14**: 147-152.	6.36
268	Saini M.K., Dhawan A.K. (2014). Effect of nitrogen fertigation and sowing time on the expression of Cry2Ab and on mortality of SpodopteraHtura in Bollgard II cotton. J*ournal of Environmental Biology*. **35**: 311.315.	6.68
269	Sandhu S.K., Brar S.S., Singh R.S., Singh P., Bhagat I., Kang M.S. (2014). GGE Biplot Analysis for Cane and Sugar Yield from Advanced-Stage Sugarcane Trials in Subtropical India. *Journal of Crop Improvement*. **28**: 641-659.	5.12
270	Sandhu S.S., Brar P.S., Dhall R.K. (2014). Elucidating genetic diversity of hardneck garlic (Allium sativum L.) using morphological and physico-chemical traits. *Vegetos*. **27**: 307-311.	6.02
271	Sandhu S.S., Mahal S.S. (2014). Performance of rice (Oryzasativa) under different planting methods, nitrogen levels and irrigation schedules. *Indian Journal of Agronomy*.**59**: 392-397.	5.00
272	Sarao P.S., Kaur H. (2014). Efficacy of Ferterra 0.4% GR (chlorantraniliprole) against stem borers and leaffolder insect-pests of basmati rice. *Journal of Environmental Biology*.**35:** 815-819.	6.68
273	Sekhon B.S., Bhumbla D.K., Sencindiver J., McDonald L.M. (2014). Using soil survey data for series-level environmental phosphorus risk assessment. *Environmental Earth Sciences*.**72**: 2345-2356.	7.45

274	Sethi V.P., Pal D.S., Sumathy K. (2014). Performance evaluation and solar radiation capture of optimally inclined box type solar cooker with parallelepiped cooking vessel design. *Energy Conversion and Management*. **81**: 231-241.	8.78
275	Shankar A., Sadana U.S., Sekhon N.K. (2014). Contribution of Post-Anthesis Growth and Manganese Dynamics to Differential Grain Yield in Different Wheat Species. *Journal of Plant Nutrition*. **37**: 1770-1781.	6.53
276	Sharma D., Sangha G.K. (2014). Triazophos induced oxidative stress and histomorphological changes in liver and kidney of female albino rats. *Pesticide Biochemistry and Physiology*. **110**: 71-80.	8.11
277	Sharma K.K., Mukherjee I., Singh B., Mandal K., Sahoo S.K., Banerjee H., Banerjee T., Roy S., Shah P.G., Patel H.K., Patel A.R., Beevi S.N., George T., Mathew T.B., Singh G., Noniwal R., Devi S. (2014). Persistence and risk assessment of spiromesifen on tomato in India: a multilocational study. *Environmental Monitoring and Assessment*. **186:** 8453-8461.	7.59
278	Sharma K.K., Mukherjee I., Singh B., Sahoo S.K., Parihar N.S., Sharma B.N., Kale V.D., Nakat R.V., Walunj A.R., Mohapatra S., Ahuja A.K., Sharma D., Singh G., Noniwal R., Devi S. (2014). Residual behavior and risk assessment of flubendiamide on tomato at different agro-climatic conditions in India. *Environmental Monitoring and Assessment*. **186:** 7673-7682.	7.59
279	Sharma N., Kaur R., Mangat G.S., Singh K. (2014). Red pericarp introgression lines derived from interspecific crosses of rice: Physicochemical characteristics, antioxidative properties and phenolic content. *Journal of the Science of Food and Agriculture*.**94:** 2912-2920.	7.76
280	Sharma N., Mandal K., Kumar R., Kumar B., Singh B. (2014). Persistence of chlorantraniliprole granule formulation in sugarcane field soil. *Environmental Monitoring and Assessment*.**186**: 2289-2295.	7.59
281	Sharma P., Singh G., Bains T.S. (2014). Influence of foliar fertilization on sink strength, growth and grain yield in mungbean (Vignaradiata L Wilczek). *Ecology, Environment and Conservation*.**20**: 1613-1617.	5.02
282	Sharma P., Singh G., Bains T.S. (2014). Mungbean seed yield: Effect of dry matter distribution, partitioning and leaf area at different crop growth stages. *Ecology, Environment and Conservation*. **20:** 1647-1651.	5.02
283	Sharma P., Tejinder S. (2014). Extraction of starch from hulled and hull-less barley with papain and aqueous sodium hydroxide. *Journal of Food Science and Technology*. **51**: 3870-3877.	7.12
284	Sharma R., Kocher G.S., Bhogal R.S., Oberoi H.S. (2014). Cellulolytic and xylanolytic enzymes from thermophilicAspergillusterreus RWY. *Journal of Basic Microbiology*.**54:** 1367-1377.	7.20
285	Sharma S., Aggarwal N. (2014). Time-linked dosage appraisal of trichogrammatids against cnaphalocrocismedinalis (Guenee) and scirpophagaincertulas (Walker) in organic aromatic rice. *Ecology, Environment and Conservation*. **20**: 111.-118.	5.02
286	Sharma S., Chander G., Verma T.S. (2014). Nitrogen Dynamics Under Long Term Lantana Camara (L.) Residue and Fertilizer Application in a Rice-Wheat Cropping System. *Journal of Plant Nutrition*. **37:** 1804-1816.	6.53
287	Sharma S., Kaur J., Kaur S., Sharma P. (2014). Synthesis, antibacterial and antifungal activities of some new azoanils containing pyrazole moiety. *Indian Journal of Chemistry - Section B Organic and Medicinal Chemistry***. 53:** 227-237.	6.69
288	Sharma S., Kaur M., Goyal R., Gill B.S. (2014). Physical characteristics and nutritional composition of some new soybean (Glycine max (L.) Merrill) genotypes. *Journal of Food Science and Technology***. 51:** 551-557.	7.12
289	Sharma S., Kaur S., Dar B.N., Singh B. (2014). Storage stability and quality assessment of processed cereal brans. *Journal of Food Science and Technology*.**51:** 583-588.	7.12
290	Sharma S., Khanna P.K., Kapoor S. (2014). Molecular characterization of Shiitake medicinal mushroom, Lentinusedodes strains (Higher Basidiomycetes) using RAPD and ITS sequencing. *International Journal of Medicinal Mushrooms*. **16**: 169-177.	6.84
291	Sharma S., Pannu C.J.S. (2014). Development and evaluation of seed metering system for water soaked cotton seeds. *AMA, Agricultural Mechanization in Asia, Africa and Latin America*.**45**: 48-52.	6.06

292	Sharma S., Singh B. (2014). Persistence behaviour of imidacloprid and its metabolites in soil under sugarcane. *Environmental Monitoring and Assessment.***186**: 2281-2288.	7.59
293	Sharma S., Singh B. (2014). Persistence of imidacloprid and its major metabolites in sugarcane leaves and juice following its soil application. *International Journal of Environmental Analytical Chemistry.***94:** 319-331.	7.24
294	Sharma S., Singh B. (2014). Metabolism and persistence of imidacloprid in different types of soils under laboratory conditions. *International Journal of Environmental Analytical Chemistry.***94**: 1100-1112.	7.24
295	Sharma S., Singh B., Gupta V.K. (2014). Biodegradation of imidacloprid by consortium of two soil isolated bacillus sp*Bulletin of Environmental Contamination and Toxicology.***93**: 637-642.	7.11
296	Sharma S., Singh B., Gupta V.K. (2014). Assessment of imidacloprid degradation by soil-isolated Bacillus alkalinitrilicus. *Environmental Monitoring and Assessment.***186:** 7183-7193.	7.59
297	Sharma S.K., Juyal S., Rao V.K., Yadav V.K., Dixit A.K. (2014). Reduction of non-enzymatic browning of orange juice and semi-concentrates by removal of reaction substrate. *Journal of Food Science and Technology*. **51**: 1302-1309.	7.12
298	Sheoran P., Sardana V., Sharma P., Chander S. (2014). Modelling approach to optimize sulphur fertilization in irrigated sunflower under semi-arid conditions in North-West Indiaq. *Legume Research*. **37**: 527-531.	6.09
299	Sheoran P., Sardana V., Singh R. (2014). Evaluating productivity potential of spring planted sunflower (Helianthus annuus) hybrids in response to sowing time under changing climate scenario. *Indian Journal of Agronomy*. **59**: 124-132.	5.00
300	Shera P.S., Sohu R.S., Gill B.S., Sekhon P.S., Sarlach R.S. (2014). Relative performance of different Bt cotton cultivars expressing single and dual toxin for pest infestation, yield and fibre quality parameters. *Vegetos.* **27**:237-243.	6.02
301	Shevkani K., Kaur A., Singh G., Singh B., Singh N. (2014). Composition, Rheological and Extrusion Behaviour of Fractions Produced by Three Successive Reduction Dry Milling of Corn. *Food and Bioprocess Technology*. **7**: 1414-1423.	10.12
302	Singh A., Singh T., Singh A. (2014). Productivity potential, quality and economic viability of hybrid bt cotton (Gossypiumhirsutum)-based intercropping systems under irrigated conditions. *Indian Journal of Agronomy*. **59**: 385-391.	5.00
303	Singh B., Gill R.I.S. (2014). Carbon sequestration and nutrient removal by some tree species in an agrisilviculture system in Punjab, India. *Range Management and Agroforestry*. **35**:107-114.	6.17
304	Singh B., Kular J.S., Ram H., Mahal M.S. (2014). Relative abundance and damage of some insect pests of wheat under different tillage practices in rice-wheat cropping in India. *Crop Protection***. 61:** 16-22.	7.30
305	Singh D., Dhillon W.S., Singh N.P., Gill P.P.S. (2014). Impact of girdling on quality and maturity of Patharnakh pear. *Indian Journal of Horticulture*. **71**: 335-339.	6.13
306	Singh G., Aggarwal N., Ram H. (2014). Efficacy of post-emergence herbicide imazethapyr for weed management in different mungbean (Vignaradiata) cultivars. *Indian Journal of Agricultural Sciences*. **84:** 540-543.	6.18
307	Singh G., Saini J.S., Bains N.S., Singh R.P. (2014). Positive influence of Lophopyrumponticum derived Y gene on yellow pigment content-A major durum wheat quality trait. *Indian Journal of Genetics and Plant Breeding.* **74**: 651-655.	6.20
308	Singh H., Dhillon T.S. (2014). In vitro morphogenesis and plant regeneration response from hot pepper (Capsicum annuum L.) cultivar Punjab Guchhedar. *Indian Journal of Horticulture***. 71:** 340-344.	6.13
309	Singh J., Mahal J.S., Manes G.S., Kahlon M.S. (2014). Point injected nitrogen application in rice residue mulched wheat : An innovative technology for enhancing productivity and nitrogen uptake. *Research on Crops*. **15**: 551-557.	6.10
310	Singh K.G., Sharda R.K., Rudra R.P., Khan A.A. (2014). Mechanization of mulch laying process - A boon in sustaining global agricultural production. *AMA, Agricultural Mechanization in Asia, Africa and Latin America*. **45**:39-42.	6.06

311	Singh M., Bhullar M.S., Chauhan B.S. (2014). The critical period for weed control in dry-seeded rice. *Crop Protection*.**66**: 80-85.	7.30
312	Singh M., Kumar A., Kaur P. (2014). Respiratory dynamics of fresh baby corn (Zea mays L.) under modified atmospheres based on enzyme kinetics. *Journal of Food Science and Technology*.**51**:1911-1919.	7.12
313	Singh M., Pannu C.J.S., Chhuneja N.K., Mahal J.S., Sharma A. (2014). Development and evaluation of pick positioner for fruit harvesting and tree pruning. *Indian Journal of Agricultural Sciences*.**84**: 149-153.	6.18
314	Singh N., Dhillon B.S., Sandhu P.S. (2014). Alleviation of soil physical constraints for improved crop production: A Review. *Ecology, Environment and Conservation*.**20:** 29-36.	5.02
315	Singh N.K., Jyoti, Vemu B., Nandi A., Singh H., Kumar R., Dumka V.K. (2014). Laboratory assessment of acaricidal activity of Cymbopogonwinterianus, Vitexnegundo and Withaniasomnifera extracts against deltamethrin resistant Hyalommaanatolicum. *Experimental and Applied Acarology*. **63**: 423-430.	7.85
316	Singh P., Cheema D.S., Dhaliwal M.S., Garg N. (2014). Heterosis and combining ability for earliness, plant growth, yield and fruit attributes in hot pepper (Capsicum annuum L.) involving genetic and cytoplasmic-genetic male sterile lines. *ScientiaHorticulturae*.**168**: 175-188.	7.40
317	Singh R., Kumar A., Singh J. (2014). Quality attributes of fresh chickpea (Cicerarietinum) sprouts stored under modified atmospheric packages. *Journal of Food Processing and Preservation*. **38:** 1054-1064.	6.45
318	Singh S., Bhogal S. (2014). Depeasantization in Punjab: Status of farmers who left farming. *Current Science*.**106:**1364-1368.	6.91
319	Singh S., Bhogal S., Singh R. (2014). Magnitude and determinants of indebtedness among farmers in Punjab. *Indian Journal of Agricultural Economics*.**69**: 243-256.	5.04
320	Singh S., Singh H., Sharma A., Meeta M., Singh B., Joshi N., Grover P., Al-Yassin A., Kumar S. (2014). Inheritance of spot blotch resistance in barley (Hordeumvulgare L.). *Canadian Journal of Plant Science*.**94**:1203-1209.	6.72
321	Singh T., Singh C., Kaur J. (2014). Effect of different nitrogen levels on the growth, yield and quality of direct-seeded hybrid rice. *Research on Crops*.**15**: 733-737.	6.10
322	Singla N., Challana S. (2014). Reproductive toxicity of triptolide in male house rat, Rattusrattus. *Scientific World Journal*.879405.	7.73
323	Singla N., Thind R.K., Mahal A.K. (2014). Potential of eucalyptus oil as repellent against house Rat, Rattusrattus. *The Scientific World Journal*.**20**: 249-284.	7.73
324	Sohail Y., Bansal U., Bariana H., Chhuneja P., Mumtaz A., Rattu A., Trethowan R. (2014). Identification of a co-dominant eSTS marker linked with leaf rust resistance gene Lr28 in wheat (Triticumaestivum L.). *Australian Journal of Crop Science*. **8**: 1210-1215.	6.00
325	Sra S.K., Sandhu K.S., Ahluwalia P. (2014). Effect of treatments and packaging on the quality of dried carrot slices during storage. *Journal of Food Science and Technology*. **51**: 645-654.	7.12
326	Srivastava A., Chhillar S., Singh D., Acharya R., Pujari P.K. (2014). Determination of fluorine concentrations in soil samples using proton induced gamma-ray emission. *Journal of Radioanalytical and Nuclear Chemistry*.**302**: 461-464.	7.47
327	Sundouri A.S., Singh H., Gill M.I.S., Thakur A., Sangwan A.K. (2014). In-vitro germination of hybrid embryo rescued from low chill peaches as affected by stratification period and embryo age. *Indian Journal of Horticulture*. **71**: 151-155.	6.13
328	Suryawanshi V., Thakur S.S., Sharma A. (2014). Performance evaluation of experimental self-propelled double row sugarcane harvester. *AMA, Agricultural Mechanization in Asia, Africa and Latin America*.**45**: 48-56.	6.06
329	Taggar G.K., Gill R.S., Gupta A.K., Singh S. (2014). Induced changes in the antioxidative compounds of Vignamungo genotypes due to infestation by Bemisiatabaci (Gennadius). *Journal of Environmental Biology*. **35:** 1037-1045.	6.68

330	Tiwana U.S., Kantwa S.R., Sr., Chaudhary D.P., Sr. (2014). Effect of integrated nutrient management on productivity and economics of foodfodder cropping system. *Range Management and Agroforestry*. **35**:73-77.	6.17
331	Tiwari V.K., Wang S., Sehgal S., Vrána J., Friebe B., Kubaláková M., Chhuneja P., Doležel J., Akhunov E., Kalia B., Sabir J., Gill B.S. (2014). SNP Discovery for mapping alien introgressions in wheat. *BMC Genomics.***15:** 1-273.	10.40
332	Tyagi S., Mir R.R., Kaur H., Chhuneja P., Ramesh B., Balyan H.S., Gupta P.K. (2014). Marker-assisted pyramiding of eight QTLs/genes for seven different traits in common wheat (Triticumaestivum L.). *Molecular Breeding*. **34**: 167-175.	9.25
333	Vikal Y., Chawla H., Sharma R., Lore J.S., Singh K. (2014). Mapping of bacterial blight resistance gene xa8 in rice (Oryzasativa L.). *Indian Journal of Genetics and Plant Breeding.***74:** 589-595.	6.20
334	Vohra P., Khera K.S., Sangha G.K. (2014). Physiological, biochemical and histological alterations induced by administration of imidacloprid in female albino rats. *Pesticide Biochemistry and Physiology.***110:** 50-56.	8.11
335	Walia S.S., Gill R.S., Aulakh C.S., Kaur M. (2014). Energy-efficiency indices of alternative cropping systems of North-West India. *Indian Journal of Agronomy*. **59**: 359-363.	5.00
336	Walia S.S., Singh S., Gill R.S., Aulakh C.S., Kaur N. (2014). Production potential and economic analysis of different rice-based cropping systems in north-west India. *Research on Crops.***15**: 539-542.	6.10
337	Wilson R.A., Kadam D.M., Chadha S., Grewal M.K., Sharma M. (2014). Evaluation of physical and chemical properties of foam-mat dried mango (MangiferaIndica) powder during storage. *Journal of Food Processing and Preservation*. **38:** 1866-1874.	6.45
338	Wilson R.A., Sangha M.K., Banga S.S., Atwal A.K., Gupta S. (2014). Heat stress tolerance in relation to oxidative stress and antioxidants in Brassica juncea. *Journal of Environmental Biology.***35:** 383-387.	6.68
339	Yadvinder-Singh, Singh M., Sidhu H.S., Humphreys E., Thind H.S., Jat M.L., Blackwell J., Singh V. (2014). Nitrogen management for zero till wheat with surface retention of rice residues in north-west India. *Field Crops Research.***184:** 183-191.	8.47
340	Yuvraj, Dhatt K.K. (2014). Studies on genetic variability, heritability and genetic advance in marigold. *Indian Journal of Horticulture*. **71**: 592-594.	6.13
341	Zameer Hussain S., Singh B. (2014). Functional properties of re-fabricated rice as affected by die during extrusion process. *International Journal of Food Engineering.***10:** 417-426.	8.28
342	Zhawar V.K., Kaur N., Gupta A.K. (2014). Effect of increasing concentration of inorganic phosphate (Pi) and pyrophosphate (PPi) on growth and Phosphatases of germinating chickpea seeds. *Journal of Plant Nutrition*. **37**: 2195-2207.	6.53

2015		
343	Badaya V K, Gill B S, Kaur J and Dhakad U K (2015). Assessment of genetic diversity and path coefficient in reproductive phases and quality traits and their correlation with seed yield in soybean [*Glycine max* (l.) merrill]. *The Ecoscan***7:** 209-13.	5.06
344	Bharaj T S, Mangat G S, Kaur R, Singh K and Singh N (2015). PR 123: A new high yielding variety of superfine rice (*Oryzasativa*L.). *Agric Res J* **52:** 98-99.	5.88
345	Bhat T.A., Kotru R., Singh K.N., Dar S.B., Ram H. (2015). Real-time nitrogen management using leaf colour chart in rice (*Oryzasativa*) genotypes. *Indian Journal of Agronomy*. **60**:170-175	5.00
346	Bhat Z.A., Dhillon W.S. (2015). Genetic studies on variability, heritability, genetic advance and cluster analysis in pear (*Pyrus* spp.). *Indian Journal of Horticulture*. **72**: 167-172	6.13
347	Bhise S., Kaur A. (2015). Fortifying muffins with psyllium husk fibre, OAT fiber and barley fibre to improve quality and shelf life. *Carpathian Journal of Food Science and Technology*. **7**: 5-16	8.20
348	Bhise S., Kaur A., Aggarwal P. (2015). Development of protein enriched noodles using texturized defatted meal from sunflower, flaxseed and soybean. *Journal of Food Science and Technology*. **52**: 5882-5889	8.20

349	Bijay-Singh, Varinderpal-Singh, Purba J., Sharma R.K., Jat M.L., Yadvinder-Singh, Thind H.S., Gupta R.K., Chaudhary O.P., Chandna P., Khurana H.S., Kumar A., Jagmohan-Singh, Uppal H.S., Uppal R.K., Vashistha M., Gupta R. (2015). Site-specific fertilizer nitrogen management in irrigated transplanted rice (*Oryzasativa*) using an optical sensor. *Precision Agriculture*. **16**: 455-475	7.93
350	Boggala R.B., Singh K., Jawandha S.K., Jindal S.K., Alam M.S., Khurana D.S., Chawla N., Narsaiah K. (2015). Effect of Postharvest Application of 1-Methycyclopropene on Storage Behavior of Fresh Tomatoes (*Solanumlycopersicum* L.). *Journal of Food Processing and Preservation*. **39**: 1318-1323	7.16
351	Brar A.S., Buttar G.S., Jhanji D., Sharma N., Vashist K.K., Mahal S.S., Deol J.S., Singh G. (2015). Water productivity, energy and economic analysis of transplanting methods with different irrigation regimes in Basmati rice (*Oryzasativa* L.) under north-western India. *Agricultural Water Management*. **158**:189-195	8.29
352	Brar B S, Dheri G S, Lal R, Singh K and Walia S S (2015). Cropping system impacts on carbon fractions and accretion in typicustochrept soil of Punjab, India. *J of Crop Improvement*. **29:** 281-300.	5.12
353	Brar B S, Romana P S and Saini S P(2015). Long-term chemical fertilization impacts on kinetics of K release, wheat yield and K uptake in a typicustrochrept soil of Punjab, India. *J Crop Improve***30:** 47-64.	5.12
354	Brar B.S., Singh J., Singh G., Kaur G. (2015). Effects of long term application of inorganic and organic fertilizers on soil organic carbon and physical properties in maize-wheat rotation. *Agronomy*. **5**: 220-238	7.44
355	Brar J.S., Dhaliwal H.S., Gill M.S. (2015). Split application of inorganic fertilizers for rainy and winter season crops in Guava cv. L-49. *Indian Journal of Horticulture*. **72**: 466-471	6.13
356	Brar S.K., Gill B.S., Brar A.S. (2015). Effect of date of planting and harvesting schedule on heat-unit accumulation and biomass production in Japanese mint (*Menthaarvensis*). *Indian Journal of Agronomy*. **60**: 324-327	5.00
357	Burange P.S., Wargantiwar R.K., Gonde A.D., Rajendran T.P. (2015). Good agricultural practices - Relevance for crop health management. *Ecology, Environment and Conservation*. **21**: 155-164	5.02
358	Chahil G.S., Mandal K., Sahoo S.K., Singh B. (2015). Risk assessment of mixture formulation of spirotetramat and imidacloprid in chilli fruits. Environmental Monitoring and Assessment. **187**: 4105	7.68
359	Champa W.A.H., Gill M.I.S., Mahajan B.V.C., Arora N.K. (2015). Preharvest salicylic acid treatments to improve quality and postharvest life of table grapes (*Vitisvinifera* L.) cv. Flame Seedless. *Journal of Food Science and Technology*. **52**: 3607-3610	8.20
360	Chauhan S K, Sharma R, Singh B and Sharma S C (2015). Biomass production, carbon sequestration and economics in on-farm poplar plantations in Punjab, India. *J of Applied and Natural Science*. **7:** 452–458.	5.08
361	Cheema A.K., Bedi S., Sahi G.K., Singh K., Sharma S., Brar A.S. (2015). Biochemical Characterization of a RIL Population of Rice (Oryzasativa L.) Under Direct-Seeded Aerobic and Transplanted Conditions. Proceedings of the National Academy of Sciences India Section B - Biological Sciences. 85: 1087-1093	6.00
362	Cheema R.S., Vashishat N., Bansal A.K., Gandotra V.K. (2015). Mutual interaction of dog sperm LDHC, PH-20, actin and tubulin proteins and their immunocontraceptive potential in bitches. Indian Journal of Animal Research. 49: 461-469	6.04
363	Chhuneja P., Arora J.K., Kaur P., Kaur S., Singh K. (2015). Characterization of wild emmer wheat Triticumdicoccoidesgermplasm for vernalization alleles. Journal of Plant Biochemistry and Biotechnology. 24: 249-253	7.09
364	Chhuneja P., Yadav B., Stirnweis D., Hurni S., Kaur S., Elkot A.F., Keller B., Wicker T., Sehgal S., Gill B.S., Singh K. (2015). Fine mapping of powdery mildew resistance genes PmTb7A.1 and PmTb7A.2 in Triticumboeoticum (Boiss.) using the shotgun sequence assembly of chromosome 7AL. Theoretical and Applied Genetics. 128: 2099-2111	9.79
365	Choudhary M., Grover K., Javed M. (2015). Effect of Deep-Fat Frying on Fatty Acid Composition and Iodine Value of Rice Bran Oil Blends. Proceedings of the National Academy of Sciences India Section B - Biological Sciences. 85: 211-218	6.00

366	Choudhary M., Grover K., Kaur G. (2015). Development of rice bran oil blends for quality improvement. Food Chemistry. 173: 770-777	9.39
367	Chugh V., Kaur K., Singh D., Kumar V., Kaur H., Dhaliwal H.S. (2015). Molecular characterization of diverse wheat germplasm for puroindolineproteins and their antimicrobial activity. Turkish Journal of Biology. 39: 359-369	7.34
368	Das T K, Singh C B and Mukhopadhyay R (2015). Effect of straw mulch, irrigation and land configuration on soil hydrothermal regime under Bt cotton (Gossypiumhirsutum L.).Eco Env Cons21: 135-139.	5.02
369	Devi C.B., Kushwaha A., Kumar A. (2015). Sprouting characteristics and associated changes in nutritional composition of cowpea (Vignaunguiculata). Journal of Food Science and Technology. 52: 6821-6827	8.20
370	Dhaliwal J K, Saroa G S and Dhaliwal S S (2015). Sustainability of basmati-wheat sequence under intensive management of nutrients and its effect on yield and uptake of Zn, Cu, Fe and Mn. Ecology, Environment and Conservation. 21: 789-794.	5.02
371	Dheri G S, Lal R and Verma S (2015). Effects of nitrogen fertilizers on soil air concentration of N2O and corn growth in a greenhouse study. J of Crop Improvement. 29: 95-105.	5.12
372	Dogra A.K., Kaur J., Srivastava A. (2015). Relationship between growth and photosynthetic efficiency of soybean (Glycine max L. Merrill) genotypes under variable photoperiods. Vegetos. 28: 183-193	6.00
373	Eiche E., Bardelli F., Nothstein A.K., Charlet L., Göttlicher J., Steininger R., Dhillon K.S., Sadana U.S. (2015). Selenium distribution and speciation in plant parts of wheat (Triticumaestivum) and Indian mustard (Brassica juncea) from a seleniferous area of Punjab, India. Science of the Total Environment. 505: 952-961	10.10
374	Gandhi N., Singh B. (2015). Study of extrusion behaviour and porridge making characteristics of wheat and guava blends. Journal of Food Science and Technology. 52: 3030-3036	8.20
375	Garg N., Singla N. (2015). Blood clotting response test for detecting resistance to second generation anticoagulant bromadiolone in house rat (Rattusrattus). Indian Journal of Animal Research. 49: 607-611	6.04
376	Ghai K., Batta S.K., Kocher G.S., Gupta A.K. (2015). Production, Partial Purification and Kinetic Characterization of Dextransucrase from Leuconostocmesenteroides in Relation to Dextran Problem in Sugarcane. Sugar Technology. 17: 162-172	6.58
377	Gill A.K., Arora R., Jindal V. (2015). Beet armyworm spodopteraexigua (Hubner): A newly emerging pest of egyptian clover in Punjab. Range Management and Agroforestry. 36: 170-174	6.06
378	Gill P P S, Jawandha S K, Kaur N and Verma A (2015). Changes in quality attributes of mango in response to different ripening temperature regimes. Eco Env& Cons. 2: 91-95.	5.02
379	Gill R.S., Hans V.S., Singh S., Pal Singh P., Dhaliwal S.S. (2015). A small scale honey dehydrator. Journal of Food Science and Technology. 52: 6695-6702	8.20
380	Goraya R.K., Bajwa U. (2015). Enhancing the functional properties and nutritional quality of ice cream with processed amla (Indian gooseberry). Journal of Food Science and Technology. 52: 7861-7871	8.20
381	Gou J.-Y., Li K., Wu K., Wang X., Lin H., Cantu D., Uauy C., Dobon-Alonso A., Midorikawa T., Inoue K., Sánchez J., Fu D., Blechl A., Wallington E., Fahima T., Meeta M., Epstein L., Dubcovsky J. (2015). Wheat stripe rust resistance protein WKS1 reduces the ability of the thylakoid-associated ascorbate peroxidase to detoxify reactive oxygen species. Plant Cell. 27: 1755-1770	15.34
382	Goyal P., Gill K.K., Aggarwal R., Singla C. (2015). Probability distributions for long term rainfall data in Ludhiana - A case study. Mausam. 66: 815-824	6.18
383	Goyal R., Sharma S. (2015). Genotypic variability in seed storage protein quality and fatty acid Composition of soybean [Glycine max (L.) Merrill]. Legume Research. 38: 297-302	6.15
384	Grewal M.K., Jaiswal P., Jha S.N. (2015). Detection of poultry meat specific bacteria using FTIR spectroscopy and chemometrics. Journal of Food Science and Technology. 52: 3859-3869	8.20

385	Gupta N., Thind S.K. (2015). Improving photosynthetic performance of bread wheat under field drought stress by foliar applied glycine betaine. Journal of Agricultural Science and Technology. 17: 75-86	6.70
386	Gupta S., Sangha M.K., Kaur G., Banga S., Gupta M., Kumar H., Banga S.S. (2015). QTL analysis for phytonutrient compounds and the antioxidant molecule in mustard (Brassica juncea L.). Euphytica. 201: 345-356	7.39
387	HarindraChampa W.A., Gill M.I.S., Mahajan B.V.C., Bedi S. (2015). Exogenous treatment of spermine to maintain quality and extend postharvest life of table grapes (Vitisvinifera L.) cv. Flame Seedless under low temperature storage. LWT - Food Science and Technology. 60: 412-419	8.42
388	Horgan F.G., Ramal A.F., Bentur J.S., Kumar R., Bhanu K., Sarao P.S., Iswanto E.H., Van Chien H., Phyu M.H., Bernal C.C., Almazan M.L.P., Alam M.Z., Lu Z., Huang S.-H. (2015). Virulence of brown planthopper (Nilaparvatalugens) populations from South and South East Asia against resistant rice varieties. Crop Protection. 78: 222-231	7.49
389	Hussain S Z, Singh B and Rafiqe A (2015). Cooking behaviour of re-fabricated rice as affected by extrusion: A response surface analysis. Res Crops16: 189-194.	5.00
390	Hussain S.Z., Singh B. (2015). Physical properties of refabricated rice as affected by extrusion: A response surface analysis. Cereal Foods World. 60: 171-176	6.75
391	Hussain S.Z., Singh B., Rafiqe A. (2015). Cooking behaviour of re-fabricated rice as affected by extrusion: A response surface analysis. Research on Crops. 16: 189-194	5.00
392	Jariyal M., Gupta V.K., Jindal V., Mandal K. (2015). Isolation and evaluation of potent Pseudomonas species for bioremediation of phorate in amended soil. Ecotoxicology and Environmental Safety. 122: 24-30	8.76
393	Jariyal M., Gupta V.K., Mandal K., Jindal V. (2015). Brevibacteriumfrigoritolerans as a Novel Organism for the Bioremediation of Phorate. Bulletin of Environmental Contamination and Toxicology. 95: 680-686	7.26
394	Jhanji S., Sadana U.S., Shukla A.K. (2015). Manganese efficiency in relation to differential production and allocation of carbohydrates between source and sink organs of diverse wheat genotypes. ActaPhysiologiaePlantarum. 37: 2	7.58
395	Jyot G., Mandal K., Singh B. (2015). Effect of dehydrogenase, phosphatase and urease activity in cotton soil after applying thiamethoxam as seed treatment. Environmental Monitoring and Assessment. 187: 2	7.68
396	Katoch R., Sharma K., Singh S.K., Thakur N. (2015). Evaluation and characterization of Trypsin inhibitor from rice bean with inhibitory activity against gut proteases of Spodopteralitura. Zeitschrift fur Naturforschung - Section C Journal of Biosciences. 70: 287-295	8.06
397	Kaur A., Dubey R.K., Singh S. (2015). Effect of different potting media on growth and flowering of kalanchoe (KalanchoeblossfeldianaPoelln.). Indian Journal of Horticulture. 72: 388-391	6.13
398	Kaur A., Sandhu J.S. (2015). High throughput in vitro micropropagation of sugarcane (Saccharumofficinarum L.) from spindle leaf roll segments: Cost analysis for agri-business industry. Plant Cell, Tissue and Organ Culture. 120: 339-350	8.13
399	Kaur B, VattaK and Sidhu R S (2015). Optimising irrigation water use in Punjab agriculture: Role of crop diversification and technology. Indian J Agril Econ 70: 307-318.	5.04
400	Kaur B., Asthir B., Bains N.S. (2015). Apical stem culturing to enhance cell sap assimilates towards grain sucrose and glutamine metabolism in wheat. Cereal Research Communications. 43: 403-414	6.61
401	Kaur G and Ghai N (2014). Mineral nutrient element transporter proteins in plants. Eco Env& Cons.20: 167-72.	5.02
402	Kaur G., Asthir B., Bains N.S., Farooq M. (2015). Nitrogen nutrition, its assimilation and remobilization in diverse wheat genotypes. International Journal of Agriculture and Biology. 17: 531-538	6.00
403	Kaur H, Aulakh P S, Jawandha S K and Singh H (2015).Influence of different post-harvest treatments on physic-chemical characteristics of grapefruit at ambient conditions.EcoEnv Cons 21: 937-940.	5.02

404	Kaur H., Aulakh R.S., Bedi J.S., Kaur P., Gill J.P.S. (2015). Occurrence of pesticide residues in fodder from Punjab (India): Temporal and spatial variation. Indian Journal of Animal Sciences. 85: 764-766	6.16
405	Kaur H., Banga S.S. (2015). Genetic divergence in novel determinate variants of resynthesized indian mustard (Brassica juncea (L.) Czern&Coss). Indian Journal of Genetics and Plant Breeding. 75: 260-263	6.19
406	Kaur J and Gosal S K (2015). Influence of weather parameters on activities of bacterial population associates with rhizobium soil of rice crop. EcolEnv Conser21: 145-152	5.02
407	Kaur J., Ram H., Gill B.S., Kaur J. (2015). Agronomic performance and economic analysis of soybean (Glycine max) in relation to growth regulating substances in Punjab, India. Legume Research. 38: 603-608	6.15
408	Kaur K., Dhillon W.S. (2015). Influence of maturity and storage period on physical and biochemical characteristics of pear during post cold storage at ambient conditions. Journal of Food Science and Technology. 52: 5352-5356	8.20
409	Kaur M., Dhaliwal H.S., Thakur A., Singh G., Kaur M. (2015). In vitro plantlet formation in Carrizo citrange: A promising citrus rootstock. Indian Journal of Horticulture. 72: 6	6.13
410	Kaur M., Dhatt A.S., Sandhu J.S., Gosal S.S. (2015). Effect of genotype, explant and culture media on direct plant regeneration in eggplant. Indian Journal of Horticulture. 72: 232-238	6.13
411	Kaur M., Jain P., Singh M. (2015). Studies on structural and magnetic properties of ternary cobalt magnesium zinc (CMZ) Co0.6-xMgxZn0.4 Fe2O4 (x = 0.0, 0.2, 0.4, 0.6) ferrite nanops. Materials Chemistry and Physics. 162: 332-339	8.26
412	Kaur M., Singh M., Mukhopadhyay S.S., Singh D., Gupta M. (2015). Structural, magnetic and adsorptive properties of clay ferrite nanocomposite and its use for effective removal of Cr (VI) from water. Journal of Alloys and Compounds. 653: 202-211	9.00
413	Kaur N., Bhullar M.S. (2015). Harvest time residues of pendimethalin and oxyfluorfen in vegetables and soil in sugarcane-based intercropping systems. Environmental Monitoring and Assessment. 187: 6	7.68
414	Kaur N., Kumar A., Kaur K., Kaur S., Gupta A.K., Singh I. (2015). Abiotic Stress Tolerance of Chickpea Genotypes Depends Upon Antioxidative Potential and Nutritional Quality of Seeds. Proceedings of the National Academy of Sciences India Section B - Biological Sciences. 85: 615-623	6.00
415	Kaur N., Sharma P. (2015). Studies on factors affecting root colonization of root and nodule endophytic bacteria from mungbeanrhizosphere. Journal of Pure and Applied Microbiology. 9: 1597-1609	6.00
416	Kaur N., Sharma P., Sharma S. (2015). Co-inoculation of Mesorhizobium sp. and plant growth promoting rhizobacteriaPseudomonas sp. as bio-enhancer and bio-fertilizer in chickpea (Cicerarietinum L.). Legume Research. 38: 367-374	6.15
417	Kaur N., Singh A.K., Chopra S. (2015). Evaluation of electrical conductivity of maize flour by ohmic heating. Indian Journal of Agricultural Sciences. 85: 59-64	6.14
418	Kaur P., Kang B.K. (2015). Effect of selected synergists on insecticidal toxicity of deltamethrin and biochemical mechanisms on the field populations of tobacco caterpillar from Punjab, India. Phytoparasitica. 43: 565-575	6.90
419	Kaur P., Kaur P., Bhullar M.S. (2015). Persistence behaviour of pretilachlor in puddled paddy fields under subtropical humid climate. Environmental Monitoring and Assessment. 187: 524	7.68
420	Kaur P., Uppal S.K., Dhir C., Sharma P., Kaur R. (2015). Comparative Study of Chemical Pretreatments and Acid Saccharification of Bagasse of Sugar Crops for Ethanol Production. Sugar Tech. 17: 412-417	6.58
421	Kaur P.K., Kaur J., Saini H.S. (2015). Antifungal potential of Bacillus vallismortis R2 against different phytopathogenic fungi. Spanish Journal of Agricultural Research. 13: 11	6.70
422	Kaur R., Bains T.S., Bindumadhava H., Nayyar H. (2015). Responses of mungbean (Vignaradiata L.) genotypes to heat stress: Effects on reproductive biology, leaf function and yield traits. ScientiaHorticulturae. 197: 527-541	7.37
423	Kaur R., Gupta A.K., Taggar G.K. (2015). Characterisation and inhibition studies of Helicoverpaarmigera (Hübner) gut α-amylase. Pest Management Science. 71: 1228-1237	8.69

424	Kaur R., Gupta A.K., Taggar G.K. (2015). Induced resistance by oxidative shifts in pigeonpea (Cajanuscajan L.) following Helicoverpaarmigera (Hübner) herbivory. Pest Management Science. 71: 770-782	8.69
425	Kaur R., Kaur S., Mandal K., Singh B. (2015). Dissipation behavior and risk assessment of acephate in brinjal using GLC with FPD. Environmental Monitoring and Assessment. 187: 4	7.68
426	Kaur R., Sharma N., Raina R. (2015). Identification and functional annotation of expressed sequence tags based SSR markers of Stevia rebaudiana. Turkish Journal of Agriculture and Forestry. 39: 439-450	6.93
427	Kaur R., Singh B., Singh M., Thind S.K. (2015). Hyperspectral Indices, Correlation and Regression Models for Estimating Growth Parameters of Wheat Genotypes. Journal of the Indian Society of Remote Sensing. 43: 551-558	6.76
428	Kaur R., Uppal S.K. (2015). Structural characterization and antioxidant activity of lignin from sugarcane bagasse. Colloid and Polymer Science. 293: 2585-2592	7.87
429	Kaur S, Singh S and Mohan C (2015). Impact of crop establishment and weed control on disease infestation and rice productivity. Ecol Environ Conserv. 21: 163-166.	5.02
430	Kaur S., Aggarwal R., Jalota, Sood A. (2015). Estimation of fluxes across boundaries for groundwater flow model using GIS. Current Science. 109: 607-610	6.92
431	Kaur S., Dar B.N., Pathania S., Sharma S. (2015). Reduction of Antinutritional Factors in Cereal Brans for Product Development. Journal of Food Processing and Preservation. 39: 215-224	7.16
432	Kaur S., Gupta A.K., Zhawar V.K. (2015). ABA-dependent sucrose regulation of antioxidant metabolism in wheat cultivars varying in ABA-sensitivity. Biologia (Poland). 70: 165-173	6.83
433	Kaur S., Jalota S.K., Kaur H., Vashisht B.B., Jalota U.R., Lubana P.P.S. (2015). Evaluation of statistical corrective methods to minimize bias at different time scales in a regional climate model driven data. Journal of Agrometeorology. 17: 29-35	6.15
434	Kaur S., Sharma S., Singh B., Dar B.N. (2015). Effect of extrusion variables (temperature, moisture) on the antinutrient components of cereal brans. Journal of Food Science and Technology. 52: 1670-1676	8.20
435	Kaur S., Vatta K. (2015). Groundwater depletion in Central Punjab: Pattern, access and adaptations. Current Science. 108: 485-490	6.93
436	Khare A.K., Biswas A.K., Balasubramanium S., Chatli M.K., Sahoo J. (2015). Optimization of meat level and processing conditions for development of chicken meat noodles using response surface methodology. Journal of Food Science and Technology. 52: 3719-3729	8.20
437	Khosa J.S., Dhatt A.S. (2015). Genetic diversity for morphological and biochemical traits in bulb onion. Indian Journal of Horticulture. 72: 143-146	6.13
438	Kingra P.K. (2015). Trends and variability in pan evaporation at Ludhiana. Journal of Agrometeorology. 17: 271-272	6.15
439	Kulhari A., Singh R., Chaudhury A., Dhawan A.K., Kalia R.K. (2015). Assessment of genetic variability through ISSR and RAPD markers in Commiphorawightii (Arn.) Bhandari. ActaPhysiologiaePlantarum. 37: 113-114	7.58
440	Kumar A., Sangha K.S., Dhillon G.P.S. (2015). Screening of 19 genotypes of Eucalyptus spp. against gall wasp (Leptocybeinvasa) in North-western India. Journal of Forestry Research. 26: 355-359	6.78
441	Kumar R, Singh J and Uppal S K (2015). Intercropping of medicinal and high value crops in autumn sugarcane (Saccharum sp. hybrid) for higher productivity and profitability. Indian J of Agronomy. 60: 61-64.	5.00
442	Kumar R., Dixit A.K., Sharma R.K. (2015). Properties and use of JatrophaCurcas ethyl ester and diesel fuel blends in variable compression ignition engine. Journal of Scientific and Industrial Research. 74: 343-347	6.50
443	Kumar R., Singh J., Uppal S.K. (2015). Intercropping of medicinal and high value crops in autumn sugarcane (Saccharum spp. hybrid) for higher productivity and profitability. Indian Journal of Agronomy. 60: 61-64	5.00
444	Kumar S. (2015). Relative abundance of turnip aphid and the associated natural enemies on oilseed Brassica genotypes. Journal of Agricultural Science and Technology. 17: 1209-1222	6.70

445	Kumar V., Grewal G.K. (2015). Laboratory Evaluation of Transgenic Bt Cotton (cry1Ac +cry2Ab genes) and Non-Bt Cotton against Neonates, First and Second Instar Larvae of Spodopteralitura Fab. Phytoparasitica. 43: 177-187	6.90
446	Kumari P., Khanna V., Sharma P., Kumari S. (2015). Metabolites in control of Rhizoctoniabataticola. Journal of Pure and Applied Microbiology. 9: 749-756	6.00
447	Lima J.M., Nath M., Dokku P., Raman K.V., Kulkarni K.P., Vishwakarma C., Sahoo S.P., Mohapatra U.B., Amitha Mithra S.V., Chinnusamy V., Robin S., Sarla N., Seshashayee M., Singh K., Singh A.K., Singh N.K., Sharma R.P., Mohapatra T. (2015). Physiological, anatomical and transcriptional alterations in a rice mutant leading to enhanced water stress tolerance. AoB PLANTS. 7: plv023	8.27
448	Lore J.S., Jain J., Hunjan M.S., Gargas G., Mangat G.S., Sandhu J.S. (2015). Virulence spectrum and genetic structure of Rhizoctonia isolates associated with rice sheath blight in the northern region of India. European Journal of Plant Pathology. 143: 847-860	7.49
449	Mahajan B.V.C., Dhillon W.S., Kumar M., Singh B. (2015). Effect of different packaging films on shelf life and quality of peach under super and ordinary market conditions. Journal of Food Science and Technology. 52: 3756-3762	8.20
450	Mahajan G., Chauhan B.S. (2015). Weed control in dry direct-seeded rice using tank mixtures of herbicides in South Asia. Crop Protection. 72: 90-96	7.49
451	Mahajan G., Sharma N., Kaur R., Chauhan B.S. (2015). Comparison of photoperiod-sensitive and photoperiod-insensitive basmati cultivars for grain yield, water productivity, and quality traits under varied transplanting dates in Northwest India. Crop and Pasture Science. 66: 793-801	7.48
452	Makkar G S and Chhuneja P K (2015). Diversity assessment of regional crop pollinating bee fauna in ecological perspective.EcolEnv Cons21: 1811-1816.	5.02
453	Manes G.S., Dixit A., Singh A., Singh M., Singh B.P. (2015). Comparative Performance Evaluation of Axial Flow and Tangential Axial Flow Threshing System for Basmati Rice (Oryzasativa). Agricultural Research. 4: 303-308	5.88
454	Manikantan M.R., Sharma R., Yadav D.N., Gupta R.K. (2015). Selection of process parameters for producing high quality defatted sesame flour at pilot scale. Journal of Food Science and Technology. 52: 1778-1783	8.20
455	Manpreet-Singh, Bhullar M.S., Chauhan B.S. (2015). Seed bank dynamics and emergence pattern of weeds as affected by tillage systems in dry direct-seeded rice. Crop Protection. 67: 168-177	7.49
456	Mason A.S., Takahira J., Atri C., Samans B., Hayward A., Cowling W.A., Batley J., Nelson M.N. (2015). Microspore culture reveals complex meiotic behaviour in a trigenomicBrassica hybrid. BMC Plant Biology. 15: 173	9.81
457	Melkani A and Kataria P (2015). The development-conservation trade off facing Indian agriculture: Carbon costs of Punjab agriculture. Agril Econ Res Rev28: 219-228.	5.68
458	Miglani N., Bains K., Kaur H. (2015). Development of baked and extruded functional foods from metabolic syndrome specific ingredient mix. Journal of Food Science and Technology. 52: 5850-5857	8.20
459	Mir N.A., Gul K., Riar C.S. (2015). Physicochemical, Pasting and Thermal Properties of Water Chestnut Flours: A Comparative Analysis of Two Geographic Sources. Journal of Food Processing and Preservation. 39: 1407-1413	7.16
460	Mir N.A., Gul K., Riar C.S. (2015). Technofunctional and Nutritional Characterization of Gluten-Free Cakes Prepared from Water Chestnut Flours and Hydrocolloids. Journal of Food Processing and Preservation. 39: 978-984	7.16
461	Mishra P.K., Singh M., Sharma A., Sharma K., Mahal A.K. (2015). Studies on effectiveness of electrostatic spraying for cotton crop. AMA, Agricultural Mechanization in Asia, Africa and Latin America. 46: 17-22	6.01
462	Mittal A., Jiang Y., Ritchie G.L., Burke J.J., Rock C.D. (2015). AtRAV1 and AtRAV2 overexpression in cotton increases fiber length differentially under drought stress and delays flowering. Plant Science. 241: 78-95	9.61

463	Munshi R., Kochhar A., Garg V. (2015). Impact of Dietary Habits and Physical Activity on Bone Health among 40 to 60 Year Old Females at Risk of Osteoporosis in India. Ecology of Food and Nutrition. 54: 470-492	6.81
464	Padbhushan R., Kumar D. (2015). Distribution of Boron in Different Fractions in Some Alkaline Calcareous Soils. Communications in Soil Science and Plant Analysis. 46: 939-953	6.39
465	Padbhushan R., Kumar D. (2015). Soil Boron Fractions and Response of Green Gram in Calcareous Soils. Journal of Plant Nutrition. 38: 1143-1157	6.49
466	Padbhushan R., Kumar D. (2015). Yield and Nutrient Uptake of Green Gram (Vignaradiata L.) as Influenced by Boron Application in Boron-Deficient Calcareous Soils of Punjab. Communications in Soil Science and Plant Analysis. 46: 924-939	6.39
467	Pal P.K., Kumar R., Guleria V., Mahajan M., Prasad R., Pathania V., Gill B.S., Singh D., Chand G., Singh B., Singh R.D., Ahuja P.S. (2015). Crop-ecology and nutritional variability influence growth and secondary metabolites of Stevia rebaudianaBertoni. BMC Plant Biology. 15: 67	9.81
468	Pandey M., Singh T., Kang J.S. (2015). Competitive indices of bed planted wheat based intercropping systems as influenced by row orientations and different intercrops. Research on Crops. 16: 432-437	5.00
469	Pandey S., Sharma S., Sandhu S.S., Arora R. (2015). Development and food consumption of some lepidopteran pests under increased temperature conditions. Journal of Agrometeorology. 17: 36-42	6.15
470	Pandey S., Singh J., Singh S.K., Mourya I.B. (2015). Influence of growing environment on growth, yield and chemical composition of strawberry (Fragaria × ananassa) fruits under open vs naturally ventilated polyhouse conditions. Indian Journal of Agricultural Sciences. 85: 1540-1545	6.14
471	Parihar C.M., Jat S.L., Singh A.K., Kumar B., Yadvinder-Singh, Pradhan S., Pooniya V., Dhauja A., Chaudhary V., Jat M.L., Jat R.K., Yadav O.P. (2015). Conservation agriculture in irrigated intensive maize-based systems of north-western India: Effects on crop yields, water productivity and economic profitability. Field Crops Research. 193: 104-116	8.98
472	Prakash J., Naik H.R., Hussain S.Z., Singh B. (2015). Effect of processing conditions on the quality characteristics of barley chips. Journal of Food Science and Technology. 52: 294-302	8.20
473	Prakash S., Mahajan G., Sharma N., Sardana V. (2015). Enhancing Grain Yield and Nitrogen-Use Efficiency in Rice through Foliarly Applied Gibberellic Acid in Dry-Direct-Seeded Rice. Journal of Crop Improvement. 29: 65-81	5.12
474	Pratiksha S, Sahota P and Fatima (2015). Optimization, production and scale up of debitteredkinnow beverage by α-L-rhamnosidase producing yeast. Emirates J Food Agric.27: 548-555.	5.34
475	Raina D., Dhillon W.S., Gill P.P.S., Singh N.P. (2015). Assessment of genetic divergence using Mahalanobis D2 and principal component analysis of qualitative and quantitative characters in pomegranate genotypes under sub-tropics. Indian Journal of Horticulture. 72: 451-456	6.13
476	Raju S S, Chand R, Srivastava S K, Kaur A, Singh J, Jain R, Immanuelraj K and Kaur P (2015). Comparing performance of various crops in Punjab based on market and economic prices and natural resource accounting. Agril Econ Res Rev 28: 189-198.	5.68
477	Ram H., Malik S.S., Dhaliwal S.S., Kumar B., Singh Y. (2015). Growth and productivity of wheat affected by phosphorus-solubilizing fungi and phosphorus levels. Plant, Soil and Environment. 61: 122-126	7.23
478	Ram H., Sohu V.S., Cakmak I., Singh K., Buttar G.S., Sodhi G.P.S., Gill H.S., Bhagat I., Singh P., Dhaliwal S.S., Mavi G.S. (2015). Agronomic fortification of rice and wheat grains with zinc for nutritional security. Current Science. 109: 1171-1176	6.93
479	Ramya H.G., Kumar S. (2015). Evaluation of Mass Transfer Kinetics for Osmotic Dehydration of Oyster Mushrooms (Pleurotussajor-caju) in Salt-sugar Solution. Proceedings of the National Academy of Sciences India Section B - Biological Sciences. 85: 517-525	6.00
480	Rana S., Jindal V., Mandal K., Kaur G., Gupta V.K. (2015). Thiamethoxam degradation by Pseudomonas and Bacillus strains isolated from agricultural soils. Environmental Monitoring and Assessment. 187: 2	7.68

481	Rani R., Sharma V.K., Kumar P., Mohan C. (2015). Impact of simulated rainfall on persistence of fungicides used against late blight (Phytophthorainfestans) of tomato (Solanumlycopersicum). Indian Journal of Agricultural Sciences. 85: 256-260	6.14
482	Rani R., Sharma V.K., Lore J.S., Pannu P.P.S. (2015). Cultural studies on Ustilaginoideavirens, the incitant of false smut of rice (Oryzasativa). Indian Journal of Agricultural Sciences. 85: 888-891	6.14
483	Saha D., Kukal S.S. (2015). Soil structural stability and water retention characteristics under different land uses of degraded lower himalayas of North-West India. Land Degradation and Development. 26: 263-271	9.09
484	Saini M K and Chopra S (2015). Influence of weed control methods on weed, yield energetics and economics of basmati rice under sub-mountaineous conditions of Punjab. Indian J Agron60: 410-413.	5.00
485	Sandhu A.K., Mandal K., Singh B. (2015). Estimation and Validation of Propanil Residues in Rice and Soil Samples by Gas Liquid Chromatography with Electron Capture Detector. Bulletin of Environmental Contamination and Toxicology. 95: 368-372	7.26
486	Sandhu P.S., Brar K.S., Chauhan J.S., Meena P.D., Awasthi R.P., Rathi A.S., Kumar A., Gupta J.C., Kolte S.J., Manhas S.S. (2015). Host–pathogen interactions of Brassica genotypes for white rust (Albugo candida) disease severity under aided epiphytotic conditions in India. Phytoparasitica. 43: 197-207	6.90
487	Sangwan A.K., Dhillon W.S., Singh H., Singh N.P., Chohan S.K., Gill P.P.S. (2015). Influence of horti-silviculture combinations on pre-bearing growth and physiological parameters of pear. Indian Journal of Horticulture. 72: 21-27	6.13
488	Sarao P.S., Shera P.S., Singh P. (2015). Impact of multiple insect-pest incidence on yield in basmati rice. Cereal Research Communications. 43: 260-271	7.10
489	Saxena S.N., Sharma Y.K., Rathore S.S., Singh K.K., Barnwal P., Saxena R., Upadhyaya P., Anwer M.M. (2015). Effect of cryogenic grinding on volatile oil, oleoresin content and anti-oxidant properties of coriander (Coriandrumsativum L.) genotypes. Journal of Food Science and Technology. 52: 568-573	8.20
490	Schilling K., Johnson T.M., Dhillon K.S., Mason P.R.D. (2015). Fate of Selenium in Soils at a Seleniferous Site Recorded by High Precision Se Isotope Measurements. Environmental Science and Technology. 49: 9690-9698	11.33
491	Seth K., Bajwa U. (2015). Effect of acidulants on the recovery of milk constituents and quality of Mozzarella processed cheese. Journal of Food Science and Technology. 52: 1561-1569	8.20
492	Sharma A., Bhardwaj R.D., Gupta A.K. (2015). Ferulic acid: A novel inducer of antioxidant enzymes in wheat (Triticumaestivum L.) seedlings. Cereal Research Communications. 43: 394-402	7.10
493	Sharma B.D., Brar J.S., Chanay J.K., Sharma P., Singh P.K. (2015). Distribution of Forms of Copper and their Association with Soil Properties and Uptake in Major Soil Orders in Semi-arid Soils of Punjab, India. Communications in Soil Science and Plant Analysis. 46: 511-527	6.39
494	Sharma D., Sangha G.K., Khera K.S. (2015). Effect of Preconceptional Exposure of Triazophos Formulation on Fertility and Reproductive Performance of Female Wistar Rats, Rattusnorvegicus. Proceedings of the National Academy of Sciences India Section B - Biological Sciences.85: 987-992	6.00
495	Sharma D., Sangha G.K., Khera K.S. (2015). Triazophos-induced oxidative stress and histomorphological changes in ovary of female Wistar rats. Pesticide Biochemistry and Physiology. 117: 18	8.01
496	Sharma K.K., Mukherjee I., Singh B., Sahoo S.K., Mandal K., Mohapatra S., Ahuja A.K., Sharma D., Parihar N.S., Sharma B.N., Kale V.D., Walunj A.R. (2015). Dissipation pattern and risk assessment of flubendiamide on chili at different agro-climatic conditions in India. Environmental Monitoring and Assessment. 187: 2	7.68
497	Sharma S and Aggarwal N (2015).Time-linked dosage appraisal of Trichogrammatids against Cnaphalocrocismedinalis(Guenée) and Scirpophagaincertulas(Walker) in organic aromatic rice. Ecology, Environment and Conservation. 20: 111-118.	5.02
498	Sharma S and Aggarwal N (2015).Time-linked dosage appraisal of Trichogrammatids against Cnaphalocrocismedinalis(Guenée) and Scirpophagaincertulas(Walker) in organic aromatic rice. Ecology, Environment and Conservation. 20: 111-118.	5.02

499	Sharma S., Aggarwal N. (2015). Dispersal ability and parasitisation performance of Trichogrammaspp (Hymenoptera:Trichogrammatidae) in organic Basmati rice. Journal of Environmental Biology. 36: 1345-1348	6.56
500	Sharma S., Goyal R. (2015). Effect of Environment on Fatty Acid Composition and Tocopherol Content in Soybean, Glycine max L Merrill. Proceedings of the National Academy of Sciences India Section B - Biological Sciences. 85: 443-450	6.00
501	Sharma S., Sangha J.K. (2015). Relation between food safety awareness and disease incidence: A study of home food preparers in Punjab. Studies on Ethno-Medicine. 9: 255-261	6.21
502	Sharma S., Singh B., Sikka R. (2015). Soil organic carbon and nitrogen pools in a chronosequence of poplar (Populusdeltoides) plantations in alluvial soils of Punjab, India. Agroforestry Systems. 89: 1049-1063	7.22
503	Sharma S., Singh N., Singh B. (2015). Effect of extrusion on morphology, structural, functional properties and in vitro digestibility of corn, field pea and kidney bean starches. Starch/Staerke. 67: 721-728	7.68
504	Sharma S., Thind H.S., Singh Y., Singh V., Singh B. (2015). Soil enzyme activities with biomass ashes and phosphorus fertilization to rice–wheat cropping system in the Indo-Gangetic plains of India. Nutrient Cycling in Agroecosystems. 101: 391-400	7.90
505	Sheemar G., Dhatt A.S. (2015). PCR-based rapid identification of Indian onion populations possessing S-cytoplasm for isolation of CMS lines. Research on Crops. 16: 133-138	5.00
506	Sheoran P, Sardana V, Kumar A, Mann A and Singh S (2015). Integrating herbicidal and conventional approach for profitable weed management in groundnut (Arachishypogaea). Indian J Agron60: 581-584.	5.00
507	Sheoran P., Sardana V., Chahal V.P., Sharma P., Singh S. (2015). Effect of sowing time on the yield and quality parameters of sunflower (Helianthus annuus) hybrids under semiarid irrigated conditions of northern India. Indian Journal of Agricultural Sciences. 85: 549-554	6.14
508	Shera P.S., Arora R., Singh P. (2015). Comparative susceptibility of transgenic Bt cotton hybrids to Earias spp. and other non-target insects. Crop Protection. 71: 51-59	7.49
509	Sidhu H.S., Singh M., Singh Y., Blackwell J., Lohan S.K., Humphreys E., Jat M.L., Singh V., Singh S. (2015). Development and evaluation of the Turbo Happy Seeder for sowing wheat into heavy rice residues in NW India. Field Crops Research. 184: 201-212	8.98
510	Singh A and Singh T (2015). Growth yield and quality of Bt cotton (Gossypiumhirsutum L.) as influenced by different intercropping systems and nitrogen levels. Indian J of Agronomy (accepted May 2015).	5.00
511	Singh B., Rachna, Hussain S.Z., Sharma S. (2015). Response Surface Analysis and Process Optimization of Twin Screw Extrusion Cooking of Potato-Based Snacks. Journal of Food Processing and Preservation. 39: 270-281	7.16
512	Singh C.B., Singh S., Arora V.K., Sekhon N.K. (2015). Residue Mulch Effects on Potato Productivity and Irrigation and Nitrogen Economy in a Subtropical Environment. Potato Research. 58: 245-260	6.91
513	Singh D., Dhillon W.S., Singh N.P., Gill P.P.S. (2015). Effect of girdling on leaf nutrient levels in pear cultivars Patharnakh and Punjab Beauty. Indian Journal of Horticulture. 72: 319-324	6.13
514	Singh G, Aggarwal N, Ram H, Kaur H, Gill K K and Sharma P (2015). Phenology, thermal requirement and productivity of mungbean as influenced by sowing time. EcolEnv Cons 21: 1415-1419.	5.02
515	Singh G. (2015). Agriculture diversification for food, nutrition, livelihood and environmental security: Challenges and opportunities. Indian Journal of Agronomy. 60: 172-184	5.00
516	Singh J.M., Grover D.K. (2015). Impact of national food security mission-pulses on legumes production performance in Punjab, India. Legume Research. 38: 609-615	6.15
517	Singh K and Brar A S (2015). Effect of planting methods and irrigation schedules on cane yield, quality, economics and water productivity of spring sugarcane (Saccharumofficinarum) in south-western Punjab. Indian J Agron60: 601-605.	5.00
518	Singh K B, Jalota S K and Gupta R K (2015). Soil water balance and response of spring maize (Zea mays) to mulching and differential irrigation in Punjab. Indian J of Agronomy. 60: 132-137.	5.00

519	Singh K., Brar A.S. (2015). Effect of planting methods and irrigation schedules on cane yield, quality, economics and water productivity of spring sugarcane (Saccharumofficinarum) in south western Punjab. Indian Journal of Agronomy. 60: 601-605	5.00
520	Singh K., Choudhary O.P., Singh K., Singh H., Singh S., Singh R.S. (2015). Identification of integrated nutrient management for sustaining soil health and sugarcane yield in South Western Punjab. Journal of Environmental Biology. 36: 551-555	6.56
521	Singh K., Rathore P., Gumber R.K. (2015). Impact of harvest-aid defoliants on yield of American cotton and their monetary evaluation. Vegetos. 28: 41-46	6.00
522	Singh K.B., Jalota S.K., Gupta R.K. (2015). Soil water balance and response of spring maize (Zea mays) to mulching and differential irrigation in Punjab. Indian Journal of Agronomy. 60: 279-284	5.00
523	Singh K.V., Setia R., Sahoo S., Prasad A., Pateriya B. (2015). Evaluation of NDWI and MNDWI for assessment of waterlogging by integrating digital elevation model and groundwater level. Geocarto International. 30: 650-661	7.37
524	Singh M., Bala M. (2015). Induction of mutation in chrysanthemum (DendranthemagrandiflorumTzvelev.) cultivar Bindiya through gamma irradiation. Indian Journal of Horticulture. 72: 376-381	6.13
525	Singh M., Bhullar M.S., Chauhan B.S. (2015). Influence of tillage, cover cropping, and herbicides on weeds and productivity of dry direct-seeded rice. Soil and Tillage Research. 147: 39-49	8.62
526	Singh M., Kumar R., Sharma A., Singh B., Thind S.K. (2015). Calibration and algorithm development for estimation of nitrogen in wheat crop using tractor mounted N-sensor. Scientific World Journal. 2015: 163968	6.00
527	Singh M.P., Jaswal R.K., Sodhi H.S. (2015). Evaluation of Agaricusbisporuslange (sing.) strains and their steeping for improved shelf life. Journal of Pure and Applied Microbiology. 9: 1633-1640	6.00
528	Singh P., Cheema D.S., Dhaliwal M.S., Garg N., Jindal S.K., Chawla N. (2015). Combining Ability and Heterosis for Quality and Processing Traits in Chili Pepper (Capsicum annuum L.) Involving Male Sterile Lines. Journal of Crop Improvement. 29: 379-404	5.12
529	Singh P., Gandhi N. (2015). Milk Preservatives and Adulterants: Processing, Regulatory and Safety Issues. Food Reviews International. 31: 236-261	8.21
530	Singh P, Sahota P, Bhadra F and Singh R K (2015). Optimization, production and scale up of debitteredkinnow beverage by α-L-rhamnosidase producing yeast. Emir J Food Agric 27: 548-555.	5.34
531	Singh P., Sahota P.P., Bhadra F., Singh R.K. (2015). Optimization, production and scale up of debitteredkinnow beverage by α-L-rhamnosidase producing yeast. Emirates Journal of Food and Agriculture. 27: 548-555	5.34
532	Singh P., Sahota P.P., Singh R.K. (2015). Evaluation and characterization of new α-L-rhamnosidase-producing yeast strains. Journal of General and Applied Microbiology. 61: 149-156	6.94
533	Singh S., Bhat Z.A., Rehman H.U. (2015). Impact of organic and integrated nutrient management on yield and nutrient uptake of wheat under rice-wheat cropping system. Ecology, Environment and Conservation. 21: 215-220	5.02
534	Singh S., Chander S., Saini J.S. (2015). Thermo-hydraulic performance due to relative roughness pitch in V-down rib with gap in solar air heater duct - Comparison with similar rib roughness geometries. Renewable and Sustainable Energy Reviews. 43: 1159-1166	11.90
535	Singh S., Gill P.P.S., Aulakh P.S., Singh S. (2015). Changes of minerals in fruit peel and pulp of grapefruit (Citrus paradisiMacf.) cv. Star Ruby during fruit development. Research on Crops. 16: 669-674	5.00
536	Singh S., Singh B., Hans V.S., Gill R.S. (2015). CFD (computational fluid dynamics) investigation on Nusselt number and friction factor of solar air heater duct roughened with non-uniform cross-section transverse rib. Energy. 84: 509-517	10.84
537	Singh Y., Mandal K., Singh B. (2015). Dissipation pattern and risk assessment studies of triazophos residues on capsicum (Capsicum annuum L.) using GLC-FPD and GC-MS. Environmental Monitoring and Assessment. 187: 1-8	7.68

538	Singla L.D., Singla N., Parshad V.R. (2015). Development of concurrent infection of notoedric mange in rabbits infected with trypanosomaevansi. Scandinavian Journal of Laboratory Animal Science. 41:1-6	6.25
539	Singla N., Babbar B.K. (2015). Critical timings and methods of rodent pest management in groundnut (Arachishypogaea L.) crop. Legume Research. 38: 681-686	6.15
540	Singla N., Kaur S. (2015). Toxicity of cholecalciferol to lesser bandicoot rat, Bandicotabengalensis: Biochemical and histopathological changes. International Biodeterioration and Biodegradation. 103:125-133	8.13
541	Singla N., Kaur S., Javed M. (2015). Rodenticidal potential of bromadiolone and cholecalciferol in synergism against Bandicotabengalensis. Crop Protection.72:163-168	7.49
542	Srivastava R., Sarkar D., Mukhopadhayay S.S., Sood A., Singh M., Nasre R.A., Dhale S.A. (2015). Development of hyperspectral model for rapid monitoring of soil organic carbon under precision farming in the Indo-Gangetic Plains of Punjab, India. Journal of the Indian Society of Remote Sensing.43:751-759	6.76
543	Srivastava S, Chand R, Raju S S, Jain R, Kingsly I, Sachdeva J and Singh J (2015). Unsustainable groundwater use in Punjab agriculture: Insights from cost of cultivation survey. Indian J Agril Econ 70: 365-378.	5.04
544	Tanveer A., Khaliq A., Ali H.H., Mahajan G., Chauhan B.S. (2015). Interference and management of parthenium: The world's most important invasive weed. Crop Protection. 68: 49-59	7.49
545	Tomer V., Sangha J.K., Ramya H.G. (2015). Pesticide: An Appraisal on Human Health Implications. Proceedings of the National Academy of Sciences India Section B - Biological Sciences. 85: 451-463	6.00
546	Tyagi M., Singh H., Jawandha S.K. (2015). Performance of papaya cultivars grown under protected conditions. Indian Journal of Horticulture. 72: 334-337	6.13
547	Tyagi V., Dhillon S.K., Bajaj R.K., Gupta S. (2015). Phenotyping and genetic evaluation of sterile cytoplasmic male sterile analogues in sunflower (Helianthus annuusL.). Bangladesh Journal of Botany. 44:23-30.	6.13
548	Vashisht B B, Jalota S K and Vashist K K (2015). Yield, water productivity and economics of rice (Oriya sativa) as influenced by transplanting dates, varieties and irrigation regimes in central Punjab. Indian J of Agronomy. 60: 65-69.	5.00
549	Vashisht B.B., Nigon T., Mulla D.J., Rosen C., Xu H., Twine T., Jalota S.K. (2015). Adaptation of water and nitrogen management to future climates for sustaining potato yield in Minnesota: Field and simulation study. Agricultural Water Management. 152: 198-206	8.29
550	Verma L., Bains N.S., Gosal S.S. (2015). Effect of ticarcillin, cefotaxime and carbenicillin doses on efficacy of tissue culture parameters associated with durum wheat transformation. Vegetos. 28: 89-93	6.00
551	Yadav S., Naveen Kumar P., Arora A., Kumar R. (2015). Effect of protease inhibitors on physiological and biochemical changes influencing keeping quality in gladiolus. Indian Journal of Horticulture. 72: 92-99	6.13
552	Yu Q., Plotto A., Baldwin E.A., Bai J., Huang M., Yu Y., Dhaliwal H.S., Gmitter F.G. Jr. (2015). Proteomic and metabolomic analyses provide insight into production of volatile and non-volatile flavor components in mandarin hybrid fruit. BMC Plant Biology. 15:1-16	9.81
2016		
553	Aggarwal N., Sharma S., Jalali S.K. (2016). On-farm impact of biocontrol technology against rice stem borer, *Scircophaga incertulas* (Walker) and rice leaf folder *Cnaphalocrocismedinalis* (Guenee) in aromatic rice. *Entomologia Generalis*.**36**:137-148.	6.07
554	Aggarwal N., Singh A., Singh S.P. (2016). Heat utilization and radiation interception in transplanted rice (*Oryza sativa* L.) in relation to seedling age. *Journal of Agrometeorology*. **18**: 93-96	6.36
555	Alam M.S., Kaur J., Khaira H., Gupta K. (2016). Extrusion and Extruded Products: Changes in Quality Attributes as Affected by Extrusion Process Parameters: A Review. *Critical Reviews in Food Science and Nutrition*. **56**: 445-473	11.49

556	Alam M.S., Pathania S., Sharma A. (2016). Optimization of the extrusion process for development of high fibre soybean-rice ready-to-eat snacks using carrot pomace and cauliflower trimmings. *LWT - Food Science and Technology*. **74**: 135-144	8.71
557	Ali S., Singh B., Sharma S. (2016). Response surface analysis and extrusion process optimisation of maize–mungbean-based instant weaning food. *International Journal of Food Science and Technology*. **51**: 2301-2312	7.50
558	Amitha Mithra S.V., Kar M.K., Mohapatra T., Robin S., Sarla N., Seshashayee M., Singh K., Singh A.K., Singh N.K., Sharma R.P. (2016). DBT propelled national effort in creating mutant resource for functional genomics in rice. *Current Science*. **110**: 543-548	6.97
559	Atri C., Kaur B., Sharma S., Gandhi N., Verma H., Goyal A., Banga S.S. (2016). Substituting nuclear genome of *Brassica juncea* (L.) Czern & Coss. In cytoplasmic background of Brassica fruticulosa results in cytoplasmic male sterility. *Euphytica*. **209**:131-140	7.62
560	Aulakh C S, Kaur P, Walia S S, Gill R S, Sharma S and Buttar G S (2016). Productivity and quality of *basmati* rice (*Oryza sativa*) in relation to nitrogen management. *Ind J Agron* **61:** 467-473.	5.46
561	Aulakh P.S., Dhaliwal M.S., Jindal S.K., Schafleitner R., Singh K. (2016). Mapping of male sterility gene ms10 in chilli pepper (*Capsicum annuum* L.). *Plant Breeding*. **135**: 531-535	7.50
562	Awlachew Z.T., Singh R., Kaur S., Bains N.S., Chhuneja P. (2016). Transfer and mapping of the heat tolerance component traits of *Aegilops speltoides* in tetraploid wheat *Triticum durum*. *Molecular Breeding*. **36**: 78	8.11
563	Azeez ahmed S.K., Dubey R.K., Kukal S.S., Sethi V.P. (2016). Effect of different nitrogen-potassium concentrations on growth and flowering of chrysanthemum in a drip hydroponic system. *Journal of Plant Nutrition*. **39**: 1891-1898	6.51
564	Bahadur V., Meena O.P. (2016). Genetic diversity analysis of indigenous turmeric genotypes using horticultural markers. *Indian Journal of Horticulture*. **73**: 538-543	6.13
565	Bahadur V., Yeshudas V., Meena O.P. (2016). Nature and magnitude of genetic variability and diversity analysis of Indian turmeric accessions using agro-morphological descriptors. *Canadian Journal of Plant Science*. **96**: 371-381	6.73
566	Bala M., Madhu B., Tyagi S.K., Gupta R.K. (2016). Optimization of supercritical CO_2 extraction of safflower seed oil using response surface methodology. *Asian Journal of Chemistry*.**28**: 1579-1583	5.00
567	Bala M., Singh K.P. (2016). Gamma irradiation of in-vitro proliferated cultures of rose (*Rosa hybrida*) for induction of novel mutants. *Indian Journal of Agricultural Sciences*. **86**: 137-142	6.17
568	Bala R, Sharma A, Kashyap L, Rana B, Bains N S and Sharma I (2016). Molecular mapping of QTLs for Karnal bunt resistance in six near isogenic (NILs) populations of bread wheat. *Ind Phytopath***69:** 242-246.	5.90
569	Bala S., Asthir B., Bains N.S. (2016). Activities of cell wall peroxidases in relation to lignification in six wheat (*Triticum aestivum* L.) genotypes under heat and drought stress. *Journal of Environmental Biology*. **37**: 437-442	6.53
570	Bala S., Asthir B., Bains N.S. (2016). Syringaldazine peroxidase stimulates lignification by enhancing polyamine catabolism in wheat during heat and drought stress. *Cereal Research Communications*. **44**: 561-571	6.53
571	Banta G., Jindal V., Mohindru B., Sharma S., Kaur J., Gupta V.K. (2016). Molecular phylogenetic analysis of mango mealybug, *Drosicha mangiferae* from Punjab. *Journal of Environmental Biology*. **37**: 49-55	6.53
572	Barbetti M.J., Li C.X., You M.P., Singh D., Agnihotri A., Banga S.K., Sandhu P.S., Singh R., Banga S.S. (2016). Valuable New Leaf or Inflorescence Resistances Ensure Improved Management of White Rust (*Albugo candida*) in Mustard (*Brassica juncea*) *Crops*. *Journal of Phytopathology*. **164**: 404-411	6.95
573	Baswal A K, Rattanpal H S and Sidhu G S (2016). Varietal assessment and variability studies in grapefruit (*Citrus paradisi* Mac. Fadyen) genotypes in subtropical zones of Punjab, India. *The Bioscan* **11:** 1369-1371.	5.26

574	Baweja S., Babbar B.K. (2016). Restoration of fatty acid composition of common carp *Cyprinus carpio* (Linnaeus, 1758) fed terrestrial oil based diets using fish oil finishing diet. *Indian Journal of Fisheries*. **63**: 49-56	6.16
575	Benbi D.K., Singh P., Toor A.S., Verma G. (2016). Manure and Fertilizer Application Effects on Aggregate and Mineral-Associated Organic Carbon in a Loamy Soil under Rice-Wheat System. *Communications in Soil Science and Plant Analysis*. **47**: 1828-1844	6.53
576	Bhagat P., Gosal S.K., Singh C.B. (2016). Effect of mulching on soil environment, microbial flora and growth of potato under field conditions. *Indian Journal of Agricultural Research*. **50**:542-548	6.17
577	Bhardwaj U, Jyot G, Mandal K, Battu R S and Singh B (2016). Residues of spirotetramat and imidacloprid in brinjal (*Solanum melongena* l) and their risk assessment. *Pestic Res J***28:** 35-41.	5.90
578	Bhardwaj U., Chahal K.K., Kaur R. (2016). Chemistry of khusinol: A sesquiterpenoid isolated from vetiver oil. *Asian Journal of Chemistry*.**28**: 2461-2463	5.00
579	Bhatia S., Bhakri G., Arora M., Batta S.K., Uppal S.K. (2016). Kinetic and Thermodynamic Properties of Partially Purified Dextranase from *Paecilomyces lilacinus* and Its Application in Dextran Removal from Cane Juice. *Sugar Tech*.**18**: 204-213	6.62
580	Bhullar M.S., Kumar S., Kaur S., Kaur T., Singh J., Yadav R., Chauhan B.S., Gill G. (2016). Management of complex weed flora in dry-seeded rice. *Crop Protection*.**83**: 20-26	7.65
581	Chahal K.K., Kaur P., Kataria D., Kaur R. (2016). Carotol: A sesquiterpenoid isolated from carrot seed oil. *Asian Journal of Chemistry*. **28**: 1004-1006	5.00
582	Chahal K.K., Singh B., Kataria D., Dhillon N.K. (2016). Nematotoxicity of lemongrass oil, citral and its derivatives against *Meloidogyne incognita*. *Allelopathy Journal*. **39**: 217-230	6.53
583	Chandanasree D., Gul K., Riar C.S. (2016). Effect of hydrocolloids and dry heat modification on physicochemical, thermal, pasting and morphological characteristics of cassava (*Manihot esculenta*) starch. *Food Hydrocolloids*.**52**: 175-182	9.86
584	Chandi A K (2016).Relative toxicity of different insecticides against *Helicoverpa armigera* (Hubner) in Punjab. ***JExp Zoology*** *19:1371-1373.*	5.51
585	Chandi A K (2016).Relative toxicity of different insecticides against *Spodoptera litura* (Fabricius) in Punjab. *Pestic Res J***28:**185-187.	5.90
586	Chandi A K, Suri K S and Kaur R (2016).Relative toxicity of different insecticides against *Plutella xylostella litura* (Linnaeus) in Punjab.***J Exp Zool****India19:****1323-1326.***	5.51
587	Chandi R S and Kumar V (2016). Efficacy of insect growth regulator, pyriproxyfen against cotton whitefly and predatory complex on Bt cotton. *Ind J Pl Prot***44:** 177-184.	5.07
588	Chatterjee D., Banga S., Gupta M., Bharti S., Salisbury P.A., Banga S.S. (2016). Resynthesis of *Brassica napus* through hybridization between *B. juncea* and *B. carinata*. *Theoretical and Applied Genetics*. **129**: 977-990	9.90
589	Chatterjee J., Dionora J., Elmido-Mabilangan A., Wanchana S., Thakur V., Bandyopadhyay A., Brar D.S., Quick W.P. (2016). The evolutionary basis of naturally diverse rice leaves anatomy. *PLoS ONE*. **11**: e0164532	9.06
590	Chaudhary D.P., Kumar A., Kumar R., Singode A., Mukri G., Sah R.P., Tiwana U.S., Kumar B. (2016). Evaluation of normal and specialty corn for fodder yield and quality traits. *Range Management and Agroforestry*. **37**: 179-183	6.39
591	Choudhury B.U., Sharma B.D., Mukhopadhyay S.S., Verma B.C. (2016). Pedosphere degradation due to seasonal water logging in southwestern Punjab. *Proceedings of the National Academy of Sciences India Section B - Biological Sciences*. **86**: 835-845	5.00
592	Chouksey H, Sardana V and Sharma P (2016).Influence of phosphorus application on seed yield, quality and phosphorus uptake pattern of Indian mustard (*Brassica juncea*) cultivars. *J Oilseeds Res***33:**163-167.	5.02

593	Dalal P.K., Arora R. (2016). Impact of temperature on food consumption and nutritional indices of tomato fruit borer, *Helicoverpa armigera* (Hübner) (Noctuidae: Lepidoptera). *Journal of Agrometeorology*. **18**:162-167	6.36
594	Dangon K.S., Siag M., Sharda R. (2016). Response of drip irrigated spring maize to different levels of salinity. *Indian Journal of Ecology*. **43**:333-334	4.96
595	Dar S.B., Ram H. (2016). Grain yield, nutrient uptake and water-use efficiency of wheat (*Triticum aestivum*) under different moisture regimes, nutrient and hydrogel levels. *Indian Journal of Agronomy*. **61**: 101-104	5.46
596	Dehal I.B., Kalia R., Kumar B. (2016). Genetic estimates and path coefficient analysis in chickpea (*Cicer arietinum* L.) under normal and late sown environments. *Legume Research*. **39**: 510-516	6.15
597	Dhadli H.S., Brar B.S. (2016). Effect of long-term differential application of inorganic fertilizers and manure on soil CO_2 emissions. *Plant, Soil and Environment*.**62**: 195-201	7.04
598	Dhadli H.S., Brar B.S., Black T.A. (2016). N_2O emissions in a long-term soil fertility experiment under maize-wheat cropping system in Northern India. *Geoderma Regional*. **7**: 102-109	8.86
599	Dhar S., Jindal V., Gupta V.K. (2016). Optimization of growth conditions and medium composition for improved conidiation of newly isolated *Beauveria bassiana* strains. *Indian Journal of Experimental Biology*. **54**: 634-643	7.17
600	Dhillon G K, Kaur A, Bhise S and Ahluwalia P (2016). Synergistic effect of spices and herbs on rheological and bread making properties of wheat flour. *J Pure App Microbiol* **2:** 1-9. **5.00)**	5.00
601	Dhillon K.S., Dhillon S.K. (2016). Selenium in groundwater and its contribution towards daily dietary Se intake under different hydrogeological zones of Punjab, India. *Journal of Hydrology*. **533**: 615-626	9.04
602	Dhillon W.S., Mahajan B.V.C., Chahal T.S., Kumar M., Sidhu M.K., Singh S.P. (2016). Effect of different packaging films on shelf-life and quality of daisy mandarin under ambient conditions. *Indian Journal of Horticulture*. **73**:262-266	6.13
603	Dhkal M., Hunjan M.S., Kaur H., Kaur R. (2016). Biochemical basis of bacterial leaf streak resistance in maize. *Indian Phytopathology*. **69**: 373-380	5.90
604	Dixit J., Mahal J.S., Manes G.S. (2016). Design of nitrogen (liquid urea) Metering mechanism for point injection in straw mulched fields. *AMA, Agricultural Mechanization in Asia, Africa and Latin America*.**47**: 328-335	6.06
605	Dwivedi S, Thind S K and Sharma A (2016). Molecular evidence of association of chilli leaf curl virus with leaf curl disease of papaya in Punjab. *The Bioscan***11:** 863-866.	5.26
606	Ellur R.K., Khanna A., Gopala Krishnan S., Bhowmick P.K., Vinod K.K., Nagarajan M., Mondal K.K., Singh N.K., Singh K., Prabhu K.V., Singh A.K. (2016). Marker-aided incorporation of Xa38, a novel bacterial blight resistance gene, in PB1121 and comparison of its resistance spectrum with xa13 + Xa21. *Scientific Reports*. 629188.	11.23
607	Eyarkai Nambi V., Behera G., Saharan V.K., Meena V.S. (2016). Optimization of salt curing of bitter gourd (*Momordica charantia* L.) with blanching as pre-treatment using response surface methodology. *Nutrition and Food Science*.**46**: 742-752	5.26
608	Gaba J., Sharma S., Arora G., Sharma P. (2016). Synthesis, characterization and microbial activity of N-substituted pyrazolines. *Asian Journal of Chemistry*.**28**: 2031-2037	5.00
609	Garg N and Singla N (2016). Intoxication potential of sublethal doses of bromadiolone in house rat (*Rattus rattus*). *J Anim Res* **6:** 955-960.	5.68
610	Gautam A., Khurana R., Manes G.S., Dixit A., Verma A. (2016). Development and evaluation of inclined plate metering mechanism for onion pelleted seeds. *Vegetos*. **29**: 95-99	5.00
611	Gill K.K., Kaur B., Sandhu S.S., Kaur P. (2016). Simulating mustard crop phenology and productivity with InfoCrop-Mustard model under temperature increase scenarios. *Journal of Agrometeorology*. **18**: 240-244	6.36

612	Gill K.S., Dhaliwal H.S., Mahajan B.V.C. (2016). Pre-harvest application of salicylic acid and N-propyl gallate for enhancing shelf-life of guava. *Indian Journal of Horticulture*. **73**: 279-286	6.13
613	Gill K.S., Dhaliwal H.S., Mahajan B.V.C., Paliyath G., Boora R.S. (2016). Enhancing postharvest shelf life and quality of guava (*Psidium guajava* L.) cv. Allahabad Safeda by pre-harvest application of hexanal containing aqueous formulation. *Postharvest Biology and Technology*. **112**: 224-232	8.62
614	Gill P K, Tiwana U S and Kaur S (2016). Crop-weed competition in Napier Bajra hybrid (*Pennisetum purpureum* × *Pennisetum glaucum*) under different planting materials. *Ind J Agron* **61:** 495-500	5.46
615	Gill P.K., Tiwana U.S., Kaur S. (2016). Crop-weed competition in Napier Bajra hybrid (*Pennisetum purpureum* × *Pennisetum glaucum*) under different planting materials. *Indian Journal of Agronomy*. **61**:495-500	5.46
616	Goyal A, Sharma S, Gaba J and Kaur H (2016). Green synthesis of isoxazoline derivatives using microwave irradiation and their antifungal activity.*Asian J Chem***28:** 2169-2172.	5.00
617	Goyal M and Tiwana U S (2016). Ensiling legume with cereal fodder influences quality of silage mixtures. *Ind J Anim Nutr***33:** 228-232.	5.02
618	Grover G., Kaur B., Pathak D., Kumar V. (2016). Genetic variation for leaf trichome density and its association with sucking insect-pests incidence in Asiatic cotton. *Indian Journal of Genetics and Plant Breeding*. **76**: 365-368	6.28
619	Gul K., Singh A.K., Sonkawade R.G. (2016). Physicochemical, thermal and pasting characteristics of gamma irradiated rice starches. *International Journal of Biological Macromolecules*.**85**: 460-466	9.14
620	Gunasinghe N., You M.P., Li X.X., Banga S.S., Banga S.K., Barbetti M.J. (2016). New host resistances to *Pseudocercosporella capsellae* and implications for white leaf spot management in Brassicaceae crops. *Crop Protection*. **86**: 69-76	7.65
621	Gupta K., Dharni K. (2016). Use and influence of nutrition labelling: an emerging market experience. *Nutrition and Food Science*. **46**: 441-456	5.26
622	Gupta M., Atri C., Agarwal N., Banga S.S. (2016). Development and molecular-genetic characterization of a stable Brassica allohexaploid. *Theoretical and Applied Genetics*. **129**: 2085-2100	9.90
623	Gupta M., Mason A.S., Batley J., Bharti S., Banga S., Banga S.S. (2016). Molecular-cytogenetic characterization of C-genome chromosome substitution lines in *Brassica juncea* (L.) Czern and Coss. *Theoretical and Applied Genetics*.**129**: 1153-1166	9.90
624	Gupta S., Yadav R., Gaikwad K., Kushwah A., Singh A.M., Bainsla N.K. (2016). Genetic improvement trend analysis for end-use quality characteristics among wheat cultivars of North-Western India. *Indian Journal of Genetics and Plant Breeding*. **76**: 137-143	6.28
625	Hari N S, Jindal J and Aggarwal N (2016). Learning in the oviposition preference of *Chilo partellus*. *Ind J Plant Protect* **44:** 268-273.	5.07
626	Hundal J.S., Sodhi S.S., Gupta A., Singh J., Chahal U.S. (2016). Awareness, knowledge, and risks of zoonotic diseases among livestock farmers in Punjab. *Veterinary World*. **9**: 186-191	5.71
627	Hussain S.Z., Singh B. (2016). Moisture dependent dimensional and physical properties of re-fabricated rice. *AMA, Agricultural Mechanization in Asia, Africa and Latin America*. **47**: 427-431	6.06
628	Itoo A A, Sharma A, Zehra S B and Kang S S (2016). Potential reservoirs of whitefly transmitted begomovirus causing chilli leaf curl disease in Punjab. *Appl Biol Res***18:** 270-276.	5.07
629	Jain R and Singla N (2016). Formulation and nutritional evaluation of food products supplemented with niger seeds. *Nutr Food Sci***46:**604–614.	5.26
630	Jain T., Grover K., Kaur G. (2016). Effect of processing on nutrients and fatty acid composition of garden cress (*Lepidium sativum*) seeds. *Food Chemistry*.**213**: 806-812	10.05
631	Jalota S.K., Vashisht B.B. (2016). Adapting cropping systems to future climate change scenario in three agro-climatic zones of Punjab, India. *Journal of Agrometeorology*. **18**:148-156	6.36

632	Javed M., Sidhu S.S., Singh S. (2016). An extension of Franklin's randomized response technique for multi-proportions. *Communications in Statistics - Theory and Methods*. **45**: 4637-4662	6.30
633	Jindal V., Banta G., Singh M. (2016). Molecular identification of mango hoppers infesting mango trees in Punjab through DNA barcoding. *Indian Journal of Horticulture*. **73**:192-196	6.13
634	Johal N, Badaya V K, Gill B S and Dhoot M (2016). Diversity and association analysis for yield contributing and morphological traits in soybean (*Glycine max* (L.) Merrill). *The Bioscan* **11:** (2013)-(2017).	5.26
635	Kalsi A., Sikka R., Singh D. (2016). Influence of organic and inorganic amendments on the bioavailability of lead and micronutrient composition of Indian mustard (*Brassica juncea* (L.) Czern) in a lead-contaminated soil. *Environmental Earth Sciences*. **75**:1254	6.00
636	Kapoor S., Ranote P.S. (2016). Antioxidant components and physico-chemical characteristics of jamun powder supplemented pear juice. *Journal of Food Science and Technology*.**53**: 2307-2316	7.24
637	Kataria D., Chahal K.K., Kumar A. (2016). Chemical transformations of carotol isolated from carrot seed oil. *Asian Journal of Chemistry*.**28**: 1790-1792	5.00
638	Kaur A, Jawandha S K and Singh H (2016). Physico-chemical and enzymatic changes in low temperature stored plum fruits in response to boric acid application.*Vegetos* **29:** 80-83.	5.00
639	Kaur A., Brar A.S. (2016). Influence of mulching and irrigation scheduling on productivity and water use of turmeric (*Curcuma longa* L.) in north-western India. *Irrigation Science*. **34**: 261-269	7.95
640	Kaur A., Ghumman A., Singh N., Kaur S., Virdi A.S., Riar G.S., Mahajan G. (2016). Effect of different doses of nitrogen on protein profiling, pasting and quality attributes of rice from different cultivars. *Journal of Food Science and Technology*.**53**: 2452-2462	7.24
641	Kaur A., Jawandha S.K., Singh H. (2016). Physico-chemical and enzymatic changes in low temperature stored plum fruits in response to boric acid application. *Vegetos*.**29**: 80-83	5.00
642	Kaur A., Sharma M., Sharma C., Kaur H., Kaur N., Sharma S., Arora R., Singh I., Sandhu J.S. (2016). Pod borer resistant transgenic pigeon pea (*Cajanus cajan* L.) expressing cry1Ac transgene generated through simplified Agrobacterium transformation of pricked embryo axes. *Plant Cell, Tissue and Organ Culture*.**127**: 717-727	8.39
643	Kaur B, Taggar M S, Sharma P and Sangha M K (2016). Purification and characterization of extracellular lipase from *Pseudomonas aeruginosa* KF853103. *J Pure Appl Microbiol***10:** 1-8.	5.00
644	Kaur B., Asthir B. (2016). Hydroponic culturing upregulates sucrose and glutamine metabolism by enhancing their utilization via intermediates of aerobic pathway in wheat. *Cereal Research Communications*. **44**: 381-392	6.53
645	Kaur B., Sangha M.K., Kaur G. (2016). Calibration of NIRS for the Estimation of Fatty Acids in *Brassica Juncea*. *JAOCS, Journal of the American Oil Chemists' Society*. **93**: 673-680	7.51
646	Kaur D., Grewal S.K., Kaur J., Singh S., Singh I. (2016). Water deficit stress tolerance in chickpea is mediated by the contribution of integrative defence systems in different tissues of the plant. *Functional Plant Biology*. **43**: 903-918	8.49
647	Kaur G and Aggarwal P (2016). Effect of preservation processes on the shelf stability and antioxidant properties of radish juice. *The Bioscan***11:** 2241-2244.	5.21
648	Kaur G and Sangha K S (2016). Diversity of arthropod fauna associated with chilli (*Capsicum annum* L) in Punjab. *J Entmol and Zool Studs***4:** 390-396.	5.53
649	Kaur G, Asthir B and Bains N S (2016). Genotypic variation for nitrogen uptake and assimilation using hydroponic culture technique in wheat. *J Plant Nutr***39:** 1292-1296.	6.51
650	Kaur G., Goyal M. (2016). Nitrogen assimilation potential in relation to nitrate-N toxicity at different growth stages and N inputs in oats (*Avena sativa* L.). *Indian Journal of Biochemistry and Biophysics*. **53**:126-134	6.96

651	Kaur G., Sharma S., Singh B., Dar B.N. (2016). Comparative Study on Functional, Rheological, Thermal, and Morphological Properties of Native and Modified Cereal Flours. *International Journal of Food Properties*. **19**: 1949-1961	7.59
652	Kaur H, Pathak D and Rathore P (2016). Development and characterization of an interspecific *Gossypium hirsutum* x *Gossypium armourianum* hybrid. *App Bio Res***18:**146-154.	5.07
653	Kaur H., Gill R.S., Kaur S. (2016). Antinutritional factors in ricebean, *Vigna umbellata* Thunb. (Ohwi and Ohashi) against *Callosobruchus maculatus* F. (Coleoptera: Bruchidae). *Phytoparasitica*. **44**: 609-614	7.03
654	Kaur H., Kapoor S., Kaur G. (2016). Application of ligninolytic potentials of a white-rot fungus *Ganoderma lucidum* for degradation of lindane. *Environmental Monitoring and Assessment*.**188**: 588	7.63
655	Kaur J and Joshi N (2016). Evaluation of different cereal based media for the production of *Bacillus thuringiensis* and their virulence against *Spodoptera litura* (fabricius).*The Bioscan***11:** 1501-1504.	5.21
656	Kaur J, Mahal S S and Kaur H (2016). Impact of sowing methods, mulch levels and irrigation schedules on water use and grain quality in barley (*Hordeum vulgare* L.). *Intl J Agric Stat Sci***12:** 377-384.	5.13
657	Kaur J., Mahal S.S. (2016). Effect of sowing methods, paddy straw mulch and irrigation schedules on crop performance, water productivity and monetary returns of barley (*Hordeum vulgare*). *Indian Journal of Agronomy*. **61**: 366-371	5.46
658	Kaur J., Mahal S.S., Kaur A. (2016). Yield and quality evaluation of direct seeded basmati rice (*Oryza sativa* L.) under different irrigation and nitrogen regimes. *Cereal Research Communications*. **44**: 330-340	6.53
659	Kaur K., Dhillon W.S. (2016). Effect of harvesting date and packaging materials on core browning and phenolic contents of pear cv. Punjab beauty during storage. *Indian Journal of Horticulture*. **73**: 619-622	6.13
660	Kaur K., Phutela U.G. (2016). Enhancement of paddy straw digestibility and biogas production by sodium hydroxide-microwave pretreatment. *Renewable Energy*. **92**: 178-184	9.40
661	Kaur K., Phutela U.G. (2016). Sodium carbonate pretreatment: an approach towards desilication of paddy straw and enhancement in biogas production. *Paddy and Water Environment*.**14**:113-121	6.87
662	Kaur K., Zhawar V.K. (2016). Antioxidant potential of fresh and after-ripened dry embryos of two wheat cultivars contrasting in drought tolerance. *Indian Journal of Plant Physiology*.**21**: 350-354	5.18
663	Kaur L., Zhawar V.K. (2016). Antioxidant parameters under salt stress in drought tolerant and susceptible wheat cultivars. *Indian Journal of Plant Physiology*.**21**: 101-106	5.18
664	Kaur M, Sardana V and Sharma P (2016). Productivity, economics and competitive indices of component crops in intercropping of canola oilseed rape (*Brassica napus*) and Ethiopian mustard (*Brassica carinata*) with Indian rape (*Brassica rapavar* Toria). *J Oilseeds Res***33:** 26-32.	5.02
665	Kaur N, Gill R I S and Bhullar M S (2016). Integrated weed management in poplar (*Populus deltoides*)–turmeric (*Curcuma longa*) based agro-forestry system in Punjab. *Ind J Agron***61:** 13-18.	5.46
666	Kaur N., Jhanji S. (2016). Effect of soil cadmium on growth, photosynthesis and quality of *Raphanus sativus* and *Lactuca sativa*. *Journal of Environmental Biology*.**37**: 993-997	6.53
667	Kaur N., Prabhjyot-Kaur (2016). Projected climate change under different scenarios in central region of Punjab, India. *Journal of Agrometeorology*. **18**: 88-92	6.36
668	Kaur N., Singh A.K. (2016). Ohmic Heating: Concept and Applications-A Review. *Critical Reviews in Food Science and Nutrition*. **56**: 2338-2351	11.49
669	Kaur P., Kaur P., Singh K., Kaur M. (2016). Adsorption and Desorption Characteristics of Pretilachlor in Three Soils of Punjab. *Water, Air, and Soil Pollution*. **227**: 376	7.55

670	Kaur P., Pal P., Virdi A.S., Kaur A., Singh N., Mahajan G. (2016). Protein and starch characteristics of milled rice from different cultivars affected by transplantation date. *Journal of Food Science and Technology*. **53**: 3186-3196	7.24
671	Kaur R., Bedi S., Mahajan G., Kaur G., Chauhan B.S. (2016). Physiological and biochemical indicators for assessing nitrogen-use efficiency in rice (*Oryza sativa)* genotypes under dry direct seeding. *Crop and Pasture Science*. **67**: 1158-1167	7.49
672	Kaur R., Goyal M., Tiwana U.S. (2016). Influence of seasonal variation on oxalate accumulation in Napier Bajra hybrid under different nitrogen nutrition. *Range Management and Agroforestry*.**37**:162-168	6.39
673	Kaur R., Joshi N., Virk J.S., Sharma S. (2016). Evaluation of *Pseudomonas fluorescens* for the management of tomato early blight disease and fruit borer. *Journal of Environmental Biology*. **37**: 869-872	6.53
674	Kaur R., Kaur K. (2016). Appraisal of maize germplasm for identification of nutritionally rich nutraceutical genotypes. *Cereal Research Communications*.**44**: 501-512	6.53
675	Kaur R., Mandal K., Sahoo S.K., Kumar R., Arora R., Singh B. (2016). Estimation and risk assessment of flubendiamide on fodder berseem clover (*Trifolium alexandrinum* L.) by QuEChERS methodology and LC-MS/MS. *Environmental Science and Pollution Research*. **23**: 9791-9798	8.76
676	Kaur R., Singh M., Kingra P.K. (2016). Hyperspectral remote sensing for monitoring growth of rice (*Oryza sativa*) crop. *Indian Journal of Agronomy*. **61**:191-196	5.46
677	Kaur S, Kular J S and Chandi R S (2016). Status of *Thrips tabaci* Lindeman in context of its biology and ecology. *J Exp Zool India***19:** 1199-1207.	5.51
678	Kaur S, Sharma P, Sandhu P S and Grover P (2016). Mycelial compatibility and cultural grouping of *Sclerotinia sclerotiorum* isolates causing root rot and stem rot of sunflower in Punjab. *Vegetos* **29:** 177-183.	5.00
679	Kaur S., Aggarwal P. (2016). Development and quality characteristics of nutritionally enhanced potato legume based wari- an Indian traditional savoury. *Journal of Food Science and Technology*. **53**: 1899-1908	7.24
680	Kaur S., Aggarwal R., Lal R. (2016). Assessment and Mitigation of Greenhouse Gas Emissions from Groundwater Irrigation. *Irrigation and Drainage*. **65**: 762-770	6.57
681	Kaur S., Jairath A., Singh I., Nayyar H., Kumar S. (2016). Alternate mild drought stress (–0.1 MPa PEG) immunizes sensitive chickpea cultivar against lethal chilling by accentuating the defense mechanisms. *Acta Physiologiae Plantarum*. **38**:189	7.56
682	Kaur S., Kaur S., Gupta A.K., Kaur J. (2016). Physiochemical and nutritional attributes of raw and soaked seeds of chickpea (*Cicer arietinum* L.) genotypes. *Legume Research*. **39**: 359-369	6.15
683	Kaur S., Singh S. (2016). Energetics, productivity and weed control in different rice (*Oryza sativa*) establishment methods in north-western indo-gangetic plains. *Indian Journal of Agronomy*. **61**: 179-185	5.46
684	Kaur T and Kumar R (2016). Weed management strategies in chickpea (*Cicer arietinum*) for higher productivity and profitability in North-West India. *Ind J Agro* **61:** 99-103.	5.46
685	Khan I., Sharma A., Kang S.S., Kaur G., Dhatt A.S. (2016). Molecular characterization and identification of Garlic virus D associated with garlic in India. *Journal of Plant Pathology*. **98**: 607-609	7.04
686	Khan J.N., Jain A.K., Singh V.P., Kumar R., Sharda R., Siag M. (2016). Simulation of mulch and no-mulch conditions for various soil matric potential thresholds for drip-fertigated Guava (*Psidium guajava* L.) in the semiarid region of Northwest India. *Journal of Irrigation and Drainage Engineering*. **142**: 4016040	7.36
687	Khanna P., Kaur K., Gupta A.K. (2016). Salicylic acid induces differential antioxidant response in spring maize under high temperature stress. *Indian Journal of Experimental Biology*. 54: 386-393	7.17

688	Khera K.S., Kaur J., Sangha G.K. (2016). Reproductive toxicity of quinalphos on female albino rats: Effects on ovary and uterus. *Indian Journal of Animal Research*.**50**: 537-543	6.09
689	Khurana D.S., Mehta N.A., Singh H. (2016). Performance of amaranthus genotypes for growth and yield under different nitrogen levels. *Indian Journal of Horticulture*.**73**: 137-140	6.13
690	Kingra P.K. (2016). Climate variability impacts on wheat productivity in central Punjab. *Journal of Agrometeorology*. **18**:197-199	6.36
691	Kooner R, Sharma S, Sandhu S S and Arora R (2016). Chlorantraniliprole - A diamide to manage tomato fruit borer, *Helicoverpa amrigera* (Hubner) (Lepidoptera: Noctuiidae). *Pestic Res J***28:** 188-193.	5.90
692	Kukal S.S., Saha D., Sharma P., Sharma B.D. (2016). Profile Distribution of Carbon Fractions Under Long-term Rice-wheat and Maize-wheat Production in Alfisols and Inceptisols of Northwest India. *Land Degradation and Development*.**27**: 1205-1214	14.15
693	Kumar A and Gill P P S (2016). Changes in colour development, anthocyanin contents and organoleptic rating during fruit development of pomegranate *cv.* Mridula. *The Bioscan***11:** 1683-1685.	5.21
694	Kumar A., Misra T., Batra K., Sharma R., Mishra A.K., Vennila S., Tanwar R.K., Singh N., Wahi P., Rajendran R., Sidde Gowda D.K., Sarao P.S., Jalgaonkar V.N., Roy S.K., Chattopadhyay C. (2016). Web enabled and weather based forewarning of yellow stem borer [*scirpophaga incertulas* (Walker)] and leaf folder [*cnaphalocrcis medinalis* (guenee)] for different rice growing locations of india. *Mausam*. **67**: 861-868	6.31
695	Kumar B., Dhaliwal S.S., Singh S.T., Lamba J.S., Ram H. (2016). Herbage production, nutritional composition and quality of teosinte under Fe fertilization. *International Journal of Agriculture and Biology*. **18**: 319-329	6.76
696	Kumar B., Guleria S.K., Khanorkar S.M., Dubey R.B., Patel J., Kumar V., Parihar C.M., Jat S.L., Singh V., Yatish K.R., Das A., Sekhar J.C., Bhati P., Kaur H., Kumar M., Singh A.K., Varghese E., Yadav O.P. (2016). Selection indices to identify maize (Zea mays L.) hybrids adapted under drought-stress and drought-free conditions in a tropical climate. *Crop and Pasture Science*. **67**: 1087-1095	7.49
697	Kumar B., Hooda K.S., Gogoi R., Kumar V., Kumar S., Abhishek A., Bhati P., Sekhar J.C., Yathish K.R., Singh V., Das A., Mukri G., Varghese E., Kaur H., Malik V., Yadav O.P. (2016). Inheritance study and stable sources of Maydis leaf blight (*Cochliobolus heterostrophus*) resistance in tropical maize Germplasm. *Cereal Research Communications*. **44**: 424-434	6.53
698	Kumar P, Dhillon S K, Sao A, Thakur A K, Kumar P, Kanwar R R and Patel R K (2016). Implications of genetic heterogeneity among cultivated genotypes for global food security in climate change era. *J Pure App Microbiol***10:** 2019-2033.	5.00
699	Kumar R., Mandal K., Taggar G.K., Singh R., Singh B. (2016). Bioefficacy and persistence of acephate in mungbean *Vigna radiata* (L.) Wilczek. *Environmental Monitoring and Assessment*. **188**: 392	7.63
700	Kumar S., Archak S., Tyagi R.K., Kumar J., Vikas V.K., Jacob S.R., Srinivasan K., Radhamani J., Parimalan R., Sivaswamy M., Tyagi S., Yadav M., Kumari J., Deepali, Sharma S., Bhagat I., Meeta M., Bains N.S., Chowdhury A.K., Saha B.C., Bhattacharya P.M., Kumari J., Singh M.C., Gangwar O.P., Prasad P., Bharadwaj S.C., Gogoi R., Sharma J.B., Gm S.K., Saharan M.S., Bag M., Roy A., Prasad T.V., Sharma R.K., Dutta M., Sharma I., Bansal K.C. (2016). Evaluation of 19,460 wheat accessions conserved in the indian national genebank to identify new sources of resistance to rust and spot blotch diseases. *PLoS ONE*. **11**: 167702	9.06
701	Kumar S., Garg A.K., Aulakh M.S. (2016). Effect of conservation agriculture practices on physical, chemical and biological attributes of soil health under soybean–rapeseed rotation. *Agricultural Research*. **5**: 145-161	5.90
702	Kumari M., Asthir B. (2016). Characterisation of rice cultivars on the basis of antioxidant defense response. *Indian Journal of Plant Physiology*. **21**:107-113	5.18
703	Kumari M., Asthir B. (2016). Transformation of Sucrose to Starch and Protein in Rice Leaves and Grains under Two Establishment Methods. *Rice Science*.**23**: 255-265	5.33

704	Lal M and Saini K S (2016). Impact of different planting techniques and cutting practices on yield performance, weeds, quality and economics of dual purpose barley (*Hordeum vulgare* L.). *Int J Agric Stat Sci***12:** 385-389.	5.13
705	Mahajan B.V.C., Dhillon W.S., Sidhu M.K., Jindal S.K., Kumar M., Dhaliwal M.S., Singh S.P. (2016). Effect of packaging films on shelf-life and quality of bell pepper under super and ordinary market conditions. *Indian Journal of Horticulture*.**73**: 114-119	6.13
706	Majeed R., Jawandha S.K. (2016). Enzymatic changes in plum (*Prunus salicina* Lindl.) subjected to some chemical treatments and cold storage. *Journal of Food Science and Technology*. **53**: 2372-2379	7.24
707	Majid I., Dhatt A.S., Sharma S., Nayik G.A., Nanda V. (2016). Effect of sprouting on physicochemical, antioxidant and flavonoid profile of onion varieties. *International Journal of Food Science and Technology*. **51**: 317-324	7.24
708	Makkar A., Kaur P., Kaur P., Kaur K. (2016). Comparison of extraction techniques for quantitative analysis of pendimethalin from soil and rice grain. *Journal of Liquid Chromatography and Related Technologies*. **39**: 718-723	6.67
709	Makkar G S, Chhuneja P K and Singh J (2016). Morphometric characterization of *Apis* species (Hymenoptera - Apoidea). *Vegetos* (accepted).	5.00
710	Makkar G S, Chhuneja P K and Singh J (2016). Stingless bee, *Tetragonula iridipennis* Smith, 1854 (Hymenoptera: Apidae: Meliponini): Molecular and morphological characterization. *Proc of Natl Acad of Sci, India, Section B: Biol Sci* DOI: 10.1007/s40011-016-0757-4.	5.00
711	Makkar G.S., Chhuneja P.K. (2016). Bee diversity assemblage on pigeon pea, Cajanus cajan along habitat gradient. *Journal of Environmental Biology*.**37**: 1309-1314	6.53
712	Mangal M., Bansal S., Sharma S.K., Gupta R.K. (2016). Molecular detection of foodborne pathogens: a rapid and accurate answer to food safety. *Critical Reviews in Food Science and Nutrition*.**56**: 1568-1584	11.49
713	Meenu and Joshi N (2016). Screening and characterization of Triazophos tolerant bacteria from soil. *J Pure App Microbiol* **10:** 1649-1654.	5.00
714	Mehta M., Hundal S.S. (2016). Effect of sodium arsenite on reproductive organs of female Wistar rats. *Archives of Environmental and Occupational Health*. **71**: 116-125	7.60
715	Mittal P., Devi R., Gosal S.S. (2016). Effect of genotypes and activated charcoal on high frequency in vitro plant regeneration in sugarcane. *Indian Journal of Biotechnology*. **15**: 261-265	6.29
716	Modak S.P., Dogra B., Dogra R., Kumar D. (2016). Design of rotary weeder blade. *AMA, Agricultural Mechanization in Asia, Africa and Latin America*. **47**: 432-240	6.06
717	Naresh R.K., Gupta R.K., Jat M.L., Singh S.P., Dwivedi A., Dhaliwal S.S., Kumar V., Kumar L., Singh O., Singh V., Kumar A., Rathore R.S. (2016). Tillage, irrigation levels and rice straw mulches effects on wheat productivity, soil aggregates and soil organic carbon dynamics after rice in sandy loam soils of subtropical climatic conditions. *Journal of Pure and Applied Microbiology*. **10**: 1987-2002	5.00
718	Naresh R.K., Rathore R.S., Dhaliwal S.S., Yadav R.B., Kumar D., Singh S.P., Nawaz A., Kumar N., Gupta R.K. (2016). Crop establishment methods: foliar and basal nourishment of rice (*Oryza sativa*) cultivation affecting growth parameters, water saving, productivity and soil physical properties. *Paddy and Water Environment*.**14**: 373-386	6.87
719	Naveen-Gupta, Sudhir-Yadav, Humphreys E., Kukal S.S., Balwinder-Singh, Eberbach P.L. (2016). Effects of tillage and mulch on the growth, yield and irrigation water productivity of a dry seeded rice-wheat cropping system in north west India. *Field crops research*, **196**: 219-236	8.93
720	Pooja, Kocher G.S., Gill M.I.S. (2016). Dynamics of biochemicals of Punjab MACS purple and H-144 from veraison to maturity under Punjab conditions. *Indian Journal of Horticulture*. **73**: 400-404	6.13

721	Prakash D., Benbi D.K., Saroa G.S. (2016). Dependence of soil organic carbon on available iron and manganese concentrations in submerged rice soils. *Vegetos*. **29**: 35-42	5.00
722	Prakash D., Benbi D.K., Saroa G.S. (2016). Effect of rate and source of phosphorus application on soil organic carbon pools under rice (*Oryza sativa*)-wheat (*Triticum aestivum*) cropping system. *Indian Journal of Agricultural Sciences*. **86**: 1127-1132.	6.17
723	Prasad P and Kochhar A (2016). Development of ready to eat supplementary foods using germinated pulse mix, potato flour and green leafy vegetables for malnourished children. *Nutr Food Sci***46:** 30-42.	5.26
724	Ram H., Aggarwal N., Singh G., Singh S.P. (2016). Heat and water-use efficiency in summer mungbean (*Vigna radiata* L. Wilczek) under different thermal and moisture regimes. *Journal of Agrometeorology*. **18**: 196-200	6.36
725	Ram H., Singh G., Aggarwal N. (2016). Effect of irrigation, straw mulching and weed control on growth, water use efficiency and productivity of summer mungbean. *Legume Research*. **39**: 284-288	6.15
726	Ramos J.M., Furuta T., Uehara K., Chihiro N., Angeles-Shim R.B., Shim J., Brar D.S., Ashikari M., Jena K.K. (2016). Development of chromosome segment substitution lines (CSSLs) of *Oryza longistaminata* A. Chev. & Röhr in the background of the elite japonica rice cultivar, Taichung 65 and their evaluation for yield traits. *Euphytica*. **210**: 151-163	7.62
727	Rani A., Kumar V., Gill B.S., Morya V., Rawal R. (2016). Assessment of genetic diversity of soybean genotypes differing in resistance against yellow mosaic virus using simple sequence repeat markers. *Legume Research*. **39**:674-681	6.15
728	Reeti G., Sharma S., Mohammed J. (2016). Influence of Growing Environment on Antinutrients/ Bioactive Compounds in Soybean, *Glycine max* (L.) Merill Genotypes. *Proceedings of the National Academy of Sciences India Section B - Biological Sciences*. **86**: 343-349	5.00
729	Saluja M., Kaur S., Sharma P., Bains N.S., Chhuneja P. (2016). Evaluation of molecular diversity in stripe rust samples using EST-derived SSR markers. *Indian Phytopathology*. **69**: 368-372	5.90
730	Sandhu D., Atkinson T., Noll A., Johnson C., Espinosa K., Boelter J., Abel S., Dhatt B.K., Barta T., Singsaas E., Sepsenwol S., Goggi A.S., Palmer R.G. (2016). Soybean proteins GmTic110 and GmPsbP are crucial for chloroplast development and function. *Plant Science*. **252**: 76-87	9.36
731	Sandhu J.S., Kaur M., Kaur A., Kalia A. (2016). Single step direct transgenic plant regeneration from adventive embryos of agro-infected sugarcane (*Saccharum* spp.) spindle leaf roll segments with assured genetic fidelity. *Plant Cell, Tissue and Organ Culture*. **125**: 149-162	8.39
732	Sandhu S.K., Dhaliwal L.K., Pannu P.P.S. (2016). Role of microclimate in management of yellow rust (*Puccinia striformis* f sp tritici) of wheat (*Triticumaestivum*) under Ludhiana conditions. *Indian Journal of Agricultural Sciences*.**86**: 930-934	6.17
733	Sandhu S.S., Prabhjyot-Kaur, Tripathi P., Patel S.R., Prasad R., Solanki N.S., Kumar R., Singh C.B., Dubey A.P., Rao V.U.M. (2016). Effect of intra-seasonal temperature on wheat at different locations of India: A study using ceres-wheat model. *Journal of Agrometeorology*. **18**: 222-233	6.36
734	Sangha G.K., Kalra S. (2016). Evaluation of oxidative stress in rats (*Rattus rattus*) inhabiting Bathinda region of Punjab, India. *Indian Journal of Animal Research*.**50**: 168-174	6.09
735	Sarao P.S., Bentur J.S. (2016). Antixenosis and Tolerance of Rice Genotypes Against Brown Planthopper. *Rice Science*. **23**: 96-103	5.33
736	Sarao P.S., Sahi G.K., Neelam K., Mangat G.S., Patra B.C., Singh K. (2016). Donors for Resistance to Brown Planthopper *Nilaparvata lugens* (Stål) from Wild Rice Species. *Rice Science*. **23**: 219-224	5.33
737	Sekhon B.S., Bhumbla D.K. (2016). Using soil survey data for modeling phosphorus sorption capacity. *Environmental Earth Sciences*. 75: 638	6.00
738	Sethi R., Kaur N. (2016). Role of ethylene in germination and seedling growth of little seed canary grass (*Phalaris minor* Retz.). *Indian Journal of Plant Physiology*.**21**: 345-349	5.18

739	Sethi S., Saini J.S., Mohan A., Brar N.K., Verma S., Sarao N.K., Gill K.S. (2016). Comparative and evolutionary analysis of α-amylase gene across monocots and dicots. *Functional and Integrative Genomics*. **16**: 545-555	8.27
740	Sethi V.P., Kumar A. (2016). Design and installation of pot-based indigenous hybrid hydroponics technology with water and nutrient recirculation system for commercial greenhouse vegetable production: *AMA, Agricultural Mechanization in Asia, Africa and Latin America*. **47**: 160-168	6.06
741	Sethi V.P., Kumar A., Dhatt A.S., Sidhu M.K. (2016). Experimental and economic evaluation of pot-based indigenous hybrid hydroponics technology with water and nutrient recirculation system for commercial greenhouse vegetable production: *AMA, Agricultural Mechanization in Asia, Africa and Latin America*. **47**: 169-174	6.06
742	Sharma A., Singh S., Utreja D. (2016). Recent advances in synthesis and antifungal activity of 1,3,5-triazines. *Current Organic Synthesis*. **13**:484-503	8.05
743	Sharma B.D., Choudhary O.P., Chanay J.K., Singh P.K. (2016). Forms and Uptake of Manganese in Relation to Soil Taxonomic Orders in Alluvial Soils of Punjab, India. *Communications in Soil Science and Plant Analysis*. **47**:313-327	6.53
744	Sharma B.D., Raj-Kumar, Manchanda J.S., Dhaliwal S.S., Thind H.S., Yadvinder-Singh (2016). Mapping of Chemical Characteristics and Fertility Status of Intensively Cultivated Soils of Punjab, India. *Communications in Soil Science and Plant Analysis*. **47**: 1813-1827.	6.53
745	Sharma K.K., Shukla V.R., Patel A.R., Vaghela K.M., Patel H.K., Shah P.G., Banerjee H., Banerjee T., Hudait R.K., Sharma D., Sahoo S.K., Singh B., Tripathy V. (2016). Multilocation field trials for risk assessment of a combination fungicide Fluopicolide + Propamocarb in tomato. *Environmental Monitoring and Assessment*.**188**: 604	7.63
746	Sharma M., Kaur S., Saluja M., Chhuneja P. (2016). Mapping and characterization of powdery mildew resistance gene in synthetic wheat. *Czech Journal of Genetics and Plant Breeding*.**52**: 120-123	6.48
747	Sharma P., Sardana V. (2016). Evaluating morpho-physiological and quality traits to compliment seed yield under changing climatic conditions in Brassicas. *Journal of Environmental Biology*. **37**: 493-502	6.53
748	Sharma P., Utreja D., Bedi S. (2016). Chemical transformations and biological studies of terpenoids isolated from essential oil of *Cyperus scariosus*. *Asian Journal of Chemistry*. **28**: 2153-2158	5.00
749	Sharma R., Chauhan S.K., Tripathi A.M. (2016). Carbon sequestration potential in agroforestry system in India: an analysis for carbon project. *Agroforestry Systems*.**90**: 631-644	6.91
750	Sharma S and Aggarwal N (2016). Natural parasitism of lepidopteran insect pests in organic and conventionally managed *basmati* rice in Punjab. *Vegetos***29:** 26-29.	5.00
751	Sharma S, Singh H and Thakur A (2016). Quality improvement in plum though CPPU and potasium in the North-West Plains of India. *The Bioscan* **11:** 623-626.	5.26
752	Sharma S., Gupta R., Singh D. (2016). Variation in Selenium Tolerance, Accumulation, and Growth Parameters of Different Wheat Cultivars. *Communications in Soil Science and Plant Analysis*. **47**: 203-212	6.53
753	Sharma S., Khanna P.K., Kapoor S. (2016). Optimised isolation of polysaccharides from Lentinula edodes strain NCBI JX915793 using response surface methodology and their antibacterial activities. *Natural Product Research*. **30**: 616-621	7.06
754	Sharma S., Shera P.S., Kaur R., Sangha K.S. (2016). Standardization of egg dosages for mass production of *Corcyra cephalonica* (Stainton). *Phytoparasitica*.**44**: 459-464	7.03
755	Shende D., Sidhu G.K. (2016). Response surface methodology to optimize enzyme-assisted aqueous extraction of maize germ oil. *Journal of Food Science and Technology*. **53**: 3282-3295	7.24
756	Sheoran P., Sardana V., Singh S., Kumar A., Mann A., Sharma P. (2016). Agronomic and physiological assessment of nitrogen use, uptake and acquisition in sunflower. *International Journal of Plant Production*. **10**: 109-122	7.07

757	Sheoran P., Singh S., Bawa S.S., Sardana V., Kumar A., Rajkumar R., Bhushan B., Dheri G.S. (2016). Assessing long term impact of nutrient management and rainfall variability on the agroecological resilience of maize (*Zea mays*) - Wheat (*Triticum aestivum*) system in NW India. *Indian Journal of Agricultural Sciences*.**86**: 113-119	6.17
758	Shera P S and Arora R (2016). Effect of cotton fruiting bodies on the growth and development of spotted bollworm (*Earias vittella)*. *Ind J Pl Protect* **44:** 304-309.	5.07
759	Shera P.S., Arora R. (2016). Comparative study on oviposition and larval preference of spotted bollworm, *Earias vittella* on Bt and non-Bt cotton. *Journal of Environmental Biology*. **37**:121-127	6.53
760	Shera P.S., Arora R. (2016). Impact of transgenic Bt cotton on nutritional indices of spotted bollworm, *Earias vittella* (Fabricius) (Lepidoptera: Nolidae). *Phytoparasitica*. **44**: 447-457	7.03
761	Shera P.S., Arora R. (2016). Survival and development of spotted bollworm, *Earias vittella* (Fabricius) (Lepidoptera: Nolidae) on different transgenic Bt and isogenic non-Bt cotton genotypes. *Phytoparasitica*. **44**: 99-113	7.03
762	Sidhu G K, Kaur P and Singh M (2016). Retention of bioactive compounds in fresh fenugreek leaves during storage under modified atmosphere packaging. *Nutr and Food Sci* **46:** 529-541.	5.26
763	Sikka R., Nayyar V.K. (2016). Monitoring of Lead (Pb) Pollution in Soils and Plants Irrigated with Untreated Sewage Water in Some Industrialized Cities of Punjab, India. *Bulletin of Environmental Contamination and Toxicology*. **96**: 443-448	7.19
764	Sikka R., Singh D., Deol J.S., Kaur J. (2016). Productivity enhancement of soybean as influenced by integerated nutrient and other agronomic interventions in sub - Humid Punjab, India. *Legume Research*. **39**: 768-773	6.15
765	Singh A, Bains K and Aggarwal R (2016). Impact of nutrition education to rural women for prevention of iron deficiency anemia through dietary approach. *Ind J Ext Edu***52:** 71-78.	5.32
766	Singh A., Bains K., Kaur H. (2016). Effect of inclusion of key foods on in vitro iron bioaccessibility in composite meals. *Journal of Food Science and Technology*.**53**: 2033-2039	7.24
767	Singh A., Bains K., Kaur H. (2016). Relationship of dietary factors with dialyzable iron and in vitro iron bioavailability in the meals of farm women. *Journal of Food Science and Technology*. **53**: 2001-2008	7.24
768	Singh A., Kathuria L.M. (2016). Understanding drivers of branded food choice among low-income consumers. *Food Quality and Preference*. **52**: 52-61	9.69
769	Singh B., Singh P., Gill R.I.S. (2016). Seasonal variation in biomass and nitrogen content of fine roots of bead tree (*Melia azedarach*) under different nutrient levels in an agroforestry system. *Range Management and Agroforestry*. **37**: 192-200	6.39
770	Singh B, Singh V, Singh Y, Kumar A, Singh J, Vashistha M, Thind H S and Gupta R K (2016). Fertilizer nitrogen management in irrigated transplanted rice using dynamic threshold greenness of leaves. Agri Res52: 174-181.	5.90
771	Singh B., Singh V. (2016). Laboratory and field studies demonstrating the insecticidal potential of diatomaceous earth against wheat aphids in rice-wheat cropping system of Punjab (India). *Cereal Research Communications*. **44**: 435-443	6.53
772	Singh D, Gill M I S and Arora N K (2016). Morphological characterization of promising guava (*Psidium guajava* L.) varieties under sub-tropical humid conditions of North India. *The Bioscan***11:** 681-685.	5.26
773	Singh D., Dudi B.S., Meena O.P., Dhankhar S.K. (2016). Determination of genetic relationships among different agro-morphological traits in okra genotypes. *International Journal of Agricultural and Statistical Sciences*. **12**: 245-253	5.13
774	Singh D., Singh N.P., Dhillon W.S., Gill P.P.S. (2016). Improvement in production and fruit quality of semi-soft pear by girdling. *Indian Journal of Horticulture*.**73**: 339-343	6.13

775	Singh G, Kaur H and Khanna V (2016). Integration of pre- and post-emergence herbicides for weed management in pigeonpea. *Ind J Weed Sci***48:** 336-338.	5.17
776	Singh G., Ram H., Aggarwal N., Turner N.C. (2016). Irrigation of chickpea (cicer arietinum l.) Increases yield but not water productivity. *Experimental Agriculture*.**52**:11-13	6.97
777	Singh J., Brar B.S., Sekhon B.S., Mavi M.S., Singh G., Kaur G. (2016). Impact of long-term phosphorous fertilization on Olsen-P and grain yields in maize–wheat cropping sequence. *Nutrient Cycling in Agroecosystems*. **106**: 157-168	7.49
778	Singh J., Hadda M.S. (2016). Physiological Growth Indices of Maize Under Semi-Arid Irrigated Conditions as Influenced by Subsoil Compaction and Nitrogen Fertilization. *Proceedings of the National Academy of Sciences India Section B - Biological Sciences*. **86**: 847-855	5.00
779	Singh J.P., Kaur A., Shevkani K., Singh N., Singh B. (2016). Physicochemical characterisation of corn extrudates prepared with varying levels of beetroot (*Beta vulgaris*) at different extrusion temperatures. *International Journal of Food Science and Technology*. **51**: 911-919	7.50
780	Singh K., Kaur T., Bhullar M.S., Brar A.S. (2016). The Critical period for weed control in spring maize in North-West India. *Maydica*. **61**: 1-7	6.48
781	Singh K., Sharma R., Chauhan S.K., Singh N.B. (2016). Evaluation and selection of salix clones for different end uses under punjab conditions. *Range Management and Agroforestry*. **37**: 88-92	6.39
782	Singh M., Bhardwaj C., Singh S., Panatu S., Chaturvedi S.K., Rana J.C., Rizvi A.H., Kumar N., Sarker A. (2016). Chickpea genetic resources and its utilization in India: Current status and future prospects. *Indian Journal of Genetics and Plant Breeding*. **76**: 515-529	6.28
783	Singh M., Mahal J.S., Sidhu H.S., Manes G.S., Jat M.L., Singh Y. (2016). Development and feasibility of innovative relay seeders for seeding wheat into standing cotton using a high clearance tractor in cotton-wheat system. *Applied Engineering in Agriculture*. **32**: 341-352	6.43
784	Singh M., Vashist K.K. (2016). Enhancing productivity of spring maize (*Zea mays*) through planting methods, varieties and irrigation levels in Punjab. *Indian Journal of Agronomy*. **61**: 348-353	5.46
785	Singh N., Bhardwaj R.D. (2016). Ascorbic acid alleviates water deficit induced growth inhibition in wheat seedlings by modulating levels of endogenous antioxidants. *Biologia(Poland)*. **71**: 402-413	6.72
786	Singh P., Singh B. (2016). Biomass and nitrogen dynamics of fine roots of poplar under differential N and P levels in an agroforestry system in Punjab. *Tropical Ecology*. **57**: 143-152	7.17
787	Singh R., Bassi G. ((2016)). Response of bitter gourd (*Momordica charantia*) seed to seed priming treatments under sub-optimal environments. *Indian Journal of Agricultural Sciences*. **86**: 935-939	6.17
788	Singh S, Arora N K, Gill M I S and Gill K S (2016). Pre-harvest application of abscisic acid improves the fruit quality of Flame Seedless grapes (Vitis vinifera L.). *The Bioscan***11:** 1351-1354.	5.26
789	Singh S., Aulakh P.S., Gill P.P.S. (2016). Seasonal variation in leaf nutrient concentration of grapefruit. *Indian Journal of Horticulture*. **73**: 42-47	6.13
790	Singh S., Dubey R.K., Kukal S.S. (2016). Nitrogen Supplemented Cocopeat-Based Organic Wastes as Potting Media Mixtures for the Growth and Flowering of Chrysanthemum. *Communications in Soil Science and Plant Analysis*. **47**: 1856-1865	6.53
791	Singh S., Kaur G., Gupta M., Banga S., Banga S.S. (2016). Genomic affinities between *Brassica napus* and *Raphanus raphanistrum* as revealed by meiotic GISH. *Plant Breeding*. **135**: 459-465	7.50
792	Sondal J., Singh D., Sikka R. (2016). Comparative evaluation of arsenate sorption–desorption in two soils of North India. *Environmental Earth Sciences*.**75**:249	6.00
793	Srivastava A., Srivastava P., Sharma A., Sarlach R.S., Bains N.S. (2016). Evaluation of RIL population derived from traditional and modern cultivar of wheat (C 518/2 PBW 343) for yield potential under drought stress conditions. *Vegetos*. **29**: 89-94	5.00

794	Suri K S and Makkar G S (2016). Efficacy assessment of fipronil 0.6% GR against rice stem borer and leaf folder. *J Exp Zool India***19:** 857-861.	7.23
795	Suryavanshi P., Buttar G.S., Brar A.S. (2016). Effect of osmoprotectants on performance of wheat (*Triticum aestivum*) under terminal heat stress condition of North-West India. *Indian Journal of Agricultural Sciences*. **86**:1037-1042	6.17
796	Tan M.K., Raman H., Chambers G., Sharma I., Chen Z., Deshpande N., Wilkins M.R. (2016). Characterization of SNP and structural variations in the mitochondrial genomes of *Tilletia indica* and its closely related species formed basis for a simple diagnostic assay. PLoS ONE. **11**:166086	9.06
797	Thakur T and Dhatt K K (2016). Study on correlation and phenotypic stability of gladiolus genotypes. *The Bioscan***11:** 959-963.	5.26
798	Toor P.I., Kaur S., Bansal M., Yadav B., Chhuneja P. (2016). Mapping of stripe rust resistance gene in an *Aegilops caudata* introgression line in wheat and its genetic association with leaf rust resistance. *Journal of Genetics*. **95**: 933-938	7.11
799	Tyagi M and Singh H(2016). Evaluation of growth and yield of papaya cultivars under protected conditions in North Indian plains.*The Bioscan* **11:** 2435-2438.	5.26
800	Uppal S.K., Kaur R., Yuvraj, Chandni, Kaur P., Dhir C. (2016). Evaluation of potential of sweet sorghum bagasse for production of value-added chemicals: 5-Hydroxymethyl furfural and its derivatives. *Indian Journal of Chemical Technology*. **23**: 412-418	6.49
801	Vashisht A.K., Aggarwa R. (2016). Performance of cotton mat as pre-filtration unit for groundwater recharging. *Current Science*. **111**: 1591-1595	6.97
802	Vashisht A.K., Shakya S.K. (2016). Development of semi-analytical solution for recharging through multiple well points system under constant head conditions. *ISH Journal of Hydraulic Engineering*. **22**: 150-158	7.28
803	Velu G., Crossa J., Singh R.P., Hao Y., Dreisigacker S., Perez-Rodriguez P., Joshi A.K., Chatrath R., Gupta V., Balasubramaniam A., Tiwari C., Mishra V.K., Sohu V.S., Mavi G.S. (2016). Genomic prediction for grain zinc and iron concentrations in spring wheat. *Theoretical and Applied Genetics*. **129**: 1595-1605	9.90
804	Verma N., Grewal N., Bains S. (2016). Evaluation of comfort and handle behavior of mulberry silk waste/wool blended fabrics for end use. *Journal of Natural Fibers*. **13**: 277-288	6.58
805	Virdi R., Mavi G.S., Bala R., Sohu V.S., Bains N.S., Kaur D.J., Sharma I. (2016). Genetic characterization of resistance to stripe rust, leaf rust, Karnal bunt and cereal cyst nematode in a multiple disease resistant wheat stock W8627. *Indian Journal of Genetics and Plant Breeding*. **76**: 140-146	6.28
806	Yadav A., Dhaliwal M.S., Jindal S.K. (2016). Genetic diversity analysis of indigenous and exotic chilli genotypes. *Indian Journal of Horticulture*. **73**:154-159	6.13
807	Yadav I.S., Sharma A., Kaur S., Nahar N., Bhardwaj S.C., Sharma T.R., Chhuneja P. (2016). Comparative temporal transcriptome profiling of wheat near isogenic line carrying Lr57 under compatible and incompatible interactions. *Frontiers in Plant Science*. 7: 1943	10.49
808	You M.P., Uloth M.B., Li X.X., Banga S.S., Banga S.K., Barbetti M.J. (2016). Valuable new resistances ensure improved management of Sclerotinia stem rot (*Sclerotinia sclerotiorum*) in Horticultural and Oilseed Brassica Species. *Journal of Phytopathology*. **164**: 291-299	6.95
809	Yousuf B., Gul K., Wani A.A., Singh P. (2016). Health benefits of anthocyanins and their encapsulation for potential use in food systems: A Review. *Critical Reviews in Food Science and Nutrition*. **56**: 2223-2230	11.49

2017		
810	Aggarwal P and Kaur S (2017). Technology development for the preparation, concentration and utilization of rose extract in different valuable products and by products with retention of color and flavor. *The Pharma Innvo J***6:** 189-193.	5.03
811	Ahmed S, Rattanpal H S, Ahmad E and Singh G (2017). Influence of storage duration and storage temperature on *in-vitro* pollen viability of citrus species. *Chem Sci Rev Lett***6:** 1841-1849.	5.21
812	Alam M S, Sandhya, Bhatia S and Kaur K (2017). Effect of physical processing on quality of flour and cookies from de-oiled rice bran. *Agril Engg Today***41:** 35-43.	5.30
813	Ali S., Singh B., Sharma S. (2017). Development of high-quality weaning food based on maize and chickpea by twin-screw extrusion process for low-income populations. *Journal of Food Process Engineering*. **40**: e12500	7.37
814	An R., Suri K.S., Jurat-Fuentes J.L., Grewal P.S. (2017). Dynamics of transcriptomic response to infection by the nematode *Heterorhabditis bacteriophora* and its bacterial symbiont *Photorhabdus temperata* in *Heliothis virescens* larvae. *Insect Molecular Biology*. **26**: 584-600	8.84
815	Arora S and Sukhmani (2017). A study of job constraints for female employees in banking sector of Ludhiana city. *Int J Edu Manag Studies* **7:** 493-497	4.79
816	Arora S., Singh N., Kaur S., Bains N.S., Uauy C., Poland J., Chhuneja P. (2017). Genome-wide association study of grain architecture in wild wheat *aegilopstauschii*. *Frontiers in Plant Science*. **8**: 886	10.30
817	Arya S, Hooda R S, Arya V S, Lohan S K, Saimbhi V Sand Singh K (2017). Use of satellite data for energy generation from forest biomass in Haryana state. *J Agrometeorol* **9:** 179-186.	6.36
818	Asthir B., Jain D., Kaur B., Bains N.S. (2017). Effect of nitrogen on starch and protein content in grain influence of nitrogen doses on grain starch and protein accumulation in diversified wheat genotypes. *Journal of Environmental Biology*. **38**: 427-433	6.70
819	Asthir B and Tak Y (2017). Fluoride induced changes in carbon and nitrogen metabolism in two contrasting cultivars of *Triticum aestivum* L. *Fluoride* **50:** 334-342.	6.80
820	Asthir B., Kumari M. (2017). Modulation of antioxidant defense system and polyamine catabolism in rice leaves under two planting conditions. *Cereal Research Communications*. **45**:157-167	6.50
821	Aujla I.S., Paulitz T.C. (2017). An improved method for establishing accurate water potential levels at different temperatures in growth media. *Frontiers in Microbiology*. **8**: 1497	10.08
822	Aulakh M.S., Garg A.K., Manchanda J.S., Dercon G., Nguyen M.-L. (2017). Biological nitrogen fixation by soybean and fate of applied 15N-fertilizer in succeeding wheat under conventional tillage and conservation agriculture practices. *Nutrient Cycling in Agroecosystems*. **107**: 179-189	7.84
823	Aujla I S and Paulitz T C (2017). An improved method for establishing accurate water potential levels at different temperatures in growth media. *Front Microbiol* **8:** 1497.	10.16
824	Badgujar C M, Dhingra H S, Mannes G S and Khurana R (2017). Development and evaluation of inclined plate metering mechanism for soaked okra (*Abelmoschus esculentus*) seeds. *Int J Curr Microbiol Appl Sci***6:** 3948-3961.	5.38
825	Bains T S, Gill R K, Singh S and Singh I (2017). Variety SML1115. *Ind J Genet***77:** 326	6.28
826	Bala P, Gill T S, Bains A S and Kaur H (2017). Ion-acoustic dressed solitary structures in two component plasma with Tsallis-nonthermal velocity distribution of electrons. Ind J Phys 91: 1625-1634.	6.96
827	Bala M (2017). Weed management effect on vegetative growth and flowering parameters of chrysanthemum. Ind J Weed Sci49: 303-305	5.17

828	Balram N, Bhattacharyya U K, Sharma A, Kumar P, Raheja S, Arora R, Kumar A, Palchoudhury S, Monga D and Biswas K K (2017). Current distribution and severity of leaf curl Begomovirus disease in cotton growing areas of North West India. *J Mycol Plant Pathol***47**: 259-272.	5.79
829	Bansal M., Kaur S., Dhaliwal H.S., Bains N.S., Bariana H.S., Chhuneja P., Bansal U.K. (2017). Mapping of *Aegilops umbellulata* derived leaf rust and stripe rust resistance loci in wheat. *Plant Pathology*. **66**: 138-144	8.43
830	Bathla S and Grover K (2017). Impact of double fortified salt (DFS) supplementation on the nutritional profile: Anemic adolescent girls. *Chem Sci Rev Lett***6:** 1630-1637	5.21
831	Batra N, Kaur K, Kaur H and Singh B (2017). Status of defensive enzymes and contents of total phenols, tannins and nutrients determine aphid resistance in barley. *Proc Natl Acad Sci, India, Sect B Biol Sci* DOI: 10.1007/s40011-017-0899-z.	5.00
832	Benbi D K, Thind H S, Sharma S, Brar K and Toor A S (2017). Bagasse ash application stimulates agricultural soil C sequestration without inhibiting soil enzyme activity. *Comm Soil Sci Plant Anal* **48:** 1822-1833.	6.53
833	Bhardwaj U., Chahal K.K., Dhillon N.K., Kaur R. (2017). Nematicidal activity of vetiver essential oil and its fractions against *Meloidogyne incognita*. *Indian Journal of Nematology*. **47**: 143-150	5.03
834	Bhatia D, Joshi S, Das A, Vikal Y, Sahi G K, Neelam K, Kaur K and Singh K (2017). Introgression of yield component traits in rice (*Oryza sativa*s sp *indica*) through inter-specific hybridization. *Crop Sci* **57:** 1-17	7.55
835	Bhatia S, Kaur R and Kaur P (2017). Packaging influences anti-oxidants and anti-oxidative enzyme activities of tomato during storage under refrigerated conditions. *Chem Sci Rev Lett***6:** 1998-2007.	5.21
836	Bhatt R., Kukal S.S. (2017). Tillage and establishment method impacts on land and irrigation water productivity of wheat-rice system in north-west India. *Experimental Agriculture*. **53**: 178-201	7.07
837	Bhatt T D, Bector V, Singh M and Singh D (2017). Development of tractor operated real time measuring system for mapping of spatial variation in soil pH. *J Agril Engg* 35-44.	5.59
838	Bhatt T D, Bector V, Singh M and Singh D (2017). Performance evaluation of real-time soil pH measuring system in different tillage conditions. *Agri Engg Today***41:** 26-31.	5.30
839	Bhoi P B, Singh J and Sachdeva J (2017). Farm specific technical efficiency in paddy production and its determinants. *Ind J Eco Dev* **13:** 493-494.	4.82
840	Bhoi P, Singh J and Kumar S (2017). Farm-size profitability relations in wheat cultivation in Punjab. *Ind J Eco Dev***13:** 305-314.	4.82
841	Bhullar H S and Gill R S (2017). Food consumption and utilization indices of *Spodoptera litura* (Fabricius) on different Bt cotton cultivars. *J Insect Sci***30:** 120-125.	6.65
842	Bijay-Singh, Varinderpal-Singh, Yadvinder-Singh, Thind H.S., Kumar A., Choudhary O.P., Gupta R.K., Vashistha M. (2017). Site-Specific Fertilizer Nitrogen Management Using Optical Sensor in Irrigated Wheat in the Northwestern India. *Agricultural Research*. **6**: 159-168	5.90
843	Bindra S and Paul S (2017). Genetic variability and association studies in linseed (*Linum usitatissimum*L). *The Bioscan***11:** 1855-1859.	5.26
844	Bindra S, Mittal R K, Sood V K and Chaudhary H K (2017). Genetic analysis of various quantitative traits in inter-varietal crosses of *Vigna mungo*. *Legume Res***40:** 795-802.	6.15
845	Brar A, Gosal S K and Walia S S (2017). Effect of biofertilizer and farmyard manure on microbial dynamics and soil health in maize (*Zea mays* L.) rhizosphere. *Chem Sci Rev Lett***6:** 1524-1529.	5.21
846	Brar H S and Bhullar M S (2017) Growth, yield and water productivity of dry direct seeded rice in relation to sowing date, variety and weed control. *App Biol Res***19**: 180-186	5.07

847	Brar I S, Dixit A K, Khurana R and Gautam A (2017). Studies on physical properties of maize (*Zea mays* L.) seeds. *Int J Curr Micro Appl Sci***6:** 963-970.	5.38
848	Brar R.S., Gill R.S., Lore J.S., Khanna R. (2017). Molecular screening of hybrid rice parental lines for bacterial blight resistance genes. *Indian Phytopathology*. **70**: 282-286	5.90
849	Brar J S, Gill K S, Arora N K, Gill MIS and Kaur T (2017). Weed management in guava orchards. Ind J Weed Sci49: 374-377.	5.17
850	Brar J S, Gill K S, Kaur T, Arora N K, Gill M I S and Kaur G (2017). Soil temperature and horticultural traits as influenced by different types of mulching materials in guava orchard. *J Agrometeorol***19:** 318-323	6.36
851	Brar T S and Sharma S (2017). Influence of temperature and carbon dioxide levels on growth and development of *Spodoptera litura* Fabriciuson cauliflower. *J Agrometeorol* **19:** 306-311	6.36
852	Buttar D.S., Singh P. (2017). Cotton leaf curl virus disease (CLCuVD) predictive model based on environmental variables. *Indian Journal of Agricultural Sciences*. **87**: 681-684	6.22
853	Buttar G.S., Thind H.S., Sekhon K.S., Kaur A., Gill R.S., Sidhu B.S., Aujla M.S. (2017). Management of saline-sodic water in cotton-wheat cropping system. *Journal of Agricultural Science and Technology*. **19**: 465-474	6.81
854	Chahal K K, Dhaiwal K, Kumar A, Kataria D and Singla N (2017). Chemical composition of *Trachyspermum ammi* L. and its biological properties: A review. *J Pharmacogn Phytochem* **6:** 131-140.	5.21
855	Chahal K K, Monika, Kumar A, Bhardwaj U and Kaur R (2017). Chemistry and biological activities of *Anethum graveolens* L. (dill) essential oil: A review. *J Pharmacogn Phytochem* **6:** 295-306.	5.21
856	Chahal S.S., Choudhary O.P., Mavi M.S. (2017). Organic amendments decomposability influences microbial activity in saline soils. *Archives of Agronomy and Soil Science*. **63**: 1875-1888	8.14
857	Chahal T.S., Singh N. (2017). Studies on fruit growth and development in Daisy tangerine. *Indian Journal of Horticulture*. **74**: 27-32	6.15
858	Chandi A K and Kaur A (2017). Impact of different insecticides on locomotory behaviour of Plutella xylostella (Linnaeus). Int J Curr Microbiol App Sci6: 47-54.	5.90
859	Chandi A.K., Singh G. (2017). Locomotory behaviour of susceptible and resistant *Plutella xylostella* (Linnaeus (Lepidoptera: Plutellidae). *Phytoparasitica* **45**: 541-548	6.88
860	Chandi R S, Kumar V and Bhullar H S (2017). Pyriproxyfen - An IGR for the management of whitefly, *Bemisia tabaci* (Gennadius) on chilli. *Ind J Entomol* **79:** 406-410.	5.89
861	Chandel S, Hadda M S, Vaidya Pratima and Mahal A K (2017). Performance evaluation of different runoff estimation methods in North-Western tract of India.Int J Curr Microbiolbiol App Sci 6: 649-662.	5.38
862	Changan S., Chaudhary D.P., Kumar S., Kumar B., Kaul J., Guleria S., Jat S.L., Singode A., Tufchi M., Langyan S., Yadav O.P. (2017). Biochemical characterization of elite maize (*Zea mays*) germplasm for carotenoids composition. *Indian Journal of Agricultural Sciences*. 87: 146-150	6.22
863	Chana B and Kumar R (2017). Synthesis and properties of cupric sulphate doped polyvinyal pryrroliode (PVP) solution. *J Marcomol Sci Part B* **56:** 863-872	6.83
864	Chaudhary N and Dhatt K K (2017). Varietal response of gladiolus to planting time for off season flower production. *The Bioscan***12:** 1975-1980.	5.26
865	Chaudhary S., Dheri G.S., Brar B.S. (2017). Long-term effects of NPK fertilizers and organic manures on carbon stabilization and management index under rice-wheat cropping system. *Soil and Tillage Research*. **166**: 59-66	9.40
866	Chavan P., Sharma S.R., Mittal T.C., Mahajan G., Gupta S.K. (2017). Optimization of Parboiling Parameters to Improve the Quality Characteristics of Pusa basmati 1509. *Journal of Food Process Engineering*. **40**: e12454	7.37

867	Choudhary O P (2017). Long term impact of cyclic use of sodic and canal waters for irrigation on soil properties and crop yields in cotton-wheat rotation in a semi-arid climate. *Agric Res* **6:** 267-272.	5.90
868	Chouksey H, Sardana V and Sharma P (2017). Variability in Indian mustard (*Brassica juncea*) genotypes in response to applied phosphorus. *Ind J Agron* **62:** 374-377.	5.46
869	Dar E.A., Brar A.S., Mishra S.K., Singh K.B. (2017). Simulating response of wheat to timing and depth of irrigation water in drip irrigation system using CERES-Wheat model. *Field Crops Research*. **214**:149-163	9.05
870	Dar E.A., Brar A.S., Singh K.B. (2017). Water use and productivity of drip irrigated wheat under variable climatic and soil moisture regimes in North-West, India. *Agriculture, Ecosystems and Environment*. **248**: 9-19	10.10
871	Dar E A, Yousuf A, and Brar A S (2017). Comparison and evaluation of selected evapotranspiration models for Ludhiana district of Punjab. *J Agrometeorol***19**: 274-276	6.40
872	Dar M.U.D., Aggarwal R., Kaur S. (2017). Effect of climate change scenarios on yield and water balance components in rice-wheat cropping system in central Punjab, India. *Journal of Agrometeorology*. **19**: 226-229	6.40
873	Deldan N., Rajan A., Hans V.S., Kaushal A. (2017). Evaluation of thermal performance of single pass earth–air heat exchanger in heating mode. *Environmental Progress and Sustainable Energy*. **36**: 1253-1261	7.67
874	Deosi H K (2017). *Varroa* destructor Anderson and Truman in *Apismellifera* Linnaeus colonies-morphometry of the mite and its developmental stages. *J Exp Zool***20:** 223-226.	5.51
875	Deosi H K (2017).Varroa destructor Anderson and Trueman in *Apis mellifera*Linnaeus colonies - morphometry of mite and its development stages. *J Exp Zool India***20**: 223-226.	5.51
876	Deosi H K and Chhuneja P K (2017). Control strategies for *Varroa* destructor intensity in the worker brood of *Apismellifera* colonies under Punjab conditions. *J Exp Zool***20:** 93-95.	5.51
877	Deosi H K and Chhuneja P K (2017). Preferred site of oviposition by Varroa destructor Anderson and Trueman in *Apis mellifera* Linnaeus worker brood. *J Exp Zool India***20:** 123-127.	5.51
878	Deosi H K and Chhuneja P K (2017). Some morphometric effects of *Varroa destructor* Anderson and Trueman on *Apis mellifera* Linnaeus adult workers. *J Exp Zool India***20:** 151-152.	5.51
879	Deosi H K and Chhuneja P K (2017). *Varroa* destructor Anderson and Trueman in *Apismellifera* Linnaeus colonies - development of mite. *J Exp Zool***20:** 67-70.	5.51
880	Devenda S K, Singh K, Singh D and Kaur P (2017). Screening of basmati rice varieties for their arsenic accumulation in Punjab, North-West India. *Comm Soil Sci Plant Anal***48:** 2381-2389.	6.53
881	Devi C B, Bains K, Kaur H and Sangha M K (2017). Comparison of ascorbic acid, beta carotene, chlorophyll and antioxidant activity of fresh and dry wheatgrass (*Triticum aestivum L*). *App Biol Res***19:** 336-341.	5.07
882	Devi I, Singh H and Thakur A (2017). Embryo rescue of low chill peach hybrids as affected by embryo age and growth regulators. *TheBioscan***12:** 499-503.	5.26
883	Devi I., Singh H., Thakur A. (2017). Effect of developmental stage and medium on embryo culture of low chill peach hybrids. *Current Science*. **113**: 1771-1775	6.84
884	Devi K, Joshi N and Sodhi H S (2017). UV-B radiation tolerance in the conidia of *Beauveria bassiana* (Balsamo) Vuillemin. *J Mycol Plant Patho***l47:** 441-446.	5.79
885	Dhaiwal K., Chahal K.K., Kataria D., Kumar A. (2017). Gas chromatography-mass spectrometry analysis and in vitro antioxidant potential of ajwain seed (*Trachyspermum ammi* L.) essential oil and its extracts. *Journal of Food Biochemistry*. **41**: e12364	7.00

886	Dhaliwal A.K., Brar D.S., Jindal J. (2017). Evaluation of different IPM components for the management of maize stem borer, *Chilo partellus* (Swinhoe) in Kharif maize. *Journal of Entomological Research*. **41**: 287-291	5.05
887	Dhanjal S, Gosal S K and Gill R I S (2017). Synergistic effect of biofertilizers and inorganic fertilizers on soil microbial activities in rhizospheric soil of *Eucalyptus*. *Chem Sci Rev Lett* **6:** 2342-2349	5.21
888	Dhawan M., Joshi N. (2017). Enzymatic comparison and mortality of *Beauveria bassiana* against cabbage caterpillar *Pieris brassicae* LINN. *Brazilian Journal of Microbiology*. **48**: 522-529	7.09
889	Dhillon B.S., Sharma P.K., Kingra P.K. (2017). Agronomic measures to improve thermal energy utilization by spring sunflower (*Helianthus annuus* L.). *Journal of Agrometeorology*. **19**: 134-138	6.40
890	Dhillon W S, Mahajan B V C, Gill P P S, Tandon R and Kumar M (2017). Shelf-life extension of pear with coatings under ambient and super market conditions. *Ind J Hort***74:** 429-435.	6.13
891	Dogra R, Dogra B, Gupta P K, Sharma B D and Kumar A (2017). Effect of spade angle and spading frequency of spading machine on specific soil resistance and pulverization. *CIGR J* **19:** 65-73.	6.10
892	Dua K and Kocher G S (2017). Enrichment and characterization of limonin degrading microorganisms isolated from kinnow orchard soil, peel and waste site. *App Biol Res***19:** 187-196.	6.66
893	Fiene J G, Mallick S, Mittal A, Nansen C, Kalns L, Dever J, Sword G A and Rock C D (2017). Characterization of transgenic cotton (*Gossypium hirsutum* L.) over-expressing *Arabidopsis thaliana* related to ABA-Insensitive3 (ABI3)/Vivparous1 (AtRAV1) and AtABI5 transcription factors: Improved water use efficiency through altered guard cell physiology. *Plant Biotechnol Rep* DOI: 10.1007/ s11816-017-0455-6	7.42
894	Gajbhiye A, Gupta S K, Alam M S, Sharma S R and Mittal T C (2017). Design, development and evaluation of aloevera leaf gel expulsion machine. J Food Proc Engg DOI: org/10.1111/jfpe.12543.	7.37
895	Garg N., Singla N., Jindal V., Babbar B.K. (2017). Studies on bromadiolone resistance in *Rattus rattus* populations from Punjab, India. *Pesticide Biochemistry and Physiology*. **139**: 24-31	8.59
896	Gautam A, Khurana R, Manes G S, Dixit A K and Verma A (2017). Development and evaluation of inclined plate metering mechanism for radish(*Raphanus sativus*) *pelleted seeds.Int J Curr Microbiol Appl Sci* **6:** 993-1003	5.38
897	Gayas B., Kaur G., Gul K. (2017). Ultrasound-Assisted Extraction of Apricot Kernel Oil: Effects on Functional and Rheological Properties. *Journal of Food Process Engineering*. **40**: e12439	7.37
898	Ghorai A K, Kang S S, Sharma A and Sharma S (2017).) Occurrence of cucumber mosaic virus on potato and its transmission to muskmelon under potato-cucurbit cropping pattern followed in Punjab, India. *Int J Curr Microbiol App Sci***6:** 2947-2965.	5.38
899	Gill P.P.S., Jawandha S.K., Kaur N. (2017). Transitions in mesocarp colour of mango fruits kept under variable temperatures. *Journal of Food Science and* Technology **54**: 4251-4256.	7.26
900	Gill P.P.S., Jawandha S.K., Kaur N., Singh N. (2017). Physico-chemical changes during progressive ripening of mango (*Mangifera indica* L.) cv. Dashehari under different temperature regimes. *Journal of Food Science and Technology.* **54**: 1964-1970	7.26
901	Gill R.S., Hans V.S., Saini J.S., Singh S. (2017). Investigation on performance enhancement due to staggered piece in a broken arc rib roughened solar air heater duct. *Renewable Energy*. **104**: 148-162	10.36
902	Gill R.S., Hans V.S., Singh S. (2017). Investigations on thermo-hydraulic performance of broken arc rib in a rectangular duct of solar air heater. *International Communications in Heat and Mass Transfer*. **88**: 20-27	9.72
903	Goyal A, Aslam N, Kaur S, Soni R K, Midha V, Chaudhary A, Dhaliwal L K, Chhabra B S, Shibba T, Anand M, I S Bishav and Wander G S (2017). Factors affecting seasonal changes in blood pressure in North India: A population based four seasons study. *Ind Heart J* DOI: http.//dx.doi.org/10.1016/j. ihj.2017.09.012.	6.5

904	Goyal M, Kaur H, Singh D P and Tiwana U S (2017). Evaluation of nutritional quality and yield of winter forages prevalent in Punjab. *Range Manag Agroforest***38:** 249-253	6.06
905	Grewal J.K., Kaur M. (2017). Effect of core-shell reversal on the structural, magnetic and adsorptive properties of Fe_2O_3-GO nanocomposites. *Ceramics International*. **43**: 16611-16621	8.99
906	Grover K and Choudhary M (2017). Community based preventive measures to combat iron deficiency anemia among young pregnant and non-pregnant women. *Anthropologist* **30:** 202-209.	6.20
907	Gumber K, Sidhu A and Kocher D K (2017). Synthesis of novel 1,2,-triazolt DTC based metallo phosphorus nanoformulations as larvicide against *Aedes Aegypti*. *Intl Res J Pure Appl Chem***14** (accepted).	5.40
908	Gupta J., Dubey R.K., Kaur N., Choudhary O.P. (2017). Physiological response of ornamental tree species to induced salinity. *Indian Journal of Agricultural Sciences*. **87**: 700-705	6.22
909	Gupta N, Gill M I S and Arora N K (2017) Evaluation of guava genotypes based on morphological and physico-chemical characteristics. *The Bioscan* **12**:1607-1610	5.26
910	Gupta S, Kumar H, Sardana V and Atwal A K (2017). Effect of nitrogen rate on seed yield and oil content in *Brassica* spp. Cultivars. *The Bioscan***18:** 1803-1807.	5.26
911	Gupta S., Yadav R., Gaikwad K.B., Arora A., Kumar A., Kushwah A., Bainsla N.K. (2017). Deciphering physiological basis of yield gain in Indian wheat cultivars. *Cereal Research Communications*. **45**: 512-524	6.50
912	Hadda M S, Chandel S and Singh S (2017). Assessment of soil loss tolerance through statistical and fuzzy techniques in submontane Punjab. *J Soil Water Conserv* **6:**133-141. **5.08)**	8.23
913	Hooda K S, Khokhar M K, Sekhar, Bagaria P K, Sharma S S, Kaur H, Gogoi R and Reddy R R (2017). Identification of resistance sources against post flowering stalk rots in maize. *Ind Phytopathol***70:** 432-439.	5.90
914	Horgan F.G., Srinivasan T.S., Bentur J.S., Kumar R., Bhanu K.V., Singh Sarao P., Chien H.V., Almazan M.L.P., Bernal C.C., Ramal A.F., Ferrater J.B., Huang S.H. (2017). Geographic and research center origins of rice resistance to asian planthoppers and leafhoppers: Implications for rice breeding and gene deployment. *Agronomy*. **7**: 62	7.61
915	Hundal R K, Kang J S and Singh A (2017). Variation in growth, yield and quality of Happy Seeder sown wheat with different planting patterns and times of nitrogen application. *Int J Curr Microbiol App Sci***6:** 1420-1428.	5.40
916	Jain T., Grover K., Gill N.K. (2017). Impact of garden cress supplemented biscuits on nutritional profile of malnourished and anemic school children (seven–nine years). *Nutrition and Food Science*. **47**: 553-566	5.26
917	Jan R., Saxena D.C., Singh S. (2017). Effect of extrusion variables on antioxidant activity, total phenolic content and dietary fibre content of gluten-free extrudate from germinated Chenopodium (*Chenopodium album*) flour. *International Journal of Food Science and Technology*. **52**: 2623-2630	7.64
918	Jassal R K, Kang J S, Singh H and Singh T (2017). Growth, phenology and seed yield of fodder maize in relation to different planting methods and nitrogen levels. *Int J Curr Microbiol App Sci***6:** 1723-1735.	5.38
919	Jawandha S.K., Gill P.P.S., Kaur N., Verma A., Chawla N. (2017). Effect of edible surface coatings on the storability of pear fruits. *Indian Journal of Horticulture*. **74**: 271-275	6.15
920	Jayanthi P D K, Chakravarthy A K, Raghava T, Kempraj V, Jyothi S C and Singh S (2017). Understanding tephritid fruit flies in Toto for today and tomorrow. *Curr Sci***112:** 1614-1615.	6.97
921	Jha P., Verma S., Lal R., Eidson C., Dheri G.S. (2017). Natural 13C abundance and soil carbon dynamics under long-term residue retention in a no-till maize system. *Soil Use and Management*. 33.190.97. 1	8.12

922	Jhajj H S, Walia G S, Kaur H and Jhajj P (2017). A generalized estimator of population correlation coefficient. *Intl J Agri Stat Sci* **13:** 359-363.	5.13
923	Jhanji S and Dhatt K K (2017). Effect of modified atmosphere packaging and storage duration on keeping quality of gladiolus spikes. *Ind J Hort* **74:** 596-600.	6.15
924	Joshi H, Kochhar A and Boora R S (2017). Development and quality evaluation of chutney from new varieties of white and pink fleshed guava. *Int J Curr Microbiol Appl Sci***6:** 1062-1068.	5.38
925	Joshi H, Kochhar A and Boora R S (2017). Organoleptic and nutritional evaluation of value added products developed from new varieties of white and pink fleshed guavas. *Chem Sci Rev Lett***6:** 2108-2113.	5.21
926	Jyot G., Singh B. (2017). Development and validation of an HPLC method for determination of thiamethoxam and its metabolites in cotton leaves and soil. *Journal of AOAC International*. **100**: 796-803	6.96
927	Jyoti B and Kocher G S (2017). Preparation of an alcoholic beverage from muskmelon (*Cucumis melo* L. var. Punjab Sunheri). *Intl J Curr Microbiol App Sci* **6:** 1373-1383.	5.38
928	Kahlon M.S., Chawla K. (2017). Effect of tillage practices on least limiting water range in Northwest India. *International Agrophysics*. **31**: 183-194	6.97
929	Kang J S, Kaur H, Singh H, Singh G and Kaur R (2017). Some research approaches for augmenting Zn competency in plants: A review. *The Pharma Innov J***6:** 161-165.	5.03
930	Kang J S, Singh H, Kaur M and Kaur H (2017). Agronomic techniques and planting systems moderate terminal temperature stress in wheat. *Intl J Curr Microbiol App Sci***6:** 1011-1017.	5.38
931	Kang J S, Singh H, Singh G, Kang H, Kalra V P and Kaur J (2017). Abiotic stress and its amelioration in cereals and pulses: A review. *Int J Curr Microbiol App Sci***6:** 1019-1045.	5.38
932	Kapoor R and Choudhary K (2017). Genetic diversity analysis of fodder oats (*Avena sativa* L.) germplasm by microsatellite markers. *J Agri Sci Technol***19:** 1369-1379.	6.82
933	Kapoor S., Rafiq A., Sharma S. (2017). Protein engineering and its applications in food industry. *Critical Reviews in Food Science and Nutrition*. **57**: 2321-2329	12.08
934	Karmakar P and Shera P S (2017). Toxicity of insecticides to *Aenasius arizonensis* (Girault) (=*Aenasius bambawalei* Hayat), a solitary endoparasitoid of *Phenacoccus solenopsis* Tinsley on Bt cotton under semi-field conditions. *J Biol Contr***31:** 5-9.	5.34
935	Kataria D, Chahal K K, Kumar A and Singh R (2017). Antifungal activity and molecular docking studies with sesquiterpenoids from *Daucus carota. Pestic Res J* **29:** 188-195.	5.90
936	Kataria D, Chahal K K, Kumar A and Singh R (2017). Chemical characterization of essential oil and extracts of *Daucus carota* seeds and their antifungal activity against wheat fungi. *Allelopathy J* **42:** 123-134.	7.05
937	Kaul A, Deol J S and Brar A S (2017). Within-plant yield distribution in Bt cotton following fruiting form removal. *J Crop Weed***13:** 73-78.	5.28
938	Kaur A and Kochhar A (2017). Role of spices in preventing chronic problems: A review. *Chem Sci Review Lett***6:** 88-93.	5.21
939	Kaur A and Kochhar A (2017). Sensory and proximate analysis of value added bakery products using *bael* (*Aegle marmelos*) and stevia powder. *Int J Curr Microbiol Appl Sci***6:** 3749-3760	5.38
940	Kaur A, Bhatia S and Phutela U G (2017). Partial purification and characterization of cellulolytic enzymes extracted from *Trichoderma reesei* inoculated digested biogas slurry. *J Pure App Micro* **11:** 1953-1963	5.00
941	Kaur A, Dhaliwal L K and Kingra P K (2017). Radiation utilization and growth dynamics of rice under different growing environments. *J Agrometeorol***20:** 74-79.	6.36

942	Kaur A, Grewal S K, Singh R and Kaur J (2017). Defense system in chickpea genotypes differing in tolerance to *Helicoverpa armigera* infestation. *Ind J Pl Physiol* DOI: 10.1007/s4050(2017)-0310-3.	5.18
943	Kaur A, Johal P P and Sodhi H S (2017). Evaluation of casing variables for cultivation of *Agaricus bisporus* strain U3 in Punjab, India. *J Appl Nat Sci* **9:** 305-310.	5.09
944	Kaur A, Kaur B, Sraw P K and Singh K (2017). Response of onion to applied potassium at Farmer's Scale Field. *Intl J Curr Microbiol App Sci***6**: 2491-2496.	5.38
945	Kaur A, Singh J and Kang J S (2017). Yield attributes and yield of pigeonpea [*Cajanus cajan* (L.) millsp.] as influenced by growth retardants and sowing dates. *Int J Curr Microbiol App Sci***6:** 1201-1205.	5.38
946	Kaur A., Bains N.S., Sood A., Yadav B., Sharma P., Kaur S., Garg M., Midha V., Chhuneja P. (2017). Molecular characterization of α-gliadin gene sequences in Indian wheat cultivars vis-à-vis celiac disease eliciting epitopes. *Journal of Plant Biochemistry and Biotechnology*. **26**: 106-112	6.95
947	Kaur A., Grewal S.K., Singh R., Bhardwaj R.D. (2017). Induced defense dynamics in plant parts is requisite for resistance to *Helicoverpa armigera* (Hubner) infestation in chickpea. *Phytoparasitica***45**: 559-576..	6.88
948	Kaur A., Kaur K.P., Kalia A., Rani U., Kahlon J.G., Sharma R., Malaviya D., Kapoor R., Sandhu J.S. (2017). Generation of interspecific hybrids between *Trifolium vesiculosum* and T. *alexandrinum* using embryo rescue. *Euphytica*. **213**: 253	7.63
949	Kaur B., Sangha M.K., Kaur G. (2017). Development of near-infrared reflectance spectroscopy (nirs) calibration model for estimation of oil content in *Brassica juncea* and *Brassica napus*. *Food analytical methods*. **10**: 227-233	8.04
950	Kaur D., Grewal S.K., Kaur J., Singh S. (2017). Differential proline metabolism in vegetative and reproductive tissues determine drought tolerance in chickpea. *Biologia Plantarum*. **61**: 359-366	7.55
951	Kaur D., Grewal S.K., Kaur J., Singh S. (2017). Free radical scavenging activities can mitigate the effect of water stress in chickpea. *Crop and Pasture Science*. **68**: 544-554	7.80
952	Kaur G and Goyal M (2017). Nitrogen application and oats genotypes influence nutritional aspects of oats (*Avena sativa* L.) grains at milky and mature stage of development. *Ind J Anim Nutr***34:** 155-162.	5.02
953	Kaur G and Joshi N (2017). Biosafety of *Bacillus thuringiensis* formulation on emergence of *Trichogramma chilonis*. *Pestic Res J* **29:** 251-254.	5.90
954	Kaur G, Katyal P and Singh D (2017). Physico-chemical and microbiological profile of effluents from Common Effluent Treatment Plants (CETPs). *Intl J Ecol Env Sci* (accepted).	5.18
955	Kaur G, Katyal P and Singh D (2017). Physico-chemical and microbiological profile of effluents from Common Effluent Treatment Plants (CETPs*). Int J Curr Microbiol App Sci***6:** 1403-1413.	5.38
956	Kaur H, Kaur K, Kang J S and Singh H (2017). Role of cover crops in improving intensively exploited soils in agriculture: A review.*The Pharma Innov J***6:** 457-462.	5.03
957	Kaur H., Bhardwaj R.D., Grewal S.K. (2017). Mitigation of salinity-induced oxidative damage in wheat (*Triticum aestivum* L.) seedlings by exogenous application of phenolic acids. *Acta Physiologiae Plantarum*. **39**: 221	7.36
958	Kaur H., Singh H., Hunjan M.S., Kaur G. (2017). Qualitative, quantitative and molecular detection of aflatoxins from maize grains in North-West India. *Maydica*. 62: M16	6.38
959	Kaur J and Khanna V (2017). Bacterial adaptation to cold. *Int J Curr Microbiol App Sci***6:** 628-635.	5.38
960	Kaur J, Gangwar M and Kaur S (2017). Screening of endophytic and rhizospheric actinomycetes with potential application for biocontrol of Fusarium Wilt of gladiolus. *Intl J Curr Microbiol App Sci* **6:** 1345-1355.	5.38

961	Kaur J., Kaur A., Singh J. (2017). Nutritional evaluation and utilisation of composite whole flours for making functional cookies rich in β-glucan and isoflavones. *British Food Journal*. **119**: 909-920	7.21
962	Kaur J., Kler T.K., Kang J.S., Kumar M. (2017). Impact of zero tillage agriculture on the avian fauna in Ludhiana, Punjab. *Journal of Environmental Biology*. **38**: 689-695	6.70
963	Kaur J., Mahal S.S. (2017). Influence of paddy straw mulch on crop productivity and economics of bed and flat sown wheat (*Triticum aestivum*) under different irrigation schedules. *Journal of Environmental Biology*. **38**: 243-250	6.70
964	Kaur K, Gill B S, Sharma S and Kushwah A (2017). Tocopherol Content as affected by different sowing dates and its correlation with other quality traits in soybean [*Glycine max* (L.) Merrill]. *Int J Curr Microbiol App Sci* **6:** 1492-1499.	5.38
965	Kaur K, Kaur G and Grewal M K (2017). Effect of ethanol treatment and pre-cooling on quality of grapes *cv.* Flame seedless during cold storage. *The Bioscan* **12:** 1139-1143.	5.26
966	Kaur K., Gill P.P.S., Jawandha S.K. (2017). Enzymatic and physico-chemical changes in pear fruits in response to post-harvest application of oxalic acid. *Indian Journal of Horticulture*. **74**: 303-305	6.15
967	Kaur M., Kalia A., Thakur A. (2017). Effect of biodegradable chitosan–rice-starch nanocomposite films on post-harvest quality of stored peach fruit. *Starch/Staerke*. **69**: 1600208	7.84
968	Kaur M., Sardana V., Sharma P. (2017). Performance of canola oilseed rape (*Brassica napus*), Ethiopian mustard (*Brassica carinata*) and Indian rape (*Brassica rapa*) in the intercropping system. *Indian Journal of Agron*omy. **62**: 211-214	5.46
969	Kaur N., Sharma S., Yadav D.N., Bobade H., Singh B. (2017). Quality Characterization of Brown Rice Pasta Supplemented with Vital Gluten and Hydrocolloides. *Agricultural Research*. **6**:185-194	5.90
970	Kaur N., Singh B., Gill R.I.S. (2017). Productivity and profitability of intercrops under four tree species throughout their rotation in North-Western India. *Indian Journal of Agronomy*. **62**: 160-169	5.46
971	Kaur P and Bhatia S (2017). Effect of packaging films on cell wall hydrolyzing enzymes in relation to shelf life enhancement of tomatoes stored under ambient conditions. *App Biol Res***19:** 71-78.	5.07
972	Kaur P and Zalom F G (2017). Counteraction effect between *Tetranychus urticae* Koch and *Eotetranychus lewisi* (McGregor) on strawberry. *J Entomol Zoo Stu**d*****5:** 653-656.	5.53
973	Kaur P and Zalom F G (2017). Effect of temperature on the development of *Tetranychus urticae* and *Eotetranychus lewisi* on strawberry. *J Entomol Zoo Stud***5:** 441-444.	5.53
974	Kaur P, Kaur R and Bhullar M B (2017). Evaluation of anthocorid predator, *Blaptostethus pallescens* Poppius against two-spotted spidermite, *Tetranychus urticae* Koch on brinjal. *J Entomol Zoo Stu**d***20:** 1215-1219**.**	5.53
975	Kaur P., Dilawari V.K. (2017). Behaviour of laboratory-selected Cry1Ac-tolerant strain of *Helicoverpa armigera* (Hübner) (Lepidoptera: Noctuidae) on Bt-cotton. *Current Science*. **112**: 1579-1583	6.84
976	Kaur P., Kaur N., Singh H. (2017). PRECIS-model simulated changes in climatic parameters under various scenarios in different agro-climatic zones of Punjab. *Mausam*. **68**:139-148	6.47
977	Kaur P., Kaur P., Duhan A., Bhullar M.S. (2017). Effect of long-term application of pretilachlor on its persistence and residues in paddy crop. *Environmental Technology (United Kingdom)*. **38**: 2410-2415	7.75
978	Kaur P., Randhawa S.K., Duhan A., Bhullar M.S. (2017). Influence of long term application of butachlor on its dissipation and harvest residues in soil and rice. *Bulletin of Environmental Contamination and Toxicology*. **98**: 874-880	7.41

979	Kaur R, Mavi G S, Sood N, Malhotra A, Kaur H and Sohu V S (2017). Genetic variation for grain zinc and iron concentration and quality parameters in diverse wheat (*Triticum aestivum* L.). *App Biol Res***19:** 138-145.	5.07
980	Kaur R, Sidhu A, Ghumber K and Sharma V K (2017). Synthesis of novel 1,2,4-triazolodithiocarbamato transition metal complexes as mycocidal agent. *Intl J Chemical Studs* **5:** 460-466.	5.31
981	Kaur R., Uppal S.K., Sharma P. (2017). Antioxidant and antibacterial activities of sugarcane bagasse lignin and chemically modified lignins. *Sugar Tech*. **19**: 675-680	6.83
982	Kaur R., Zhawar V.K. (2017). Hydrogen peroxide and nitric oxide regulation of phenolic metabolism under water stress and ABA in Wheat. *Acta Biologica Hungarica*. **68**: 162-174	6.51
983	Kaur S and Aggarwal P (2017). Development of maize-potato tortilla chips: A nutritious and low fat snack food. *J Pharmacog and Phytochem***6:** 153-161.	5.21
984	Kaur S, Aggarwal P and Vashist V K (2017). Processing quality traits of different potato (*Solanumtuberosum* L.) genotypes in India. *The Pharma Innov J***6:** 27-30.	5.03
985	Kaur S, Ghai N and Jindal S K (2017). Improvement of growth characteristics and fruit set in bell pepper (*Capsicum annuum* L.) through IAA application. *Ind J Pl Physiol* DOI: 10.1007/s40502-017-0293-0.	5.18
986	Kaur S, Kular J S and Chandi R S (2017). Biological parameters of *Thrips tabaci* Lindeman at different constant temperatures on Bt cotton. *J Exp Zool India***20:** 993-998.	5.51
987	Kaur S, Kular J S and Chandi R S (2017). Effect of temperature on growth and development of *Thrips tabaci* Lindeman in Bt cotton. *Int J Curr Microbiol App Sci***6:** 2553-2560.	5.38
988	Kaur S, Singh S P and Kingra P K (2017). Detection and management of abiotic stresses in wheat using remote sensing techniques. *Int J Curr Microbiol App Sci***6:** 616-628.	5.38
989	Kaur S., Ghai N., Jindal S.K. (2017). Improvement of growth characteristics and fruit set in bell pepper (*Capsicum annuum* L.) through IAA application. *Indian Journal of Plant Physiology*. **22**: 213-220	5.18
990	Kaur S., Jindal S.K., Dhailwal M.S., Chawla N., Meena O.P. (2017). Genetic diversity analysis in elite lines of tomato (*Solanum lycopersicum* L.) for growth, yield and quality parameters. *Genetika*. **49**: 329-344	7.21
991	Kaur S., Singh D., Singh K. (2017). Effect of selenium application on arsenic uptake in rice (*Oryza sativa* L.). *Environmental Monitoring and Assessment*. **189**: 430	7.69
992	Kaur T, Kaur S and Bhullar M S (2017). Control of canary grass in wheat with pre-mixture of pinoxaden plus clodinafop-propargyl. *Ind J Weed Sci***49:** 223-225.	5.17
993	Khanal S., Sekhon P.S., Astha (2017). Identification and biochemical characterization of resistance against downy mildew in snapmelon. *Indian Phytopathology*. **70**: 341-346	5.90
994	Khipla N, Gosal S K and Gill R I S (2017). Influence of biofertilizers and inorganic fertilizers on soil microbial population and enzyme activities in rhizosphere of poplar. *Chem Sci Rev Lett* **6:** 2324-2331	5.21
995	Khullar N.K., Ranga Raju K.G. (2017). Experimental and mathematical investigation for infiltration of fine suspended sediments into surface layer of bed material. *ISH Journal of Hydraulic Engineering*. **23**: 23-34	8.18
996	Khushwaha N L and Bhardwaj A (2017). Remote sensing and GIS based morphometric analysis for micro-watershed prioritization in Takarla-Ballowal watershed. *J Agri Engg***54:** 48-56	5.59
997	Khushboo and Gangwar M (2017). Antifungal activity of endophytic actinomyetes against Fusarium Wilt (*Fusarium oxysporum*) of banana trees (*Musa acuminata*). *Intl J Curr Microbiol App Sci* **6:** 328-337.	5.38

998	Kingra P.K., Setia R., Singh S., Kaur J., Kaur S., Singh S.P., Kukal S.S., Pateriya B. (2017). Climatic variability and its characterisation over Punjab, India. *Journal of Agrometeorology*. **19**: 246-250	6.40
999	Krishnamurthy S L, Sharma P C, Sharma D K, Ravikiran K T, Singh Y P, Mishra V K, Burman D, Maji B, Mandal S, Sarangi S K, Gautam R K, Singh P K, Manohara K K, Marandi B C, Padmavathi G, Vanve P B, Patil K D, Thirumeni S, Verma O P, Khan A H, Tiwari S, Geetha S, Shakila M, Gill R, *et al.* (2017). Identification of mega-environments and rice genotypes for general and specific adaptation to saline and alkaline stresses in India. *Sci Rep* **7:** 7968.	10.26
1000	Kumar A, Chahal K K and Dhillon N K (2017). GC-MS analysis and *in vitro* evaluation of methanol root extract of *Tagetes patula* against *Meloidogyne incognita.J Pharma Phytochem* **6:** 1660-1664.	5.21
1001	Kumar A, Chahal K K and Kataria D (2017). A review on phytochemistry and pharmacological activities of *Cyperus scariosus. J Pharma Phytochem***6:** 510-517.	5.21
1002	Kumar A, Chahal K K and Kataria D (2017). Comparison of chemical composition of roots and rhizosphere soil extracts of *Tagetes patula* L.: GC-MS analysis. *Asian J Chem***29:**797-800.	5.0
1003	Kumar A., Gill P.S. (2017). Developmental dynamics in chemical composition during fruit ripening of pomegranate. *Journal of Environmental Biology*. **38**: 805-813	6.70
1004	Kumar A., Hunjan M.S., Kaur H., Dhillon H.K., Singh P.P. (2017). Biochemical responses associated with resistance to bacterial stalk rot caused by *Dickeya zeae* in maize. *Journal of Phytopathology.***165**: 822-832	6.85
1005	Kumar A, Jansky S and Halterman D (2017). Potato stem cuttings to study Verticillium dahliae infection for resistance breeding and -omics studies. *American J Potato Res***94:** 270-274.	6.94
1006	Kumar A, Mosa K, Ji L, Kage U, Madalageri D, Dhokane D and Pathania N R (2017). Metabolomics assisted biotechnological interventions for developing plant-based functional foods and nutraceuticals. *Crit Rev Food Sci Nutr* DOI: 10.1080/10408398.2017.1285752.	12.08
1007	Kumar B., Hooda K.S., Singh V., Sekhar J.C., Kumar V., Parihar C.M., Jat S.L., Singh A.K., Kaul J., Kaur H., Kaur H., Yadav O.P. (2017). Multi-environment field testing to identify stable sources of resistance to charcoal rot (*Macrophomina phaseolina*) disease in tropical maize germplasm. *Maydica*. **62**: M3	6.38
1008	Kumar H, Kaur G and Banga S K (2017). Estimation of allelic loss in sesame (*Seasmum indicum* L.) varieties. *Bangladesh J Bot***46:** 61-66.	6.30
1009	Kumar N, Kaur P and Bhatia S (2017). Advances in bio-nano composite materials for food packaging - A review. *Nutr Food Sci***47:** 591-606	5.26
1010	Kumar R, Shera P S, Sharma S and Sangha K S (2017). Standardization of release rate of *Trichogramma chilonis* (Ishii) in bio-intensive management of *Chilo partellus* (Swinhoe) in fodder maize. *J Biol Contr***31:** 254-258.	5.34
1011	Kumar R., Kumar J., Brar A.S., Walia S.S., Gill B.S. (2017). Effect of straw mulch and integrated nitrogen management on yield and quality of turmeric under North Indian plains. *Indian Journal of Horticulture*. **74**: 240-244	6.15
1012	Kumar S, Kocher G S and Bakhsi D K (2017). Fermentative production of vinegar from grapes and guava using adsorbed cells of *Acetobacter aceti*. *Intl J Curr Microbiol App Sci* **6:** 2005-2012.	5.38
1013	Kumar S. (2017). Potential of Ethiopian mustard, *Brassica carinata* as a trap crop for large white butterfly, *Pieris brassicae* infesting Indian mustard, *Brassica juncea*. *Journal of Pest Science*. **90**:129-137	9.73
1014	Kumar S., Kocher G.S. (2017). Upscaled Production of Sugarcane Vinegar by Adsorbed Cells of *Acetobacter aceti* Under Semi-Continuous Fermentation Conditions. *Sugar Tech*. **19**: 409-415	6.83
1015	Kumar S, Nikhanj P and Kocher G S (2017). Assessment of diverse substrates for quality wines production. *Int J Curr Microbiol Appl Sci***6:** 2676-2682.	5.38

1016	Kumari S, Sehgal A, Kumar J, Kumar S, Singh S, Siddique K H M and Nayyar H (2017). Identification of high-temperature tolerant lentil (*Lens culinaris* Medik.) genotypes through leaf and pollen traits. *Front Plant Sci***8:** DOI: 10.3389/fpls.2017.00744.	10.49
1017	Kumari V and Kang T K (2017). Relationship between aggressive behavior and parenting style. *Int J Curr Microbiol Appl Sci***6:** 1224-1231.	5.38
1018	Madhwal S and Sharma S (2017). Food safety issues and risk associated with refrigerated foods. *Int J Curr Microbiol Appl Sci***6:** 4196-4203	5.38
1019	Mahajan G., Kaur G., Chauhan B.S. (2017). Seeding rate and genotype effects on weeds and yield of dry-seeded rice. *Crop Protection*. **96**: 68-76	7.83
1020	Mal T, Walia S S and Kaur A (2017). Evaluation of grain quality of maize, rice and wheat under different tillage, mulching and fertilizer management practices. *Chemical Sci Review Lett* **6:** 88-93.	5.21
1021	Malhotra P.K., Mittal A., Chopra R., Kaur M., Thind K.S. (2017). Genetic Augmentation of Sugarcane with Stress-Inducible DREB1A Transcription Factor Using Biolistic Approach. *Sugar Tech*. **19**: 469-475	6.83
1022	Malik E A, Bhardwaj R, Goyal M and Kaur J (2017).Morpho-physiological diversity to evaluate dry summer adaptability of pearl millet. *Agri Res***6:** 122-129	5.90
1023	Mavi M S and Marschner P (2017). Impact of salinity on microbial activity and organic matter dynamics in soils is more closely related to osmotic potential than EC. *Pedosphere***27:** 949-956	7.54
1024	Meena Y K, Khurana D S, Kaur N and Singh K (2017). Phenolic compounds enhanced low temperature stress tolerance in tomato (*Solanum lycopersicum* L.). *Br J Appl Sci Technol***20:** 1-9.	5.32
1025	Meenakshi, Agnihotri D, Kiranjeet and Sharma H (2017). A first principle investigation into effect of B and BN doped C_{60} in lowering dehydrogenation of MXH_4 (where M= Na, Li and X = Al, B). *Bull Materials Sci***40:** 1397-1403.	6.90
1026	Mehan S, Sharda R and Singh K G (2017). Impact of colored plastic mulches on plant light environment, soil temperature and yield of bell pepper under field conditions. *Agri Mechan Asia, Afr Latin Am***48:** 89.	6.06
1027	Mhapankar P G, Suri K S and Singh G (2017) Insecticide resistance in diamondback moth, Plutella xylostella (L.) (Lepidoptera: Plutellidae) in Punjab. Ind J Entomol79: 76-81.	5.89
1028	Miglani H., Sharma S. (2017). Cell wall composition and nutrients in soybean genotypes of varying seed coat colour. *Legume Research*. **40**: 444-452	6.12
1029	Miglani N., Bains K. (2017). Interplay between proteins and metabolic syndrome–A review. *Critical Reviews in Food Science and Nutrition*. **57**: 2483-2496	12.08
1030	Mishra S K, Singh G and Singh K (2017) Sugarcane growth and yield simulation under varying planting dates in subtropical. *J Agrometeorol* **19** (special issue- Agmet 2016): 200-204.	6.36
1031	Mittal N, Kaur J and Chhuneja P (2017). Screening of inter-specific introgression lines of*Triticum durum- Aegilops speltoides* against foliar blight caused by*Bipolaris sorokiniana*. *J Mycol Pl Pathol***47:** 20-24.	5.79
1032	Mohanpuria P, Duhan N, Sarao N K, Kaur M and Kaur M (2017). In silico identification and validation of potential microRNAs in kinnow mandarin (*Citrus reticulata* Blanco). *Interdiscip Sci Comput Life Sci* DOI: 10.1007/s12539-017-0235-6.	6.75
1033	Mondal B P, Sekhon B S, Sharma S, Singh M, Sahoo R N, Barman A, Sinha Y, Chattopadhyay A and Banerjee K (2017). VIS-NIR reflectance spectroscopy for assessment of soil microbiological properties. *Int J Curr Microbiol Appl Sci* **6:** 719-728.	5.38
1034	Monika, Chahal K K, Kataria D and Kumar A (2017). Transformation, characterization and bioassay of some compounds from *Anethum graveolens* L. seed oil: Structure activity relationship. *Allelopathy J***42:** 219-230. **(7.05)**	7.05

1035	Mwathi M.W., Gupta M., Atri C., Banga S.S., Batley J., Mason A.S. (2017). Segregation for fertility and meiotic stability in novel Brassica allohexaploids. *Theoretical and Applied Genetics*. **130**: 767-776	10.13
1036	Nair R.M., Götz M., Winter S., Giri R.R., Boddepalli V.N., Sirari A., Bains T.S., Taggar G.K., Dikshit H.K., Aski M., Boopathi M., Swain D., Rathore A., Anil Kumar V., Lii E.C., Kenyon L. (2017). Identification of mungbean lines with tolerance or resistance to yellow mosaic in fields in India where different begomovirus species and different *Bemisia tabaci* cryptic species predominate. *European Journal of Plant Pathology*. **149**: 349-365	7.48
1037	Naliath R, Kumar K, Arora P K, Kaur S, Kaur D and Singh K (2017). Genetic identification and inference on genetic relationships of important citrus rootstocks with microsatellite markers. *Fruits* **72:** 350-362.	6.63
1038	Narang R, Sharma S R, Mittal T C, Jindal S K and Gupta S K (2017). Storage life enhancement of cherry tomato using modified atmosphere packaging. *The Bioscan* **12:** 209-214.	5.26
1039	Nayyar S., Sharma B.K., Kaur A., Kalia A., Sanghera G.S., Thind K.S., Yadav I.S., Sandhu J.S. (2017). Red rot resistant transgenic sugarcane developed through expression of β-1,3-glucanase gene. *PLoS ONE*. **12**: e0179723.	8.81
1040	Neelam K., Thakur S., Neha, Yadav I.S., Kumar K., Dhaliwal S.S., Singh K. (2017). Novel alleles of phosphorus-starvation tolerance 1 gene (PSTOL1) from *oryza rufipogon* confers high phosphorus uptake efficiency. *Frontiers in Plant Science*. **8**: 509	10.30
1041	Neelam K, Lore J, Kaur K, Pathania S, Kumar K, Sahi G, Mangat G S and Singh K (2017). Identification of resistance sources in wild species of rice against two recently evolved pathotypes of *Xanthomonas oryzae* pv. oryzae. *Plant Genet Res***15:** 558-562.	6.61
1042	Nenavath B, Bhattacharyya U K, Sharma A, Kumar P, Raheja S, Arora R, Kumar A, Palchoudhury S, Monga D and Biswas K K (2017) Current distribution and severity of leaf curl begomovirus disease in cotton growing areas of northwest India. *J Mycol Plant Pathol***47**:259-272.	5.79
1043	Ngangom U D, Singh R and Singh S (2017). Role of host plant resistance in inter-specific chickpea genotypes against gram pod borer, *Helicoverpa armigera* (Hübner) under field conditions. *J Insect Sci* **30:** 99-105.	6.65
1044	Oberoi H K, Gupta A K and Kaur S (2017). Evaluation of non nutritive bioactive compounds in chickpea genotypes from diverse geographical locations. *App Biol Res***19:** 280-289.	5.07
1045	Pahwa K., Ghai N., Kaur J., Sngh I., Singh S., Dhingra M. (2017). Influence of ethylene and cobalt chloride on photosynthetic parameters and pedicel anatomy of pigeon pea (*Cajanus cajan* L.) genotypes. *Journal of Environmental Biology*. **38**:367-374	6.70
1046	Pal R., Mahajan G., Sardana V., Chauhan B.S. (2017). Impact of sowing date on yield, dry matter and nitrogen accumulation, and nitrogen translocation in dry-seeded rice in North-West India. *Field Crops Research*. **206**:138-148	9.05
1047	Pal S., Barad A.V., Singh A.K., Khadda B.S., Kumar D. (2017). Effects of foliar application of FeSO4 and ZnSO4 on leaf tissue nutrients of gerbera (*Gerbera jamesonii*) varieties under protected condition. *Indian Journal of Agricultural Sciences*. **87**: 102-106	6.22
1048	Pandove G, Sahota P, Gupta N and Singh P (2017) Biotechnological approach for production of fermented debittered blended beverage from kinnow: lemon using *Clavispora lusitaniae. Vegetos* **30**: 69-79	5.0
1049	Pandove G, Sahota P, Gupta N and Singh P (2017). Biotechnological approach for production of fermented debittered blended beverage from kinnow-lemon using *Clavispora lusitaniae*. *Vegetos-Int J Plant Res***30:** 69-79.	5.38

1050	Parihar A.K., Basandrai A.K., Sirari A., Dinakaran D., Singh D., Kannan K., Kushawaha K.P.S., Adinarayan M., Akram M., Latha T.K.S., Paranidharan V., Gupta S. (2017). Assessment of mungbean genotypes for durable resistance to Yellow Mosaic Disease: Genotype × Environment interactions. *Plant Breeding*. **136**: 94-100	7.34
1051	Parmdeep, Sharma S., Singh S. (2017). Comparison of cell wall constituents, nutrients and anti-nutrients of lupin genotypes. *Legume Research*. **40**: 478-484	6.12
1052	Patel M.K., Praveen B., Sahoo H.K., Patel B., Kumar A., Singh M., Nayak M.K., Rajan P. (2017). An advance air-induced air-assisted electrostatic nozzle with enhanced performance. *Computers and Electronics in Agriculture*. **135**:280-288	8.20
1053	Patil A., Singh A.K. (2017). Effect of enzyme and microwave pretreatment on oil recovery from canola. *Journal of Food Process Engineering*. **40**: e12340	7.37
1054	Pinnamwar S., Dhatt A.S. (2017). Combining ability studies for yield, quality and storage in onion. *Indian Journal of Horticulture*. **74**:162-166	6.15
1055	Prakash D., Benbi D.K., Saroa G.S. (2017). Clay, Organic Carbon, Available P and Calcium Carbonate Effects on Phosphorus Release and Sorption–Desorption Kinetics in Alluvial Soils. *Communications in Soil Science and Plant Analysis*. **48**: 92-106	6.59
1056	Prakash M.O., Vijay B. (2017). Principal component and cluster analysis of indigenous tomato genotypes based on morphological indicators. *Research Journal of Biotechnology*. **12**: 50-58	6.23
1057	Puyam A, Pannu P P S, Kaur J and Sethi S (2017). Cultural, morphological and molecular variability of sheld causing foot rot disease of basmati rice in Punjab. *J Mycol Plant Pathol* **47:** 369-381.	5.79
1058	Puyam A., Pannu P.P.S., Kaur J., Sethi S. (2017). Variability in production of gibberellic acid and fusaric acid by *Fusarium moniliforme* and their relationship. *Journal of Plant Pathology*. **99**: 103-108	7.27
1059	Rafiq A., Sharma S., Singh B. (2017). In vitro starch digestibility, degree of gelatinization and functional properties of twin screw prepared cereal-legume pasta. *Journal of Cereal Science*. **74**: 279-287	8.22
1060	Raguvaran R., Manuja B.K., Chopra M., Thakur R., Anand T., Kalia A., Manuja A. (2017). Sodium alginate and gum acacia hydrogels of Z_nO nanops show wound healing effect on fibroblast cells. *International Journal of Biological Macromolecules*. **96**:185-191	9.67
1061	Ram H, Gupta N, Mavi G S, Sarlach R S and Singh G (2017). Phenology, photo-thermal units requirement and productivity of wheat varieties as influenced by sowing dates under irrigated conditions in Punjab. *J Crop Weed* **13:** 73-77.	5.28
1062	Ram H, Mavi G S, Gupta N, Dhaliwal S S and Sohu V S (2017). Productivity and nitrogen use efficiency of wheat varieties in relation to nitrogen levels under rainfed conditions of North-Western India. *Int J Curr Microbiol App Sci* **6:** 558-563.	5.38
1063	Rana K., Atri C., Gupta M., Akhatar J., Sandhu P.S., Kumar N., Jaswal R., Barbetti M.J., Banga S.S. (2017). Mapping resistance responses to Sclerotinia infestation in introgression lines of *Brassica juncea* carrying genomic segments from wild Brassicaceae B. *fruticulosa*. *Scientific Reports*. **7**: 5904	10.26
1064	Rani A., Kumar V., Gill B.S., Rathi P., Shukla S., Singh R.K., Husain S.M. (2017). Linkage mapping of Mungbean yellow mosaic India virus (MYMIV) resistance gene in soybean. *Breeding Science*. **67**: 95-100	7.79
1065	Rani A, Kumar V, Gill B S, Shukla S, Rathi P and Singh R K (2017). Mapping of duplicate dominant genes for *mungbean* yellow mosaic India virus resistance in *Glycine soja*. *Crop Sci* **58:** 1566-1574.	7.55
1066	Rasool R., Bhullar M.S., Gill G.S. (2017). Growth stage of *Phalaris minor* retz. And wheat determines weed control and crop tolerance of four post-emergence herbicides. *Spanish Journal of Agricultural Research*. **15**: e1001	6.69

1067	Rathore N., Gupta R.K., Singh Y., Singh B. (2017). Determining critical value of soil Olsen P for dry direct seeded rice (*Oryza sativa*) in a greenhouse study in north western India. *Journal of Environmental Biology*. **38**: 623-629	6.70
1068	Rawat I., Chhuneja N.K., Gite L.P., Meena M.S. (2017). Health hazards among workers of agro-processing industries: an exploratory research in punjab's context. *National Academy Science Letters*. **40**:1	6.37
1069	Raymundo R., Asseng S., Prassad R., Kleinwechter U., Concha J., Condori B., Bowen W., Wolf J., Olesen J.E., Dong Q., Zotarelli L., Gastelo M., Alva A., Travasso M., Quiroz R., Arora V., Graham W., Porter C. (2017). Performance of the SUBSTOR-potato model across contrasting growing conditions. *Field Crops Research*. **202**: 57-76	9.05
1070	Rehal J, Kaur G J and Singh A K (2017). Influence of milling parameters on head rice recovery: A review. *Int J Curr Microbiol Appl Sci* **6:** 15-21.	5.38
1071	Reynolds M.P., Pask A.J.D., Hoppitt W.J.E., Sonder K., Sukumaran S., Joshi A.K. *et al.* (2017). Strategic crossing of biomass and harvest index source and sink achieves genetic gains in wheat. *Euphytica*. **213**: 257	7.63
1072	Saini S.S., Teotia D., Gaid M., Thakur A., Beerhues L., Sircar D. (2017). Benzaldehyde dehydrogenase-driven phytoalexin biosynthesis in elicitor-treated *Pyrus pyrifolia* cell cultures. *Journal of Plant Physiology*. **215**:154-162	9.12
1073	Sandhi R.K., Sidhu S.K., Sharma A., Chawla N., Pathak M. (2017). Morphological and biochemical basis of resistance in okra to cotton jassid, *Amrasca biguttulabiguttula* (Ishida). *Phytoparasitica*. **45**: 381-394	6.88
1074	Sandhu C and Suri K S (2017). Influence of variable temperature on developmental and reproductive physiology of *Sogatella furcifera* (Horvath) infesting rice. *Ind J Entomol* (accepted).	5.89
1075	Sandhu S K, Dhaliwal L K and Pannu P P S (2017). Effect of meteorological and micrometeorological parameters on stripe rust (*Pucciniastriformis*f. sp. *Tritici*) severity of wheat. *Int J Curr Microbiol App Sci***6:** 4512-4520.	5.38
1076	Sandhu S K, Dhaliwal L K and Pannu P P S (2017). Effect of weather parameters on incidence and severity of stripe rust in wheat under natural and artificial conditions. *J Agrometeorol***19:** 272-277.	6.36
1077	Sandhu S S, Kaur P and Gill K K (2017). Impact of climate change on the wheat duration in Central Punjab of India. *J Agrometeorol***19:** 226-230.	6.36
1078	Sandhu P P, Bains K, Singla G and Sangwan R S (2017). Utilization of corn fibre and Pectin gel for the development of low calorie and high fibre biscuits. *CurrJ Appl Sci Technol***25:** 1-9.	5.32
1079	Sanodiya R**,** Singh M, Bector V, Patel B and Mishra P (2017). Yield prediction by integrating NDVI and N-Tester data with yield monitor data. *Int J Curr Microbiol Appl Sci***6:** 1296-1307.	5.38
1080	Sapkota T.B., Jat R.K., Singh R.G., Jat M.L., Stirling C.M., Jat M.K., Bijarniya D., Kumar M., Yadvinder-Singh Y.-S., Saharawat Y.S., Gupta R.K. (2017). Soil organic carbon changes after seven years of conservation agriculture in a rice–wheat system of the eastern Indo-Gangetic Plains. *Soil Use and Management*. **33**: 81-89	8.12
1081	Sarao L.K., Arora M. (2017). Probiotics, prebiotics, and microencapsulation: A review. *Critical Reviews in Food Science and Nutrition*. **57**: 344-371	12.08
1082	Sardana V., Mahajan G., Jabran K., Chauhan B.S. (2017). Role of competition in managing weeds: An introduction to the special issue. *Crop Protection*. **95**: 7	7.83
1083	Sehgal A, Sita K, Kumar J, Kumar S, Singh S, Siddique K H M and Nayyar H (2017). Effects of drought, heat and their interaction on the growth, yield and photosynthetic function of lentil (*Lens culinaris* Medikus) genotypes varying in heat and drought sensitivity. *Front Plant Sci* DOI: 10.3389/ fpls.2017.01776.	10.49

1084	Sekhon J., Grewal S.K., Singh I., Kaur J. (2017). Evaluation of nutritional quality and antioxidant potential of pigeonpea genotypes. *Journal of Food Science and Technology*. **54**: 3598-3611	7.26
1085	Shafia B, Kaur N and Arora N (2017). Changes in activities of sugars and some sugar metabolic enzymes in grape berries during development. *Curr J Appl Sci Tech* **25:** 1-6.	5.32
1086	Sharda R., Mahajan G., Siag M., Singh A., Chauhan B.S. (2017). Performance of drip-irrigated dry-seeded rice (*Oryza sativa* L.) in South Asia. *Paddy and Water Environment*. **15**: 93-100	6.92
1087	Sharma A, Mishra S K and Kumar H (2017) Influence of weather variables on incidence and progress of bacterial blight of cotton in south western Punjab. *J Agrometeorol***19**:234-238.	6.36
1088	Sharma C and Vashishat N (2017). Assessment of heavy metals in excreta of House Crow (*Corvus splendens*) from different agro-ecosystems of Ludhiana. *J Entomol Zool Stud***5:** 1891-1895.	5.53
1089	Sharma C., Singh B., Hussain S.Z., Sharma S. (2017). Investigation of process and product parameters for physicochemical properties of rice and mung bean (*Vigna radiata*) flour based extruded snacks. *Journal of Food Science and Technology*. **54**: 1711-1720	7.26
1090	Sharma P, Kaur L, Mittal R, Kaur S and Kaur S (2017).A study on farm women awareness for climate variability and its effect on water resources in Punjab. *British J App Sci and Tech***21:** 1-9.	5.32
1091	Sharma P., Kaur A., Aggarwal P. (2017). Physicochemical, thermal, rheological, and morphological properties of flour from different guar seed (*Cyamopsis tetragonoloba*) cultivars. *International Journal of Food Properties*. **20**: 1280-1289	7.43
1092	Sharma P., Kaur A., Kaur S. (2017). Nutritional quality of flours from guar bean (*Cyamopsis tetragonoloba*) varieties as affected by different processing methods. *Journal of Food Science and Technology*. **54**:1866-1872	7.26
1093	Sharma S and Dharni K (2017). Intellectual capital disclosures in an emerging economy: Status and trends. *J Intellect Capital***18:** 868-883.	9.63
1094	Sharma S., Kooner R., Sandhu S.S., Arora R., Kaur T., Kaur S. (2017). Seasonal dynamics of insect pests of sugar beet under sub-tropical conditions. *Journal of Agrometeorology*. **19**: 81-83	6.40
1095	SharmaP, Kaur L, Mittal R, Kaur Sand Kaur S (2017). A study on farm women awareness for climate variability and its effect on water resources in Punjab. *BritishJ App Sci and Tech* **21:** 1-9.	5.32
1096	Sharma Y, Singh H and Thakur A (2017). Effect of training system and in row spacing on yield and fruit quality of peach in the sub-tropical regions. *Ind J Hort* **74:** 440-443.	6.13
1097	Sheoran P, Sardana V, Singh S, Chander S, Kumar A, Mann A and Sharma P (2017). Nutrient management for sustaining productivity of sunflower-based cropping sequence in Indian semiarid regions. *Comm in Soil Sci and Pl Analysis***48:** 581-593.	6.59
1098	Shera P.S., Karmakar P., Sharma S., Sangha K.S. (2017). Suitability of different mealybug species as hosts to solitary endoparasitoid, *Aenasius arizonensis* (Girault) (*Aenasius bambawalei* Hayat). *International Journal of Pest Management*. **63**: 280-288	6.64
1099	Shera P S and Karmakar P (2017). Effect of mating combinations on the host parasitization and sex allocation in solitary endoparasitoid, *Aenasius arizonensis* (Girault) (Hymenoptera: Encyrtidae). *Biocontr Sci Technol* DOI: 10.1080 /09583157.2017.1413707.	6.85
1100	Shera P.S., Sharma S., Jindal J., Bons M., Singh G., Kaul A., Kaur R., Sangha K.S. (2017). On-farm impact of egg parasitoid, *Trichogramma chilonis* against maize stem borer, *Chilo partellus* in Punjab. *Indian Journal of Agricultural Sciences*. **87**: 1412-1425	6.22
1101	Shoba D., Raveendran M., Manonmani S., Utharasu S., Dhivyapriya D., Subhasini G., Ramchandar S., Valarmathi R., Grover N., Krishnan S.G., Singh A.K., Jayaswal P., Kale P., Ramkumar M.K., Mithra S.V.A., Mohapatra T., Singh K., Singh N.K., Sarla N., Sheshshayee M.S., Kar M.K., Robin S., Sharma R.P. (2017). Development and genetic characterization of a novel herbicide (imazethapyr) tolerant mutant in rice (*oryza sativa* l.). *Rice*. **10**:10	9.74

1102	Sidhu A, Barmota H and Bala A (2017).Antifungal evaluation studies of copper sulfide nano-aqua formulations and its impact on seed quality of rice (*Oryzae sativa). App Nanosci* DOI: 10.1007/ s13204-017-0606-7.	9.32
1103	Sidhu A, Suman R Ghatelwal, Gumber K and Bala A (2017). Augmented antifungal potential of benzothiazol-2-ylcarbamodithioates as hybrid-silver aqua nano formulations. *App Nanosci* DOI: 10.1007/s13204-017-0600-0.	9.32
1104	Sidhu H K and Garg L (2017). Opinion of the farmers regarding mobile based agro advisory services by IFFCO. *Ind J Ext Edu* **53:** 116-119**.**	5.32
1105	Sidhu M.K., Mahajan B.V.C., Tandon R., Dhatt A.S., Dhillon W.S. (2017). Effect of polymeric flms on physiological, biochemical and enzymatic changes in eggplant (*Solanum melongena*) under ambient conditions. *Indian Journal of Agricultural Sciences*. **87**: 923-929	6.22
1106	Sidhu S.K., Kaur J., Singh I. (2017). Agroclimatic indices and phenology of pigeonpea [*Cajanus cajan* (L.) Millsp.] in relation to its yield. *Journal of Agrometeorology*. **19**:129-133	6.40
1107	***Sidhu S K, Kaur J, Singh S, Grewal S K and Singh M (2017). Variation of morpho-physiologicaltraits in geographically diverse pigeonpea [Cajanus cajan (L.) Millsp] germplasm under different phosphorus conditions. J Plant Nutr*** *41:* ***1321-1332.***	6.62
1108	Singh A and Bajwa U (2017). Physico-chemical and antioxidant properties of maillard reaction product incorporated ice-cream. *Chem Sci Review Lett***6:** 88-93.	5.21
1109	Singh A and Khanna V (2017). Functional attributes of psychrotolerant rhizobacteria from wheat (*Triticum aestivum* L.) rhizoshpere. *Int J Curr Microbiol App Sci* **6:** 2065-2078.	5.38
1110	Singh A., Bains K., Kaur H. (2017). Relationship of eating behaviors with age, anthropometric measurements, and body composition parameters among professional indian women. *Ecology of Food and Nutrition*. **56**: 411-423	6.92
1111	Singh A., Kaushal A., Garg S., Chawla N. (2017). Effect of different coloured plastic mulches on growth, yield and quality of drip fertigated bell pepper (*Capsicum annum* var. grossum). *Indian Journal of Horticulture*. **74**: 292-294	6.15
1112	Singh A., Sharma S. (2017). Bioactive components and functional properties of biologically activated cereal grains: A bibliographic review. *Critical Reviews in Food Science and Nutrition*. **57**: 3051-3071	12.08
1113	Singh A., Sharma S., Singh B. (2017). Effect of germination time and temperature on the functionality and protein solubility of sorghum flour. *Journal of Cereal Science*. **76**:131-139	8.22
1114	Singh A., Sharma S., Singh B. (2017). Influence of grain activation conditions on functional characteristics of brown rice flour. *Food Science and Technology International*. **23**: 500-512	6.99
1115	Singh A., Singh S. (2017). CFD investigation on roughness pitch variation in non-uniform cross-section transverse rib roughness on Nusselt number and friction factor characteristics of solar air heater duct. *Energy*. **128**:109-127	10.52
1116	Singh A, Sharma V, Dikshit H K, Aski M, Kumar H, Thirunavukkarasu N, Patil B S, Kumar S and Sarker A (2017) Association mapping unveils favorable alleles for grain iron and zinc concentrations in lentil (*Lens culinaris* subsp. *culinaris*). *PloS one,***12**, e0188296.	9.06
1117	Singh B, Singh V, Singh Y, Thind H S, Kumar A, Choudhary O P, Gupta R K and Vashistha M (2017). Site specific fertilizer nitrogen using optical sensor in irrigated wheat in North-Western India. *Agric Res* **6:** 159-168.	5.90
1118	Singh D P, Sharma A K, Singh I, Karwasra S S, Jain S K, Pant S K, Sharma I, Bala R, Majumdar V L and Bansal R K (2017). Resistance in Indian wheat and triticale against loose smut caused by *Ustilago tritici.Ind Phytopath***70:** 131-133.	5.90
1119	Singh D, Kaur P and Kaur M (2017). A logit analysis of farmers' knowledge regarding Zero Tillage in wheat. *Ind J Ext Edu*53: 1-5.	5.32
1120	Singh D, Gill M I S, and Arora N K (2017). Studies on crossing behaviour and hybridization in guava. *J Environ Biol* **38:** 1341-1347	6.53

1121	Singh D., Singh R., Sandhu J.S., Chunneja P. (2017). Morphological and genetic diversity analysis of *Citrullus landraces* from India and their genetic inter relationship with continental watermelons. *Scientia Horticulturae*. **218**: 240-248	7.62
1122	Singh G and Rattanpal H S (2017). Effect of indole butyric acid on quantitative measurement responses of nursery plants of fig *(Ficus carica* L.) *cv.* Brown Turkey *Chem Sci Rev Lett***6:** 88-93.	5.21
1123	Singh G, Aulakh P S and Rattanpal H S (2017). Determination of maturity and genetic diversity in mandarin (*Citrus reticulata*Blanco) genotypes based on Citrus Colour Index. *Intl J Curr Microbiol App Sci* **6:** 577-586.	5.38
1124	Singh G, Aulakh P S and Rattanpal H S (2017). Fruit setting pattern and germination of F1 Seeds in some intra-specific crosses of Mandarin (*Citrus reticulata* Blanco). *App Bio Res***19:** 264-269.	5.07
1125	Singh G, Kang J S and Singh H (2017). Productivity of *Kharif*maize (*Zea mays*L.) as influenced by sub-soiling and planting methods. *Int J Curr Microbiol App Sci***6:** 513-521.	5.38
1126	Singh G, Ram H and Aggarwal N (2017). Growth, productivity and economics of *kabuli* chickpea (*Cicer arietinum* L.) genotypes in response to seed rate in Northern India. *Int J Curr Microbiol App Sci* **6:** 3917-3930.	5.38
1127	Singh G, Ram H and Aggarwal N (2017). Agronomic management of cowpea for high grain yield and sustainable agriculture in Western Indo-Gangetic Plain of India. *IntlJ Curr Microbiol App Sci***6:** 2633-2647.	5.38
1128	Singh G, Virk H K and Sharma P (2017). Efficacy of pre- and post-emergence herbicides for weed control in green gram. *Ind J Weed Sci* **49:** 252-255.	5.17
1129	Singh H, Buttar G S, Brar A S and Deol J S (2017). Crop establishment method and irrigation schedule effect on water productivity, quality, economics and energetic of aerobic direct-seeded rice (*Oryza sativa* L.). *Paddy Water Environ***15:** 101-109	6.92
1130	Singh H, Kang J S and Kaur J (2017). Tillage and residue management for sustaining rice-wheat cropping system in Indo-Gangetic plains - A review. *The Pharma Innov J***6:** 89-99.	5.03
1131	Singh H, Mandeep and Kang J S (2017). Effect of potassium nitrate on yield and yield attributes of spring maize (*Zea mays* L.) under different dates of planting. *Intl J Curr Microbiol App Sci* **6:** 1581-1590.	5.38
1132	Singh H., Buttar G.S., Brar A.S., Deol J.S. (2017). Crop establishment method and irrigation schedule effect on water productivity, quality, economics and energetics of aerobic direct-seeded rice (*Oryza sativa* L.). *Paddy and Water Environment*. **15**: 101-109	6.92
1133	Singh H., Thakur A., Jawandha S.K. (2017). Summer stratification and germination: A viable option for recovery of hybrid seedlings in low chill peach and nectarines. *Indian Journal of Horticulture*. **74**: 151-155	6.15
1134	Singh I., Sarao P.S., Sharma N. (2017). Antibiosis components and antioxidant defense of rice as mechanism of resistance to brown planthopper, *Nilaparvata lugens* (stal). *Cereal Research Communications*. **45**: 284-295	6.50
1135	Singh I K, Singh S, Kanakachari M, Shukla J N and Subba Reddy P (2017) Comparative analysis of double-stranded RNA degradation and processing in insects. *Sci Rep* **7**: 17059doi:10.1038/s41598-017-17134-2.	10.26
1135	Singh J, Mavi M S, Sekhon B S and Singh G (2017). Soil test based fertilizer prescriptions through inductive cum targeted yield approach for wheat in alluvial soils of North-West India. *The Bioscan* **12:** 295-299.	5.26
1136	Singh J, Dhaliwal H S, Thakur A, Chhuneja P, Sidhu GS and Singh R (2017). Morphological and genetic diversity in citrus genotypes to substantiate breeding for root rot resistance. *Ind J Hort***74:** 326-333.	6.15
1137	Singh J, Dhaliwal H S, Thakur A, Chhuneja P, Sidhu G S and Singh R (2017). Morphological and genetic diversity in citrus genotypes to substantiate rootstock breeding for root rot resistance. *Ind J Hort* **74:** 326-333.	6.13

1138	Singh K, Kaur R, Singh G and Chandi A K (2017). Influence of spinosad on reproduction of diamond back moth, Plutella xylostella (Linnaeus). *Ind J Entomol***79:** 467-473.	5.89
1139	Singh K, Mishra S K and Singh R S (2017) Performance of sugarcane genotypes grown under varying weather conditions in south western Punjab. *J Agrometeorol***19**: 86-91.	6.36
1140	Singh K, Singh H P and Singh K (2017) Weed management in cotton with pre- and post-emergence herbicides. *Ind J Weed Sci***48**: 348-350.	5.17
1141	Singh K.G., Rudra R.P., Kaur A., Khan A.A. (2017). Effect of mulches and drip irrigation management on the quality and yield of potato relating hydro-thermal regime of soil. *AMA, Agricultural Mechanization in Asia, Africa and Latin America*. **48**: 37-43	6.12
1142	Singh L and Pathak D (2017). Genetic variation for some morphological characters in *desi* cotton. *App Biol Res***19:** 232-236.	5.07
1143	Singh M, Bala R, Sharma V K, Kaur J and Sharma S (2017). Biochemical basis of resistance in wheat against Karnal bunt caused by *Tilletia indica*. *Ind Phytopath***70:** 216-219.	5.90
1145	Singh M, Sharma K, Mishra P K, Dixit A K and Patel B (2017). Defoliation effect on cotton crop by using different sprayers. *Agril Engg Today***41:** 31-34.	5.30
1146	Singh M., Bhullar M.S., Chauhan B.S. (2017). Relative time of weed and crop emergence is crucial for managing weed seed production: A study under an aerobic rice system. *Crop Protection*. **99**: 33-38	7.83
1147	Singh M., Sidhu H.S., Mahal J.S., Manes G.S., Jat M.L., Mahal A.K., Singh P., Singh Y. (2017). Relay sowing of wheat in the cotton-wheat cropping system in north-west India: technical and economic aspects. *Experimental Agriculture*. **53**: 539-552	7.07
1148	Singh M C, Jain A K and Jalota S K (2017). Impact of transplanting date and irrigation scheduling on water balance, water productivity and soil moisture movement. *J Agri Engg* **54:** 28-32.	5.59
1149	Singh M C, Singh J P, Pandey S K, Mahay D and Shrivastva V (2017). Factors affecting the performance of greenhouse cucumber cultivation - A review. *Int J Curr Microbiol Appl Sci***6:** 2304-2323.	5.38
1150	Singh N., Bala M. (2017). Growth and flowering response of Chrysanthemum morifolium cultivar Anmol to different growth retardants. *Indian Journal of Agricultural Sciences*. **87**: 644-647	6.22
1151	Singh N., Raina S., Singh D., Ghosh M., Heflish A.I.A.I. (2017). Exploitation of promising native strains of *Bacillus Subtilis* with antagonistic properties against fungal pathogens and their PGPR characteristics. *Journal of Plant Pathology*. **99**: 27-35	7.27
1152	Singh N, Kumar R and Dhillon B S (2017). Status of small farming units and strategies for their sustainable development in India. *OIDA Int J Sust Dev***10:** 41-52.	7.61
1153	Singh P, Garg S, Satpute S and Singh A (2017). Use of rice husk ash to lower the sodium adsorption ratio of saline water. *Intl J Curr Microbiol App Sci***6:** 448-458.	5.38
1154	Singh P S, Singh M and Taggar M S (2017). Mass cultivation and harvesting of microalgae (*Chlorella Sorokiniana*) for biomass and lipid production. *Int J Chem Stud***5:** 173-178	5.31
1155	Singh P.K., Singh K.K., Gill K.K., Niwas R., Singh R.S., Sharma S. (2017). Dry biomass partitioning of growth and development in wheat (*Triticum aestivum* L.) crop using CERES-wheat in different agro climatic zones of India. *Current Science*. **113**: 752-766	6.84
1156	Singh R and Singh G (2017). Economic analysis of application of weed management practices in *kharif* and summer *mungbean* [*Vigna radiata* (L.) Wilczek). *IntJ Curr Microbiol App Sci* **6:** 3182-3190.	5.38
1157	Singh R.P., Srivastava P., Sharma A., Bains N.S. (2017). Bread wheat cultivar PBW 343 carries residual additive resistance against virulent stripe rust pathotype. *Journal of Crop Improvement*. **31**: 183-191	6.32

1158	Singh R.P., Srivastava P., Sharma A., Bains N.S. (2017). Genetic basis of stripe rust resistance in transgressive derivatives of a cross between susceptible bread wheat parents. *Indian Journal of Genetics and Plant Breeding*. **77**: 10-15	6.32
1159	Singh R, Chahal K K and Singla N (2017). Chemical composition and pharmacological activities of *Saussurea lappa*: A review. *J Pharma Phytochem***6:** 1298-1307.	5.21
1160	Singh R, Singla N and Kaur N (2017). Determination of method and timings of rodent control in direct seeded and transplanted basmati rice crops. *The Bioscan***12:** 697-701	5.26
1161	Singh S., Arora N.K., Gill M.I.S., Gill K.S. (2017). Differential crop load and hormonal applications for enhancing fruit quality and yield attributes of grapes var. Flame Seedless. *Journal of Environmental Biology*. **38**: 713-718	6.70
1162	Singh S., Sharnia D.K., Bhatia S., Singh A. (2017). Effect of various plant powders on rice weevil (*Sitophilus oryzae* Linn.) in stored wheat. *Journal of Environmental Biology*. **38**: 501-508	6.70
1163	Singh S, Kingra P K and Dhaliwal L K (2017). Micrometeorological aspects and radiation use efficiency of wheat under different hydrothermal regimes. *J Agrometeorol***20:** 202-206.	6.36
1164	Singh T, Singh A, Singh B and Sharma S (2017). Effect of storage conditions on product characteristics and microbiological quality of self rising flour. *Intl J Curr Microbiol App Sci***6:** 561-574.	5.38
1165	Singh, M C, Jain A K and Jalota S K (2017). Impact of transplanting date and irrigation scheduling on water balance, water productivity and soil moisture movement. *J Agril Engg***54:** 28-32.	5.59
1166	Singla D and Taggar M S (2017). Production of cellulases by solid state fermentation of different agricultural residues using *Humicola insolens* MTCC 1433. *Int J Curr Microbiol Appl Sci* **6:** 1409-1418	5.38
1167	Singla N, Singla P and Jain R (2017). Anthropometric profile of rural Punjabi women as influenced by their dietary and nutrient intake. *App Biol Res* **19:** 299-306	5.07
1168	Singla N, Dhar P and Gupta K (2017). Effect of nifedipine on fertility of male lesser bandicoot rat (*Bandicota bengalensis*). *App Biol Res* **19:** 79-88.	5.07
1169	Sinha I., Buttar G.S., Brar A.S. (2017). Drip irrigation and fertigation improve economics, water and energy productivity of spring sunflower *(Helianthus annuus* L.) in Indian Punjab. *Agricultural Water Management*. **185**: 58-64	8.85
1170	Sita K., Sehgal A., Kumar J., Kumar S., Singh S., Siddique K.H.M., Nayyar H. (2017). Identification of high-temperature tolerant lentil (*Lens culinaris* Medik.) genotypes through leaf and pollen traits. *Frontiers in Plant Science*. **8**: 744	10.30
1171	Sohi G K and Kler T K (2017). Adaptations in avian nesting behavior in relation to indigenous trees and housing structures in Punjab. *J Entomol Zoo Stud* **5:** 1045-1051.	5.53
1172	Sood B, Sahota P and Hunjan M (2017). Multidrug resistant bacillus cereus in fresh vegetables: A serious burden to public health. *Int J Curr Microbiol App Sci* **6:** 649-661.	5.38
1173	Sraw P K, Kaur A and Singh K (2017). Scope of brown manuring in aerobic rice in central Punjab. *J Crop and Weed***13:** 17-22.	5.28
1174	Subah S., Derminder S., Sanjeev C. (2017). An interactive computer vision system for tree ring analysis. *Current Science*. **112**: 1262-1265	6.84
1175	Suneja Y., Gupta A.K., Bains N.S. (2017). Bread wheat progenitors: *Aegilops tauschii* (DD genome) and *Triticum dicoccoides* (AABB genome) reveal differential antioxidative response under water stress. *Physiology and Molecular Biology of Plants*. **23**: 99-114	6.88
1176	Sunny K and Kaur S B (2017). Climatic variability and its impact on rice and wheat productivity in Punjab. *J Agrometerol***19:** 359-392.	6.40
1177	Suri K S and Makkar G S (2017). Alternative strategy for the management of leaf folder *Cnaphalocrocis medinalis* in rice. *Ind J Ent* (accepted).	5.89

1178	Suri K S and Makkar G S (2017). Bioefficacy and dose optimization of Emamectin benzoate 1.9 EC against rice stem borers and leaffolder. J Exp Zool India20: 733-737.	5.51
1179	Suri K S and Makkar G S (2017). Bioefficacy potential of Triflumezopyrim for the management of rice planthoppers. *The Bioscan* **13:** 249-253.	5.26
1180	Tak Y and Asthir B (2017). Fluoride induced changes in anti-oxidant defence system in two contrasting cultivars of *Triticum aestivum* L. *Fluoride***50:** 324-333.	6.80
1181	Thapar P and Garcha S (2017). Incidence and characterization of *Pseudomonas* species isolated from spoilt fresh produce. *Ind J Exp Biol***55:** 372-376	7.17
1182	Thind H.S., Singh Y., Sharma S., Singh V., Sran H.S., Singh B. (2017). Phosphorus fertilizing potential of bagasse ash and rice husk ash in wheat-rice system on alkaline loamy sand soil. *Journal of Agricultural Science*. **155**: 465-474	6.22
1183	Varinderpal-Singh, Bijay-Singh, Yadvinder-Singh, Thind H.S., Buttar G.S., Kaur S., Meharban-Singh, Kaur S., Bhowmik A. (2017). Site-specific fertilizer nitrogen management for timely sown irrigated wheat (*Triticum aestivum* L. and *Triticum turgidum* L. ssp. durum) genotypes. *Nutrient Cycling in Agroecosystems*. 109 1-16	7.84
1184	Verma V C, Kaur S, Gupta A K, Kaur J, Singh S and Surabhi (2017). Changes in the activity of carbon and nitrogen metabolising enzymes in nodules of bold and small seeded lentil cultivars. Int J Curr Microbiol App Sci 6: 3311-3320.	5.38
1185	Veena and Kaur P (2017). Spectrofluorometric determination of glyphosate in water. *Asian J Chem* **29:** 792-796.	5.0
1186	Virk H K, Singh G and Sharma P (2017). Effect of tillage, crop residues of preceding wheat crop and nitrogen levels on biological and chemical properties of soil in the soybean–wheat cropping system. *Comm Soil Sci Plant Anal* **48:** 1764-1771.	6.53
1187	Virk H.K., Singh G., Sharma P. (2017). Productivity, nutrient uptake, energy indices and profitability of soybean (*Glycine max*) as influenced by planting methods, Bradyrhizobium and plant growth promoting rhizobacteria. *Indian Journal of Agronomy*. **62**: 341-347	5.46
1188	Virk H K, Singh G and Sharma P (2017). Symbiotic parameters, growth, nutrient uptake as influenced by biofertilizers under conservation agriculture practices. *Proc Natl Acad Sci, India Sect B: Biol Sci* DOI: 10.1007/s40011-017-0886-4. **(5.00)**	
1189	Yadav R., Bhullar M.S., Kaur S., Kaur T., Jhala A.J. (2017). Weed control in conventional soybean with pendimethalin followed by imazethapyr + imazamox/quizalofop-p-ethyl. *Canadian Journal of Plant Science*. **97**: 654-664	6.87
1190	Yadav R, Bhullar M S, Kaur S, Kaur T and Jhala A J (2017). Weed control in conventional soybean with pendimethalin followed by imazethapyr + imazamox/quizalofop-*p*-ethyl. *Canadian J Plant Sci* **97:** 654-664	6.73
1191	Yadav S B, Patel H R, Mishra SK, Parmar PK, Karandey BI and Pandey V. (2017) Impact assessment of climate change on groundnut yield of middle Gujarat region. *Mausam***68**: 93-98.	6.47
1192	Yadav V., Kaur P., Kaur P. (2017). Effect of light conditions and chemical characteristics of water on dissipation of glyphosate in aqueous medium. *Environmental Monitoring and Assessment*. **189**: 613	7.69
1193	Yousuf A, Bhardwaj A, Tiwari A K and Bhatt V K (2017). Simulation of runoff and sediment yield from a forest micro watershed in Shivalik foothills using WEPP model.*Ind J Soil Cons***45**: 21-27.	5.20
2018		
1194	Anand A and Kaur M (2018). Stakeholders' perspective on agricultural subsidies in Punjab. *J Comm Mob Sust Dev* **13:** 151-159.	5.30

1195	Arora S, Mohanpuria P, Sidhu G S, Yadav I S and Kumari V (2018). Cloning and characterization of limonoid glucosyltransferase from Kinnow mandarin (*Citrus reticulata* Blanco). *Food Technol Biotechnol (Special Issue)***56:** DOI: 10.17113/ftb.56.02.18.5349.	6.89
1196	Atri C, Kumar H and Sharma S (2018). Agro-biochemical based characterization and molecular profiling of Linseed (*Linum usitattissimum* L.) cultivars. *App Biol Res***20:** 137-145.	5.07
1197	Atul K, Gill J P S, Bedi J S, Manav M, Ansari M J and Walia G S (2018). Sensorial and physicochemical analysis of Indian honeys for assessment of quality and floral origins. *Food Res Int***108:** 571-583.	9.09
1198	Bajaj K and Singh S (2018). Response of fruit flies, *Bactrocera* spp. (Diptera: Tephritidae) to different shapes of methyl eugenol based traps in guava orchards of Punjab. *J Entomol Zoo Stud***6:** 2435-2438.	5.52
1199	Bhatia D, Wing R A, Yu Y, Chougule K, Kudrna D, Rang A and Singh K (2018). Genotyping by sequencing of rice interspecific backcross inbred lines identifies QTLs for grain weight and grain length. *Euphytica* **214:** 41.	7.63
1200	Bindya, Dhanesh T and Kochhar A (2018).Development and sensory evaluation of a value added products incorporating partially defatted peanut cake flour and powdered greens.*Chem Sci Rev Lett* **7:** 25-33.	5.21
1201	Bindya, Dhanesh T, Kochhar A and Javed M (2018). Effect of storage on the quality of value added snacks developed using partially defatted peanut cake flour and fenugreek leaves powder. *Int J Curr Microbiol Appl Sci* **7:** 1127-1135.	5.38
1202	Bindya, Dhanesh T,Kochhar A and Javed M (2018).Shelf life study on the quality of traditional Punjab sweet products supplemented with partially defatted peanut cake flour and dehydrated spinach leaves powder. *Int J Chem Stud***6:** 682-686.	5.31
1203	Brar A S, Buttar G S and Sharma R (2018). Water and energy productivity of rice as influenced by duration of cultivars, dates of transplanting and irrigation regime in North Western India. *Paddy Water Environ* DOI: org/10.1007/s10333-018-0658-7.	6.92
1204	Chabbra A, Sharma V K and Pal V (2018). Impact of dairy cooperatives on input and energy use of milk production in Punjab. *Ind J Dairy Sci***71:** 288-293.	5.32
1205	Chahal S S, Choudhary O P and Mavi M S (2018). Microbial activity is constrained by the quality of carbon and nitrogen under long-term saline water irrigation. *Comm Soil Sci Plant Anal* **49:** 1266-1280.	6.59
1206	Chandel S, Hadda M S and Mahal A K (2018). Soil quality assessment through minimum data set under different land uses of submontane Punjab. *Comm Soil Sci Plant Anal***49:** 658-674.	6.59
1207	Chandi R S, Singh V, Pathania P C and Kataria S K (2018). First report of oleander aphid, *Aphis nerii* Boyer de Fonscolombe (Hemiptera: Aphididae) on milkweed (*Calotropis gigantea* (L.) W. T. Aiton: Apocynaceae) from Punjab, India. *J Entomol Zoo Stud***6:** 296-299.	5.53
1208	Dar E A, Brar A S and Yousuf A (2018) Growing degree days and heat use efficiency of wheat as influenced by thermal and moisture regimes. *J Agrometeorol* **20**: 168-170.	6.40
1209	Dar R A, Dar E A, Kaur A and Phutela U G(2018). Sweet sorghum - A promising alternative feedstock for biofuel production. *Renew Sust Energy Rev***82:** 4070–4090.	14.05
1210	Deol J S, Rajni and Kaur R (2018). Production potential of cotton (*Gossypium hirsutum*) as affected by plant growth regulators (PGRs) - A review. *Int J Curr Microbiol Appl Sci***7:** 3599-3610.	5.38
1211	Devi I, Singh H and Thakur A (2018). Effect of developmental stage and medium on embryo culture of low chill peach hybrids. Curr Sci 114: 1771-1775.	6.97
1212	Devi J, Bhatia S, Alam M S and Dhillon T S (2018). Effect of calcium and salicylic acid on quality retention in relation to anti-oxidative enzymes in radish stored under refrigerated conditions. *J Sci Food Technol***55:** 1116–1126.	7.26

1213	Dhaliwal A K, Brar D S, Mahal A K and Jindal J (2018). Influence of weather influence of weather parameters on incidence of maize stem borer, *Chilo partellus* (Swinhoe) in summer maize in Punjab. *Ind J Agrometeorol***20:** 174-176.	6.40
1214	Dhaliwal L K, Sandhu S K, Kaur S and Singh S (2018). Effect of meteorological parameters on incidence of brown leaf spot in rice crop under different planting methods. *J Agrometeorol***20:** 53-56.	6.40
1215	Dhanesh T, Kochhar B, Anita and Javed M (2018). Effect of storage on the quality of value added snacks developed using partially defatted peanut cake flour and fenugreek leaves powder. *Int J Curr Microbiol Appl Sci***7:** 1127-1135. **(5.38)**	5.38
1216	Dhanesh T, Kochhar B, Anita and Javed M (2018). Effect of supplementation of partially defatted peanut cake flour and dehydrated spinach leaves powder on the nutritional quality of Indian seasonal sweets. *Int J Curr Microbiol Appl Sci***7:** 384-392.	5.38
1217	Dhillon B S, Sharma P K and Dhingra M(2018). Boron and TIBA induced physiological and anatomical changes in relation to dry matter partitioning in spring sunflower (Helianthus annuus L.) under delayed sowing. Ind J Plant Physiol23: 352-359.	5.18
1218	Dhillon B S, Sharma P K and Sardana V (2018). Influence of foliar application of boron and TIBA on photosynthetic parameters *vis-a-vis* productivity of sunflower (*Helianthus annuus* L.) under variable sowing date. *J Agrometeorol***20:** 16-21.	6.40
1219	Gaba Y and Vashishat N (2018). Roosting ecology of spotted owlet (*Athene brama*) and barn owl (*Tyto alba*) in agro-ecosystem of Punjab. *J Entomol Zoo Stud***6:** 829-833.	5.53
1220	Garg L and Riar T S (2018). Perceived benefits of adoption of low tunnel technology for vegetable production in Punjab state. *J Comm Mob Sust Dev* **13:** 165-168.	5.30
1221	Garg T, Mallikarjuna B P, Thudi M, Samineni S, Singh S, Sandhu J S , Kaur L, Singh I, Sirari A, Basandrai A K , Basandrai D, Varshney R K and Gaur P M (2018). Identification of QTLs for resistance to Fusarium wilt and Ascochyta blight in a recombinant inbred population of chickpea (Cicer arietinum L.). Euphytica 214: 45.	7.63
1222	Ghorai A K, Sharma S, Sharma A and Kang S S (2018). Prevalence of major potato viruses and aphid population dynamics in Punjab, India. *J Entomol Zoo Stud***6:** 1385-1389.	5.53
1223	Gill N, Dogra R and Dogra B (2018). Influence of moisture content, particle size and binder ratio on quality economics of rice straw briquettes. *Bioene Res* **11:** 54-68.	9.31
1224	Goyal M and Kaur N (2018). Low temperature induces oxidative stress tolerance in oats (*Avena sativa* L.) genotypes. *Ind J Plant Physiol***23:** 316-324.	5.18
1225	Goyal M, Dar R A and Phutela U G (2018). Poultry dropping based biodigested slurry for protease production by *Humicola fuscoatra* MTCC 1409: Optimization and kinetic study. *J Exp Biol Agri Sci***6:** 131-141.	5.07
1226	Grewal G K and Kumar V (2018). Persistence and residual toxicity of insecticides against *Bemisia tabaci* (Gennadius) in cotton. *Ind J Entomol***80:** 427-436.	5.89
1227	Gupta J and Dubey R K (2018). Factors affecting post harvest life of flower crops. *Int J Curr Microbiol Appl Sci* **7:** 548-557.	5.38
1228	Gupta J, Dubey R K, Kaur N and Choudhary O P (2018). Nutrients accumulation in four ornamental tree species under saline stress conditions. *J Plant Nutr* **41:** 1724-1733.	6.62
1229	Gupta N, Pandove G and Gangwar M (2018) Effect of *Azotobacter* and *Sphingobacterium* species on guava seedlings under nursery conditions. *Indian J Hort***75**: 53-57	6.15
1230	Hirose S and Kumar R (2018). Measurement of the τ lepton polarization and R (D) in the decay B D τ–ντ with one-prong hadronic τ decays at Belle. *Phys Rev D***97:** 012004.	8.1

1231	Jaidka M, Deol J S and Brar A S (2018). Development of optimized source-sink relationship, favorable morpho-physiological behavior and profitability of soybean through de-topping and mepiquat chloride application. *J Crop Weed***14:** 82-89.	5.28
1232	Jain D and Katyal P (2018). Optimization of gluco-amylase production from *Aspergillus* spp. for its use in saccharification of liquefied corn starch. *Biotechnol* **8:** 1131-1134.	7.36
1233	Jalota S K, Jain A K and Vashisht B B (2018). Minimize water deficit in wheat crop to ameliorate groundwater decline in rice-wheat cropping system. *Agric Water Manag* **208:** 261-267.	8.85
1234	Jariyal M, Jindal V, Mandal K, Gupta V K and Singh B (2018). Bioremediation of organophosphorus pesticide phorate in soil by microbial consortia. *Ecotoxicol Environ Safety***159:** 310-316.	9.74
1235	Jindal V and Kumar V (2018). Impact of dissemination of integrated pest management strategies for insect-pests of transgenic cotton in Punjab. *Ind J Entomol* **80:** 226-231.	5.89
1236	Kaur A and Katyal P (2018). Tannase production by fungal isolates from tannery effluent. *Chem Sci Rev Lett* **6:** 2273-2280.	5.21
1237	Kaur A, Chahal K K, Kataria D, Kumar A and Urvashi (2018). Assessment of carrot seed essential oil and its chemical constituents against *Meloidogyne incognita*. *J Pharma Phytochem* **7:** 896-903.	5.21
1238	Kaur A, Sidana K, Bhatia D, Neelam K, Singh G, Sahi G K, Gill B K., Sharma P, Yadav I S and Singh K (2018) A novel QTL qSPP2.2 controlling spikelet per panicle identified from *Oryzalongistaminata* (A. Chev. et Roehr.), mapped and transferred to *Oryzasativa* (L.). *Mol Breed***38** doi.org/10.1007/s11032-018-0843-9	8.47
1239	**Kaur G, Singla N, Singh B and Javed M (2018). Nutritional evaluation of cereal-pulse based extruded snacks supplemented with dehydrated herbs.** *Curr J Appl Sci Tech***28:** 1-14.	**5.32**
1240	Kaur H and Gupta N (2018). Effect of proline and ascorbic acid on seed germination and viguor parameters of tomato (*Solanum lycopersicum* L.) under salt stress. *Int J Curr Microbiol Appl Sci***7:** 3523-3532.	5.31
1241	Kaur H, Bedi S, Sethi V P and Dhatt A S (2018). Effect of substrate hydroponic systems and different N and K ratios on yield and quality of tomato fruit. *J Plant Nutr***41:** 1547-1554.	6.62
1242	Kaur H, Kaur J, Bala R, Sharma A, Pannu P P S, Chunejja P and Bains N S (2018). Virulence and genetic diversity of *Puccinia striiformis* f. sp. in Punjab, India. *Ind Phytopath* **70:** 418-425.	5.90
1243	Kaur H, Kaur N, Gill R I S, Bhullar M S and Singh A (2018). Weed management in Eastern cottonwood (*Populus deltoids* Bartr.) nursery plantation. *Weed Technol***32:** 284-289.	6.88
1244	Kaur H, Sawhney B K and Jawandha S K (2018). Evaluation of plum fruit maturity by image processing technique. *J Food Sci Technol* (online).	7.00
1245	Kaur J and Babbar B K (2018). Studies on repellent and feeding behaviour of house rat, *Rattus rattus,* in response to cinnamamide. *App Biol Res* **19:** 220-225.	5.07
1246	Kaur J, Pandove G and Gangwar M (2018) Mitigating the impact of climate change by use of microbial inoculants. *The Pharma Innov J***7**: 279-288	5.03
1247	Kaur J, Pandove G, Gangwar M and Brar S K (2018) Development of liquid bio-fertilizer: An innovative agronomic practice for sustainable agriculture. *J Exp Biol Agric Sci* **6**: 472– 481	5.07
1248	Kaur K and Kaur K (2018). Nitric oxide improves thermotolerance in spring maize by inducing varied genotypic defense mechanisms. *Acta Physiol Plant***40:** 55.	7.36
1249	Kaur L and Sardana V (2018). Sowing dates and nitrogen scheduling influence growth and productivity of canola oilseed rape (*Brassica napus*). *Ind J Agron***63:** 250-254.	5.46
1250	Kaur M, Chahal K K, Kumar A, Kaur R and Urvashi (2018). Nematicidal activity of bay leaf (*Laurus nobilis* L.) essential oil and its components against *Meloidogyne incognita.J Entomol Zoo Stud***6:** 1057-1064.	5.53
1251	Kaur M, Sahota P, Sharma N, Kaur K and Sood B (2018). Enzymatic production of debittered kinnow juice and beverage. *Int J Curr Microbiol Appl Sci* **7:** 1180-1186.	5.32

1252	Kaur N and Kumar M (2018). Avian diversity in relation to indigenous trees. *J Entomol Zoo Stud***6:** 1739-1745.	5.53
1253	Kaur N, Chahal K K, Singh R and Urvashi (2018). Phytochemical screening and anti-oxidant activity of *Anethum graveolens* L. seed extracts. *Pharma Innov***7:** 324-329.	5.03
1254	Kaur N, Singla N and Singh R (2018). Efficacy of rodenticide bait application for rodent pest management in potato crop. *J Entomol Zoo Stud***6:** 2149-2152.	5.53
1255	Kaur P and Kaur P (2018). Time and temperature dependent adsorption-desorption behaviour of pretilachlor in soil. *Ecotoxicol Environ Safety***161:** 145-155.	9.97
1256	Kaur P, Makkar A, Kaur P and Shilpa (2018). Temperature dependent adsorption-desorption behaviour of pendimethalin in Punjab soils. *Bull Environ Contam Toxicol***100:** 167-175.	7.19
1257	Kaur R, Kapoor R, Vikal Y and Kaur K (2018). Assessing genetic diversity in dual purpose oat (*Avena sativa* L.) cultivars based on morphological and quality traits. *Int J Curr Microbiol Appl Sci* **7:** 1574-1586.	5.38
1258	Kaur R, Shivay Y S, Singh G, Virk H K, Sen S and Rajni (2018). Increasing area under pulses and soil quality enhancement in pulse-based cropping systems - Retrospect and prospects. *Ind J Agric Sci***88:** 10-21.	6.22
1259	Kaur S, Barua I C, Kaur T, Kaur N, Kaul A and Bhullar M S (2018). Appearance of new weeds in Punjab. *Ind J Weed Sci***50:** 59-63.	5.17
1260	Kaur S, Kaur R and Chauhan B S (2018). Understanding crop-weed-fertilizer-water interactions and their implications for weed management in agricultural systems. *Crop Prot***103:** 65-72.	7.83
1261	Kaur S, Kler T K and Javed M (2018). Abundance and diversity of water bird assemblages in relation to village ponds in Punjab. *J Entomol Zool Stud***6:** 1375-1380.	5.53
1262	Kaur T, Kapoor S and Kalia A (2018). Synthesis of silver nanoparticles from *Pieurotus florida,* Characterization and analysis of their anti-microbial activity. *Int J Curr Microbiol Appl Sci* **7:** 4085-4095.	5.32
1263	Keshani, Sharma S, Kanwar S S, Khanna P K and Kapoor S (2018). Region based diversity studies of *Saccharomyces cerevisiae* and *Lentinula edodes. Int J Curr Microbiol Appl Sci***7:** 3702-3713.	5.38
1264	Kingra P K, Setia R, Kaur S, Kaur J, Singh S, Singh S P, Kukal S S and Pateriya B (2018). Analysis and mapping of Spatio-temporal climate variability in Punjab using classical statistics and geostatistics. *Mausam***69:** 147- 160.	6.47
1265	Kler T K, Kumar M and Vashisha N (2018). Effect of electromagnetic radiations on diversity and breeding biology of birds living near power lines and mobile towers at Ludhiana, Punjab. *J Environ Biol***39:** 247-252.	6.53
1266	Kothawale A G, Bector V, Singh V P and Singh M (2018). Trend analysis of vegetation indices using spectroradiometer at different growth stages of cotton. *Agri Mechan Asia, Afr Latin Am***49:** 63-66.	6.12
1267	Kumar K, Sarao P S, Bhatia D, Meelam K, Kaur A, Mangat G S, Brar D S and Singh K (2018). High-resolution genetic mapping of novel brown planthopper resistance locus, Bph34 in *Oryza sativa* X *Oryza nivara* (Sharma & Shastry) derived interspecific F_2 population. *Theor Appl Genet***131:** 1163-1171.	10.13
1268	Kumar P and Kaur P (2018). Role expectation of subject matter specialists of selected *Krishi Vigyan Kendras* of Northern India. *Ind J Ext Edu* **53:** 37-44.	5.32
1269	Kumar S, Kumar D, Sekhon K S and Choudhary O P (2018). Influence of levels and methods of boron application on the yield and uptake of boron by cotton in a calcareous soil of Punjab. Comm Soil Sci Plant Anal 49: 499-514.	6.59
1270	Kumari S and Khanna V (2018). Biological management of vascular wilt of chickpea (*Cicer arietinum* L.) incited by *Fusarium oxysporum* f. sp.cicerisby antagonistic rhizobacteria co-inoculated with native *Mesorhizobium. Int J Curr Microbiol Appl Sci***7:** 920-941.	5.38
1271	Kumari S and Mittal R (2018). WhatsApp: A worth medium of communication for transfer of technology to the masses. *Curr J Appl Sci Technol***23:** 1-9.	5.32

1272	Maan P K, Garcha S and Singh W G (2018). Prevalence of bacteriocinogenic *Rhizobium* spp. in mungbean (*Vigna radiata*). *Legume Res* 1-8 (online).	6.12
1273	Mahala P, Chaudhary M R and Garhwal O P (2018). Yield and quality of rabi onion influenced by integrated nutrient management. *Int J Curr Microbiol Appl Sci* **7**: 3313-3321.	5.38
1274	Makkar G S, Chhuneja P K and Singh J (2018). Stingless Bee, *Tetragonulairidipennis* Smith, 1854 (Hymenoptera: Apidae: Meliponini): Molecular and morphological characterization. *Proc Natl Acad Sci, India Sec B: Biol Sci***88:** 285-291. **(5.00)**	5.00
1275	Malhotra R and Singla N (2018). Analysis of regurgitated pellets of spotted owlet Athene brama (Temminck, 1821) (Aves: Strigiformes: Strigidae) from Punjab, India. *J Threatened Taxa***10:** 11717–11724.	5.10
1276	Mann S K, Sachan D and Kaur K (2018). Occupational status of Home Science graduates and postgraduates of Punjab Agricultural University, Ludhiana. *J Comm Mob Sus Dev* **13:** 317.	5.30
1277	Mavi M S,Singh G, Singh B P, Sekhon B S, Choudhary O P, Sagi S and Berry R (2018). Interactive effects of rice-residue biochar and N-fertilizer on soil functions and crop biomass in contrasting soils.*J Soil Sci Pl Nutr* **18:** 41-59.	7.60
1278	Meena Y, Khurana D S, Kaur N and Singh K (2018). Towards enhanced low temperature stress tolerance in tomato: An approach. *J Environ Biol***39:** 529-535.	6.70
1279	Meenakshi, Kumar S, Kiranjeet and Sharma H (2018). Effect of dopants and defects in graphene nanoribbons on dehydrogenation of MXH_4 where M= Na, Li and X = Al, B. *Computatnl Theortl Chem***1130:** 90-97.	7.44
1280	Meharkure M, Jencymol T, Arun Kumar T, Balkrishna S, Bhople N V, Saresh, Vaid S K and Sahu S K (2018) Zeolite farming: A sustainable agricultural perspective. *Int J Curr Microbiol Appl Sci***7**: 2912-2924.	5.38
1281	Mehraj U Din Dar, Aggarwal R and Kaur S (2018). Comparing bias correction methods in downscaling metrological variables for climate change impact study in Ludhiana, Punjab, India. *J Agrometeorol***20:** 126-130.	6.15
1282	Miglani N, Bains K and Bhathal (2018). Formulation and efficacy of metabolic syndrome-specific ingredient mix. *Nutr Food Sci* **48:** 272-284.	5.26
1283	Murria S, Kaur N, Arora N and Mahal AK (2018). Field reaction and metabolic alterations in grape (*Vitis vinifera* L.) varieties infested with anthracnose. *Sci Horti***235:** 286-293.	7.62
1284	Negi A, Kaur K and Sidhu K (2018). Socio-personal and academic factors affecting the extent of perceived stress among postgraduate students of Northern State Agricultural Universities (SAUs) of India. *J Comm Mobili Sust Dev* **13:** 374-383.	5.30
1285	Oberai M and Khanna V (2018). Rhizoremediation - Plant microbe interactions in the removal of pollutants. *Int J Curr Microbiol Appl Sci* **7:** 2280-2287.	5.38
1286	Pal R, Mahajan G, Sardana V, Sharma N and Chauhan B S (2018). Grain quality of dry-seeded rice (*Oryza sativa* L.) in response to sowing dates and genotypes. *Int J Plant Prod* https://doi.org/10.1007/s42106-018-0010-6.	7.07
1287	Pant R P, Kumar R, Arora A and Baranwal V K (2018). Detection of mandarivirus and greening bacterium using electron microscopy, PCR and RT-PCR in Kinnow mandarin nurseries in Punjab. *Ind J Agri Sci* **88:** 86–90.	6.22
1288	Pathak N andKochhar A(2018). Extrusion technology: As vehicle of value addition for malnourished population. *Int J Curr Microbiol Appl Sci***7:** 1293-1307.	5.38
1289	Rana D S and Kumar R (2018) Socio-economic dimensions of crop- livestock integration in sub mountainous zone of Punjab: A review. *Int J Curr Microbiol Appl Sci* (Special Issue)**7**: 123-132	5.38
1290	Rani R and Sharma V K (2018). Diversity analysis of Northern Indian isolates of *Ustilaginoidea virens.Ind Phytopathol***71:** 33-42.	5.90

1291	Routray S and Khanna V (2018). Characterization of rhizobacteria for multiple plant growth promoting traits from *mungbean* rhizosphere *Int J Curr Microbiol Appl Sci* **7:** 2264-2269. **(5.38)**	5.38
1292	Roy P, Kaur M, Burman R R, Sharma J P and Roy T N (2018). Determinants of paddy straw management decision of farmers in Punjab. *J Comm Mob Sust Dev* **13:** 203-210.	5.30
1293	Sachdeva S and Singla N (2018). Anti-feedant and repellent potential of alginate based microcapsules containing eucalyptus oil against house rat, *Rattus Rattus*. *J Entomol Zoo Stud***6:** 608-617.	5.53
1294	Sahoo P, Brar A S and Sharma S (2018). Effect of methods of irrigation and sulphur nutrition on seed yield, economic and bio-physical water productivity of two sunflower (*Helianthus annuus* L.) hybrids. *Agric Water Manag***206:** 158-164.	8.85
1295	Sandhu S S, Kaur P, Gill K K and Singh P (2018). Weekly temperature ranges for higher wheat productivity in central Punja*b*. *J Agrometeorol***20:** 23-30.	6.40
1296	Sarah M, Kaur N, Arora N and Mahal A K (2018). Field reaction and metabolic alterations in grape (*Vitis vinifera* L.) varieties infested with anthracnose. *Sci Hort***235:** 286-293.	7.62
1297	Sen R, Sharma S, Kaur G and Banga S S (2018). Near-infrared reflectance spectroscopy calibrations for assessment of oil, phenols, glucosinolates and fatty acid content in the intact seeds of oilseed Brassica species. *J Sci Food Agri***98:** 4050-4057.	8.46
1298	Sethi J and Kumar M (2018). Abundance and habitat ecology of Asian pied starling (*Sturnus contra*) in agricultural ecosystem of Punjab, India. *J Entomol Zoo Stud* **6:** 1193-1196.	5.53
1299	Sethi J and Kumar M (2018). Nesting and breeding ecology of Asian pied starling *Sturnus contra*. *J Entomol Zoo Stud* **6:** 713-716.	5.53
1300	Sethi V P (2018). Thermal modeling of asymmetric overlap roof greenhouse with experimental validation. *Int J Sust Energy* DOI: 10.1080/14786451.2018.1424167.	7.1
1301	Shafia B and Kaur N (2018). The biochemistry of grape berry development. *Int J Curr Microbiol Appl Sci***7:** 1692-1699.	5.38
1302	Shailza, Jhanji S and Grewal H S (2018). Emerging prospective of floriculture industry: Drying of ornamental plants and their parts. *Int J Microbiol Appl Sci* **7:** 1619-1633.	5.38
1303	Sharma P, Kaur L, Mittal R and Kaur S (2018). Perceived cause and effect of climate change on agriculture. *J Comm Mobili Sust Dev* **13:** 137-141.	5.30
1304	Sharma R K and Bhullar M B (2018). Status of acaricide resistance in field collected two-spotted spider mite, *Tetranychusurticae* Koch, from vegetable growing areas of Punjab, India. *J Ento Zool Stud***6**:328-332	5.53
1305	Sharma S K, Garhwal O P, Mahala P and Yadav T V (2018) Influence of integrated nutrient management on yield attributes and economics of kharif onion under loamy sand soils. *Int J Curr Microbiol Appl Sci***7**: 2806-2811.	5.38
1306	Shilla K, Bal S K, and Sandhu P (2018). Visual and physical problems faced by women workers in hosiery units of Ludhiana city. *Inter J Chem Stud* **6:** 2332-2334.	5.31
1307	Sibidanov A and Kumar R (2018): Search for B μν at Belle experiment. *Phys Rev Lett***121:** 031801.	9.0
1308	Sidhu K, Kaur M and Sharma S (2018). Income generation by women self help groups. *J Comm Mobili Sust Dev* **13:** 113-117.	5.30
1309	Singh A, Bhalla J S and Singh D (2018). Knowledge level of farmers about recommended production techniques of Bt cotton in Punjab. *Ind J Ext Edu***53:** 100-103.	5.32
1310	Singh B, Aulakh C S and Gosal S K (2018). Nutrient and microbial dynamics and nutrient uptake in wheat and chickpea intercropping system under limited moisture conditions. *Agric Res J* **55:** 99-103.	5.90

1311	Singh B, Sethi V P, Sharma A and Dhiman M (2018). Design evaluation and heat transfer analysis of novel forced draft paddy straw bale combustor using heat sink pipe networks for greenhouse heating. *Energy Conver Manag***173:** 244-261.	11.59
1312	Singh G and Mavi M S (2018). Impact of addition of different rates of rice-residue biochar on C and N dynamics in texturally diverse soils. *Arch Agron Soil Sci* **64:** 1419-1431.	8.14
1313	Singh G, Virk H K, Aggarwal N, Gupta R K and Khanna V (2018). Symbiotic parameters, growth, nutrient accumulation, productivity and profitability as influenced by integrated nutrient management in lentil (*Lens culinaris*). *Arch Agron Soil Sci* DOI:10.1080/03650340.2018.1506102.	8.14
1314	Singh H and Kaur P (2018). Adaptive strategies to reduce the impact of terminal heat stress in wheat *(Triticum aestivum*) crop. *J Agrometeorol***20:** 91-97.	6.40
1315	Singh I and Singh S (2018). A review of artificial roughness geometries employed in solar air heaters. *Renew Sust Energy Rev***92:** 405-425.	14.05
1316	Singh I and Singh S (2018). CFD analysis of solar air heater duct having square wave profiled transverse ribs as roughness elements. *Solar Energy***162:** 442-453.	10.02
1316	Singh J and Singh D (2018). Identification of constraints for delineating extension strategies for Bt cotton cultivation in Punjab. *J Comm Mob Sust Dev* **1:** 191-196.	5.30
1317	Singh K, Singh J S, Jindal S, Sidhu G S, Dhaliwal A K and Gill K S (2018). Structural and functional evolution of an auxin efflux carrier PIN1 and its functional characterization in common wheat. Funct Integr Genomics. DOI: org/10.1007/s10142-018-0625-9.	9.50
1318	Singh M J, Yousuf A, Sharma S C, Bawa S S, Khokhar A, Sharma V, Kumar V, Singh S and Singh S (2018). Evaluation of vegetative barriers for runoff, soil loss and crop productivity in Kandi region of Punjab. J Soil Water Conserv, India **16**: 325-332.	5.08
1319	Singh M, Bhullar M S and Gill G (2018). Integrated wed management in dry seeded rice using stale seed bed and post sowing herbicides. *Field Crops Res***224:** 182-191.	9.05
1320	Singh M, Kumar M, Prakash A, Sharma K and Mishra P K (2018). Comparative field performance of pneumatic planters for planting of maize crop. *Agri Engg Today***42**: 12-18.	5.30
1321	Singh M, Mahala P, Yadav T V and Kraliya B L (2018) Influence of brassinolide in mitigation the adverse effect of drought on yield attributed in fenugreek genotypes. *Int J Curr Microbiol Appl Sci***7**:1475-1478. **(5.38)**	5.38
1322	Singh N and Singh J M (2018). Cost-return structure of dairy farming on marginal and small farms in sub-mountainous region of Punjab. *Ind J Dairy Sci***71:** 89-97.	5.32
1323	Singh N, Singh G,Aggarwal N and Khanna V (2018). Yield enhancement and phosphorus economy in lentil (*Lens culinaris* Medikus) with integrated use of phosphorus, *Rhizobium* and plant growth promoting rhizobacteria. *J Plant Nutr* **41:** 737-748.	6.62
1324	Singh P, Choudhary O P and Singh P (2018). Performance of some wheat cultivars under saline irrigation water in field conditions. *Comm Soil Sci Plant Anal* DOI: org/10.1080/00103624. 2018.1427258.	6.53
1325	Singh R and Chahal K K (2018). *Cichorium intybus* L.: A review on phytochemistry and pharmacology. *Int J Chem Stud***6:** 1272-1280.	5.31
1326	Singh R and Chahal K K (2018). Phytochemical analysis and *in vitro* antioxidant capacity of different solvent extracts of *Saussurea lappa* L. roots. *J Pharma Phytochem* **7:** 427-432.	5.21
1327	Singh R and Kumar M (2018). Preliminary observations on the Indian wild boar (*Sus scrofa*) and its damage in agricultural crop fields. *J Entomol Zoo Stud* **6:** 743-747.	5.53
1328	Singh R and Kumar M (2018). Seasonal variation in prevalence of Indian wild boar and its damage in agricultural crop fields. *J Entomol Zoo Stud* **6:** 445-448.	5.53
1329	Singh R, Mahajan G, Kaur S and Chauhan B S (2018). Issues and strategies for rice residue management to unravel winter smog in North India. *Curr Sci***114:** 2419.	6.84

1330	Singh S (2018). Death in the midst of plenty: Farmer suicides in Punjab. *Eco Political Wkly***53:** 15-17.	5.22
1331	Singh S, Gupta M, Pandher S, Kaur G, Rathore P and Palli Subba Reddy (2018) Selection of housekeeping genes and demonstration of RNAi in cotton leafhopper, *Amrasca biguttula biguttula* (Ishida). *PloS one,* **13**, e0191116.	8.81
1332	Singh S, Singh M and Hans V S (2018). Development of multi product solar dryer and its evaluation for fenugreek leaves. *Chem Sci Rev Lett***7:** 128-134.	5.21
1333	Singh, M and Sethi V P (2018). On the design, modeling and analysis of multi-shelf inclined solar cooker-cum-dryer. *Solar Energy***62:** 620-636.	10.02
1334	Singla N and Kaur S (2018). Rodenticide baits of cholecalciferol, bromadiolone and their combinations against lesser bandicoot rat, *Bandicota bengalensis. Pestic Res J* **30:** 85-91.	5.90
1335	Singla N, Aggarwal R, Singla P and Jain R (2018). Socio-demographic correlates of anemia among adolescent girls in rural area of district Ludhiana (Punjab). *Curr J Appl Sci Technol* **27:**1-6.	5.32
1336	Singla P, Bhullar M B and Kaur P (2018). Biological studies on brinjal shoot and fruit borer, Leucinodes orbonalis Guenee. *J Entomol Zoo Stud***6:** 161-165.	5.53
1336	Suman V, Parmar M and Phutela U G(2018). Evaluation of poultry dropping based biodigested slurry as a substrate for cellulolytic enzymes production using *Penicillium roqueforti* NCIM 712. *The Pharma InnovJ***7:** 787-791.	5.03
1337	Thakur T and Grewal H S (2018). Influence of photoperiodic night interruption on sustainable potted flower production of *Chrysanthemum* cv. Snowball. *Int J Curr Microbiol Appl Sci* **7:** 1282-1287.	5.38
1338	Trethowan R, Chatrath R, Tiwari R , Kumar S , Saharan M S, Bains N S, Sohu V S, Srivastava P, Sharma A, Nitish De, Prakashe S, Singh G P, Sharma I, Eagles H, Diffey S , Bansal U and Bariana H (2018). An analysis of wheat yield and adaptation in India. *Field Crops Res***219:** 192-213.	9.05
1339	Uma S M, Kapoor S and Kaur P (2018). Screening of mycelia of milky mushroom (*Calocybe indica*) strains for their dye decolorization potential. *Int J Curr Microbiol Appl Sci* **6:** 1485-1492.	5.32
1340	Vashisht B B and Jalota S K (2018). Impact of temperature variability and management interventions on productivity of wheat. *J Agrometeorol* **20:** 11-15.	6.40
1341	Vashisht B B, Singh C B and Biwalkar N (2018). Establishment and growth of Aonla (*Emblica officinalis*) as affected by irrigation and mulching in the Shivaliks of Punjab. *J Soil Water Conserv* **17:** 98-101.	5.08
1342	Virk H K, Singh G and Manes G S (2018). Growth, symbiosis, productivity, and profitability of soybean at varying planting methods and nitrogen levels. *J Plant Nutr***41:** 1184-1196.	6.62
1343	War A R, Taggar G K, Hussain B, Taggar M S, Nair R M and Sharma H C (2018). Plant defence against herbivory and insect adaptations. *AoB Pl* **10:** ply037.	8.24
1344	Wargantiwar R K and Kang B K (2018). Status of insecticide resistance in field populations of tomato fruit borer (*Helicoverpa armigera*) (Lepidoptera: Noctuidae) in Punjab, India. *Ind J Agri Sci* **88:** 606-610.	6.22
1345	Yadav B K and Gupta N (2018) Enzyme activities and nutrient status in soil under ber (*Ziziphus mauritiana* L.) plants in semi-arid region of Punjab. *Int J Curr Microbiol Appl Sci***7**: 479-490	5.38
1346	Yadav B K, Gupta N and Kumar D (2018) Soil micro-nutrient availability and accumulation in ber (*Ziziphus mauritiana* L.) under semi-arid region. *Multi Sci* **26**:93-96 **(5.20)**	5.20
1347	Yadav R, Prasad L, Nanjundan J, Tewari A K, Singh P, Sandhu P S, Pant U, Avtar R, Radhamani J, Kumar S, Rao M and Rana J C (2018). Identification and evaluation of Indian mustard genotypes for white rust resistance and agronomic performance. *Ind J Genet***78:** 81-89.	6.32

Annexure I V

List of sanctioned International Collaborative Projects from 2013-2018

FY 2012-13

Sr No	Project name	Principal Investigator/ Department	Funding Agency	Sanctioned budget (in Rs.)	International Collaboration
1.	Zero tillage rice estt. and crop weed dynamic in rice & wheat cropping system in India & Australia.	Dr. M.S. Bhullar, Deptt. of Agronomy	Australian Centre for Agricultural Research (ACIAR), Australia	43,59,000	University of Adelaide (Australia)
2.	Enhancing water and weed control efficiency in rice and wheat through Micro-Irrigation.	Dr. Rakesh Sharda, Deptt. of Soil & Water Engineering	IRRI, Philippines through IRRI, New Delhi	2,65,000	IRRI, Philippines
3.	Integrated weed management in Dry Seeded Rice System	Dr. M.S. Bhullar, Deptt. of Agronomy	International Rice Research Institute, Philippines (through IRRI, New Delhi)	2,75,800	IRRI, Philippines
4.	Agronomic evaluation of Micronized granulated enhanced efficiency sulphur as a source of Plant available S for wheat and maize	Dr. J.S. Manchanda, Deptt. of Soil Science	Sulvaris, Inc. 6443, 2nd Street S.E., Calgary, Alberta, Canada	4,01,300	Sulvaris, Inc. 6443, 2nd Street S.E., Calgary, Alberta, Canada
5.	Improving food and livelihood security in Punjab through water energy agriculture management under climate change and variability.	Dr. R.S. Sidhu, Dean, College of Basic Sciences	International Development Research Centre, Canada	45,35,821	Columbia University, Columbia
7	Maximizing the potential for sustainable and durable resistance to the wheat yellow rust pathogen	Dr. Parveen Chhuneja, School of Agricultural Biotechnology	DBT, New Delhi	2,53,98,400	John Innes Centre, Norwich Search Park, Norwich, U.K.
8	Safeguarding Asian Rice Production from rapidly warming climate.	Dr. G.S. Mangat, Deptt. of Plant Breeding & Genetics	IRRI, Phillipines	5,42,475	IRRI, Phillipines
9	Increasing the productivity of wheat crop under condition of rising temperatures.	Dr. G.S. Mavi, Deptt. of Plant Breeding & Genetics	CIMMYT, Maxico	9,73,744	CIMMYT, Maxico
10	Stress tolerant rice for Africa and South Africa Phase-II	Dr. Jagjit Singh, Deptt. of Plant Breeding & Genetics	IRRI, Makati, Philippines	1,54,567	International Rice Research Institute (IRRI), Makati, Philippines

11	Medium-term impact of conservation tillage and mulch on soil physical environment and crop performance in rice-wheat cropping system in NW India	Dr. S.S. Kukal, Deptt. of Soil Science	IRRI, Phillipines	2,42,183	International Rice Research Institute, Makati, Philippines
12	Stress Tolerant Rice for Africa and South Asia (STRASA) Phase 3	Dr. Jagjeet Singh Lore, Deptt. of Plant Breeding & Genetics	IRRI, Phillipines through IRRI, New Delhi	1,42,919	International Rice Research Institute (IRRI), Makati, Philippines
13	Mungbean improvement programme	Dr. T.S. Bains, Deptt. of Plant Breeding & Genetics	AVRDC-The World Vegetable Centre, ICRISAT, Patancheru	24,71,500	AVRDC-The World Vegetable Centre, Shanhua, Taiwan
14	Rapid Identitificatioon of dissaase resistance genes from plant genomes by resistance gene enrichment sequencing (RenSeq) of EMS derived susceptible mutants.	Dr. Parveen Chhuneja, School of Agril. Biotechnology	DBT, New Delhi	118,98,400	University of East Anglia, U.K.
15	Mining of heat tolerance of wheat in Australian and India environments	Dr. Kuldeep Singh, School of Agril. Biotechnology	DST New Delhi	42,32,000	University of Adelaide, Australia
16	Training programme on watershed management and seed production.	Dr. T.S. Dhillon, Director (Seeds)	Dr. Manmohanjit Singh, RRS, Kandi, Ballowal Saunkhri	ICARDA, Afghanistan	22,20,090
17	Cambridge-India Network for Translational Research in Nitrogen	Dr. Parveen Chhuneja/ Biotechology	DBT, New Delhi	1,43,94,800	National Institute of Agricultural Botany, U.K.
18	Indo-UK Centre for improvement of Nitrogen use efficiency in wheat	Dr. Achla Sharma / Plant Breeding & Genetics	DBT, New Delhi.	61,18,400	Department of Plant Biology & Crop Sci. Roth Attested Research, U.K.
19	Decision support system to estimate water requirements for the major crops.	Dr. Rakesh Sharda, Deptt. of Soil & Water Engineering	DST, New Delhi	6,30,000	i.Dr. Mohamad Abdrabou, 29 EL-Bost St. Cairo, Egypt
20	Development of heat tolerant, high yielding and climate resilient wheat cultivars by utilizing genomics, molecular and physiological information and resources (Nodal Centre + Ludhiana Centre)	Dr. Johar singh Saini (Plant Breeding & Gen.)	BIRAC, (DBT) New Delhi	2,19,78,000 + 1,37,80,000 = 3,57,50,000	i.Washington University (WSU), USA ii.Kansas State University (KSU), USA

21	Planning of decentralized erosion prevention for selected rain water retention measures in Punjab, India under the aspect of the adjustment of climate change GIZ-IPRO.	Dr. Manmohanjit Singh, RRS, Ballowal Saunkhri	GIZ, New Delhi and IPRO, Germany	38,92,200	IPROconsult GmbH, Germany
22	Bio-based packaging for fresh food (BIOFRESH PAK)	Dr. Preetinder Kaur/ Processing & Food Engineering	DBT, New Delhi	84,80,400	Mr. Edward Kosior, Nextek Limited, UK
23	Enhanced rice milling & maximized valorisation of rice milling by products.	Dr. Mahesh Kumar/ Processing & Food Engineering	DBT, New Delhi	19,05,000	i. Koolmill Systems Ltd. UK ii.Sheffield Hallam University, UK
24	Development & optimization of fresh produce supply chain & storage system.	Dr. Preetinder Kaur, Deptt. of Processing & Food Engineering	DBT, New Delhi	69,87,200	Dr. Eric Duncan, Coveris Flexible Packaging, UK

Annexure V

List of Testing Schemes

Year 2013-14

S. No.	Name of scheme	Department
1.	Evaluation of the efficacy of pyroxulam 5% and pyroxsulam 5% wg+ sulfosulfuron for weed control in wheat	AGRONOMY
2.	Evaluation of bio-efficacy of "amalgerol" as broadcast and foliar application for its yield enhancing and soil condition properties in rice	AGRONOMY
3.	Biosafety research trials level-i for hebicides tolerant corn (nk 603) in corn hybrid.	AGRONOMY
4.	Bio-efficacy trial of herbicides god-h004 in cotton & its residual study on succeeding crop	AGRONOMY
5.	Evaluation of bio-efficacy of ae 1887196-20% +ae f095404-10%-30% wg herbicide against cross spectrum weeds in direct seeded rice	AGRONOMY
6.	Evaluation of glyphosate 41% sl for efficacy in corn for total weed control	AGRONOMY
7.	Bio-efficacy of premix of metsulfuron-methyl(10%)+carfentrazone-ethyl (40%) 50% df against broad leaf weeds of wheat as post-emergence application.	AGRONOMY
8.	Evaluation of castor as a trap /companion crop in cotton agro ecosystem in relation to major insect pests	ENTOMOLOGY
9.	Evaluation of carbosulfan 6% g against top shoot borer in sugarcane	ENTOMOLOGY
10.	Evaluation of fipronil 200 sc and fipronil 0.6% gr against rice stem borers & leaf folders in rice.	ENTOMOLOGY
11.	Evaluation of neon 5% ec(fenpyroximate) against jassid and mite on cotton	ENTOMOLOGY
12.	Evaluation of limidacloprid(gaucho 600 fs) against fly and termites and its phytotoxicity on maize crop.	ENTOMOLOGY
13.	Bio-efficacy of fipronil 0.6% gr against early shoot borer and termite on sugarcane	ENTOMOLOGY
14.	Bio-efficacy of apsa 80 against aphids on wheat crops	ENTOMOLOGY
15.	Evaluation of fungicides against seed borne and foliar diseases of wheat	PLANT PATHOLOGY
16.	Evaluation of fungicides against diseases/pests of wheat and potato	PLANT PATHOLOGY
17.	Evaluation of amistar extra 280 sc against wheat rust and powdery mildew.	PLANT PATHOLOGY
18.	Evaluation of ergon 500 g/l sc against blast disease of rice	PLANT PATHOLOGY
19.	Bio-efficacy evaluation of bio-fungicide taegro on paddy for sheath blight and bacterial leaf blight.	PLANT PATHOLOGY
20.	Evaluation of orius 6% fs against seed brone disease of wheat	PLANT PATHOLOGY
21.	Evaluation of taqat (caption 70%+ hexanazole 5% wp for bio-efficacy rust, powdery mildew and other disease of wheat.	PLANT PATHOLOGY
22.	Evaluation of organic compound (change 50%+vigore 50%) against late blight of potato.	PLANT PATHOLOGY
23.	Evaluation of markzole (propieconazole 25 ec) against rust of wheat	PLANT PATHOLOGY
24.	Evaluation of bio efficacy trials for phosgold on potato crop	SOIL SCIENCE
25.	Mahadhan bensulf (90%) (bentonite sulphur) trials on potato crop-a sulphur fertilzer,	SOIL SCIENCE

Year 2014-15

S. No.	Name of scheme	Department
1.	Efficacy evaluation of f 8072 and f 9253 against weeds of sugarcane	Agronomy
2.	Efficacy evaluation of speedfol^{tm} cereals sp on rice crop	Agronomy
3.	Efficacy evaluation of clincher (cyhalofo-butyl) for grassy weed control in direct seeded rice.	Agronomy
4.	Efficacy evaluation of biovita application wheat	Agronomy
5.	Efficacy evaluation of biovita application in rice.	Agronomy
6.	Biosafety research trials level-i for hebicides tolerant corn (nk 603) in corn hybrid.	Agronomy
7.	Evaluation of calaris xtra 275 sc for efficacy in corn for total weed control	Agronomy
8.	Evaluation of calaris xtra 275 sc for efficacy in sugarcane for total weed control	Agronomy
9.	Management of insect pests with new chemistry	Entomology
10.	Bio efficacy of methoxyfenozide 24% sc w/v (21.8 w/w) against lepidopteran insect pest in sugarcane	Entomology
11.	Evaluation of carbosulfan 6% g against shoot borer in sugarcane on succeeding crop(palak)	Entomology
12.	Evaluation of rab 55 10% sc against bph & wbph in rice crop.	Entomology
13.	Evaluation of bcs cl 73507 sc 200(w/v) against fruit borer and leaf miner on tomato & phytotoxicity on tomato	Entomology
14.	Bio-efficacy of bcs cl 73507 sc 200 (w/v) against stem borer & leaf folder in rice.	Entomology
15.	Evaluation of thiamethoxam 70 ws (cruiser 70 ws) as a wheat seed treatment application for the control of wheat insect pests	Entomology
16.	Evaluation of takumi 20% wg for the control of insect pests on sugarcane.	Entomology
17.	Evaluation of castor as a trap /companion crop in cotton agro ecosystem in relation to major insect pests	Entomology
18.	Bio efficacy of bifenthrin 10 ec against termites in sugarcane	Entomology
19.	Bio-efficacy of chlorantraniliprole (rynazypyr) 35% wg against stalk borer and internode borer of sugarcane & early shoot borer and top borer of sugarcane.	Entomology
20.	Evaluation of orius 6% fs against seed borne disease of wheat	PLANT PATHOLOGY
21.	Evaluation of taqat (captan 70% hexanazole 5% wp for bio-efficacy against rust, powdery mildew and other disease of wheat	PLANT PATHOLOGY
22.	Evaluation of folicur 430sc (tabuconzole 430sc) against sheath blight and blast of rice.	PLANT PATHOLOGY
23.	Evaluation of bumper (propiconazole 25% ec0 and orius (tabuconazole 25.9% ec) against rice diseases.	PLANT PATHOLOGY
24.	Management of bakane disease and bacterial leaf blight in paddy and root rot of bt cotton throgh use of bio-pesticides	PLANT PATHOLOGY
25.	Evaluation of new combination fungicide (tetraconazole 7.46%+azoxystrobin) against sheath blight of paddy	PLANT PATHOLOGY
26.	Evaluation of ergon 500 g/l sc against blast disease of rice	PLANT PATHOLOGY
27.	Evaluation of stilt (propiconazole 25% ec) against rusts of wheat.	PLANT PATHOLOGY
28.	Evaluation of pergado 65wg (mandipropamid 5%+mancozwb 60% wg) against diseases in cucumber)	PLANT PATHOLOGY
29.	Evaluation of excel's tebuconazole 2ds against loose smut of wheat	PLANT PATHOLOGY
30.	Evaluation of apsa-80 for improving efficacy of fungicides in wheat crop.	PLANT PATHOLOGY
31.	Evaluation of tebuconazole 60 fs against karnal bunt and flag smut of wheat	PLANT PATHOLOGY



FY 2015-16

S. No.	Name of scheme	Department
1.	Bio efficacy of chlorantraniliprole (rynaxypyr) 35%wg against stalk borer and intermode borer of sugarcane and early shoot borer and top borer of sugarcane	Entomology
2.	Evaluation of marktriazo 40 ec (triazophos) against whitefly on cotton and stem borer and leaf folder in rice	Entomology
3.	Evaluation of fmc (1) 113 for the control of termites in sugarcane	Entomology
4.	Evaluation of tag folder on paddy leaf folder, stem borer and thrips	Entomology
5.	Evaluation of billo (emamectin benzoate 1.9% ec) against leaf folder and hispa in rice crop	Entomology
6.	Evaluation of triazophos 40% sc on cotton and its impact on yield	Entomology
7.	Evaluation of imidacloprid 17.1% w/w sl (imidacloprid 200sl) against sucking insect pests complex on cotton	Entomology
8.	Evaluation of ril 125(20% wg) against whitefly and other sucking insect pests on cotton	Entomology
9.	Evaluation of movento 150 od (spirotetramat 15% w/v od) against sucking insect pests complex on cotton	Entomology
10.	Evaluation of solomon 300 od against whitefly jassid and pink bollwork of cotton	Entomology
11.	Bio-efficacy of methoxyfenzide 24% sc w/v (21.8 w/w) against lepidopteran insect pest in sugarcane.	Entomology
12.	Bio efficacy of imidacloprid 17.1% w/w sl (imidacloprid) against plant hoppers in rice	Entomology
13.	Evaluation of bio-efficacy of chess 50 wg (pymethrozine 50wg) against plant hoppers in rice	Entomology
14.	Evaluation of fipronil 0.6% gr agaisnt termites in wheat	Entomology
15.	Bio efficacy of gaucho 600 fs (imidacloprid 48% w/w fs) against termite and aphid pests of wheat	Entomology
16.	Evaluation of efficacy of coragen 18.5 sc (chlorantraniliprole 18.5 sc) against early shoot borer of sugarcane.	Entomology
17.	Evaluation of sulfoxaflor 120 sc as foliar spray against aphids in mustard	Entomology
18.	Evaluation of apsa-80 for improving efficacy of fungicides in wheat crop	PLANT PATHOLOGY
19.	Bio efficacy of fosetyl aluminium (aliette 80wp) against gummosis/ foot root disease in citrus.	PLANT PATHOLOGY
20.	Evaluation of penflufen 90+tebuconazole 180:270 sc against sheath blight and brown spot of rice	PLANT PATHOLOGY
21.	Evaluation of efficacy of tricyclozole 20% (w/v) + tebuconazole 16% (w/v) against sheath blight of rice.	PLANT PATHOLOGY
22.	Evaluation of efficacy of tricyclozole 20% (w/v) + tebuconazole 16% (w/v) against blast of rice.	PLANT PATHOLOGY
23.	Evaluation of efficacy of tricyclozole 20% (w/v) + tebuconazole 16% (w/v) against false smut of rice.	PLANT PATHOLOGY
24.	Evaluation of custodia against yellow rust of wheat	PLANT PATHOLOGY
25.	Evaluation of caviet (tebuconazole 25 wg) against yellow rust of wheat.	PLANT PATHOLOGY
26.	Evaluation of ready mix azoxystrobin 11% + tebuconazole 18.3% sc fungicide for the control of late blight disease of potato	PLANT PATHOLOGY
27.	Evaluation of carboxin 75% wp against loose smut and flag smut of wheat	PLANT PATHOLOGY
28.	Evaluation of caviet against purple blotch of onion	PLANT PATHOLOGY

29.	Evaluation of difenoconazole 3% ws as seed treatment against karnal bunt in wheat.	PLANT PATHOLOGY
30.	Evaluation of efficacy of xde-729 methyl ester 20.85% w/w + florasuiam 20.0% w/w eg for broad-leaf weed control in wheat	Agronomy
31.	Bio-efficacy evaluation of product plantform-385 of wheat crop	Agronomy
32.	Bio-efficacy evaluation of ril – 066/f1 (48% ec) against important weeds in wheat	Agronomy
33.	Effect of bio-organic products on yield and soil properties under rice-wheat and maize-wheat cropping system.	SOILS SCIENCE
34.	Product trials of chamatkar (mepiquat chloride 5% as) a systemic plant growth regular in cotton	FARIDKOT, RS
35.	Evaluation of bt. Cotton hybrids of bayer crop science under high density plantation system	FARIDKOT, RS

FY 2016-17

S. No.	Name of scheme	DEPARTMENT
1.	Bio efficacy testing of bio fertilizer jumpstart in paddy and corn	AGRONOMY
2.	Efficacy evaluation of msm 20% wg (metsulfuron methyl 20% wg) as post emergent application against broad leaf weed in sugarcane and its residual effect in succeeding summer moong	AGRONOMY
3.	Evaluation of mahna -04 against grassy and broad leaf weeds in carrot	AGRONOMY
4.	Evaluation of rallis tata bahaar on growth and yield of cotton	AGRONOMY
5.	Evaluation of rallis gluco beta on growth and yield of cotton	AGRONOMY
6.	Evaluation of bio-efficacy of indaziflam-20 + glyphosate 400-420 sc against weeds in non-cropped area	AGRONOMY
7.	Efficacy evaluation of haloxyfop 10.8% ec(w/v) for weed control in mentha and residual effect on succeeding residual trials(urad bean/moong bean)	AGRONOMY
8.	Evaluation of efficacy & phytotoxicity of iris(sodium acifluorfen 16.5% + (clodinafop)-prapargyl 8% ec) against mixed weed flora in green gram	AGRONOMY
9.	Efficacy of laudis(tembotrine 420 for sc) for weed control in sugarcane and its residual effect on succeeding crop	AGRONOMY
10.	Bio-efficacy evaluation of uph 210b on transplanted paddy	AGRONOMY
11.	Compatibility evaluation of laudis 420 sc (tembotrione 420 sc) with other herbicides in maize	AGRONOMY
12.	Efficacy evaluation of xr-848 benzyl ester 20g/l + cyhalofop butyl 100g/l ec(w/v) for weed control in transplanted rice	AGRONOMY
13.	Efficacy evaluation of penoxsulam 2.67% w/w (2.5% w/v) od for weed control in transplanted rice	AGRONOMY
14.	Efficacy evaluation of penoxulam 1.02% w/w (1.0% w/v) + cyhalofop-butyl 5.1% w/w (5.0% w/v) for weed control in direct seeded rice	AGRONOMY
15.	Efficacy evaluation of xr-848 benzyl ester 12.5g/l + penoxsulam 20g/l od (w/v) for weed control on transplanted rice	AGRONOMY
16.	Efficacy evaluation of penoxsulam 0.97% w/w (1.0% w/v) + butachlor 38.8% w/w(40.0% w/v) se for weed control in transplanted rice	AGRONOMY
17.	Evaluation of efficacy of tricyclazole 20% (w/v) + tebuconazole 16% (w/v) against false smut of rice	PLANT PATHOLOGY
18.	Evaluation of difenoconazole 3% ws as seed treatment against karnal bunt in wheat	PLANT PATHOLOGY
19.	Evaluation azoxistrabin 200 + hexaconazole 80 against sheath blight and blast of rice	PLANT PATHOLOGY



20.	Evaluation of bioefficacy and phystotoxicity study of raxil easy 060 fs(tebuconazole) as seed treatment against foot rot and brown leaf spot of rice	PLANT PATHOLOGY
21.	Evaluation of nematicide bcs ar 83685 sc 400 against root knot nematode in cucumber	PLANT PATHOLOGY
22.	Evaluation for bioefficacy and phytotoxicity study of luna experience 400sc(fluopyram 200 + tebuconazole 200 sc) against dirty panicle and false smut in rice	PLANT PATHOLOGY
23.	Bio-efficacy and phytotoxicity studies of saaf(carbendazim 12% + mancozeb 63% wp) in maize	PLANT PATHOLOGY
24.	Bio-efficacy testing of fungicide mafrm-08 against late blight of potato	PLANT PATHOLOGY
25.	Evaluation of fungicides saaf and saafilizer against foot rot disease of paddy	PLANT PATHOLOGY
26.	Bio-efficacy testing of ff15-01 against blights of tomato	PLANT PATHOLOGY
27.	Bio-efficacy testing of biofungicide milastin k (bacillus subtillis ktsb 1015) against powdery and downy mildew of grapes	PLANT PATHOLOGY
28.	Bio-efficacy testing of fungicide ff15-01 against late blight of potato	PLANT PATHOLOGY
29.	Evaluation of efficacy and phytotoxicity of profiler 71.1 wg(fluopicolide 4.44% propamocard hydrochloride 66.67% wg) against gummosis disease in citrus	PLANT PATHOLOGY
30.	Bio-efficacy testing of biofungicide milastin k (bacillus subtillis ktsb 1015) against bacterial blight of pomegranate	PLANT PATHOLOGY
31.	Evaluation of orius 6% fs(tebuconazole 6% fs) on wheat against karnal bunt	PLANT PATHOLOGY
32.	Evaluation of thophanate methyl 45% + pyraclostrobin 5% fs against loose smut of wheat	PLANT PATHOLOGY
33.	Evaluation of ametoctadin 27% w/w + dmm 20.27% w/w sc against late blight of potato	PLANT PATHOLOGY
34.	Evaluation of afidopyropen 50 g/l dc(bas 440 011) on aphids in potato	ENTOMOLOGY
35.	Evaluation of sulfoxaflor 120 sc as foliar spray aphids in wheat	ENTOMOLOGY
36.	Efficacy of mahaveer 5 sc(fipronil) against sucking insect pests of cotton	ENTOMOLOGY
37.	Evaluation of brand mahaveer gr(fipronil 0.3% gr) on basmati rice	ENTOMOLOGY
38.	Bio efficacy of lesenta 80 wg, solomon 300 od & sivanto 200 sl against insect pests of vegetable crops	ENTOMOLOGY
39.	Efficacy & phytotoxicity study of movento 150 od (spirotetramat 150 od) against insect pests in citrus for label expansion	ENTOMOLOGY
40.	Evaluation & phytotoxicity study of solomon 300 od (betacyfluthrin 90 + imidacloprid 210 od) against insect pests of citrus	ENTOMOLOGY
41.	Evaluation of efficacy of rds 63 35 wg against helicoverpa armigera in tomato	ENTOMOLOGY
42.	Evaluation of efficacy of rds 63 35 wg against diamond backmoth on spodoptera litura on cabbage	ENTOMOLOGY
43.	Bio efficacy and phytotoxicity studies of ulala in brinjal	ENTOMOLOGY
44.	Bio-efficacy and phytotoxicity studies of ulala in okra	ENTOMOLOGY
45.	Bio efficacy and phytotoxicity study of gaucho in bengal gram as seed treatment	ENTOMOLOGY
46.	Study on bio-efficacy of zinc fortified phosphatic fertilizers in rice-wheat cropping system	SOILS SCIENCE
47.	Evaluation of polycoated urea for improving n use efficiency under stressed and unstressed conditions in cereal crops at ballowal saunkhri under punjab agricultural university, ludhiana	BALLOWAL SAUNKHRI, ZRSKA
48.	Evaluation of hgw86 10% od against insect pests of citrus	ABOHAR, RRS

FY 2017-18

S. No.	Name of scheme	Department
1.	Evaluation of bioefficacy and phytotoxicity study of raxil easy 060 fs(tebuconazole) as seed treatment against foot rot and brown leaf spot of rice	PLANT PATHOLOGY
2.	Evaluation of bioefficacy & phytotoxicity study of luna experience 400 sc (fluopyram 200+tebuconazole 200 sc) against dirty panicle & false smut in rice	PLANT PATHOLOGY
3.	Bioefficacy and phytotoxicity studies of saaf (carbendazim 12% + mancozeb 63% wp) in maize	PLANT PATHOLOGY
4.	Evaluation of fungicides saaf and saafilizer against foot rot diseases of paddy	PLANT PATHOLOGY
5.	Bioefficacy testing of ff15-01 against blights of tomato	PLANT PATHOLOGY
6.	Bio-efficacy testing of fungicide ff15-01 against late blight of potato	PLANT PATHOLOGY
7.	Evaluation of efficacy and phytotoxicity of profiler 71.1 wg(fluopicolide 4.44% propamocard hydrochloride 66.67% wg) against gummosis disease in citrus	PLANT PATHOLOGY
8.	Evaluation of bioefficacy and phytotoxicity of metri-16(insecticide + fungicide) against sheath blight of rice	PLANT PATHOLOGY
9.	Evaluation of bioefficacy and phytotoxicity of metri-16(insecticide + fungicide) against leaf, neck blast and lodging of basmati rice	PLANT PATHOLOGY
10.	Bioefficacy testing of flint pro(trifloxystrobin 3.5% + propineb 61.3% wg) against late spot diseases of cotton	PLANT PATHOLOGY
11.	Evaluation of bioefficacy and phytotoxicity of flute-16 (insecticide + fungicide) against leaf and neck blast of basmati rice	PLANT PATHOLOGY
12.	Evaluation of bioefficacy and phytotoxicity of flute-16(insecticide+fungicide) against sheah blight of rice	PLANT PATHOLOGY
13.	Evaluation of bioefficacy and phytotoxicity of flute-16 (insecticide+ fungicide) against stem borers and leaf folder of rice	PLANT PATHOLOGY
14.	Evaluation of nativo(tebuconazole 50% + trifloxystrobin 25% wg) against powdery mildew in green pea	PLANT PATHOLOGY
15.	Evaluation of bioefficacy and phytotoxicity of upf-115 fungicide against blast and brown leaf spot of paddy	PLANT PATHOLOGY
16.	Evaluation of evergol xtend in rice as seed treatment against blast disease	PLANT PATHOLOGY
17.	Evaluation of flint pro(trifloxystrobin 3.5% + propineb 61.3 wg) on tomato	PLANT PATHOLOGY
18.	Evaluation of evergol xtend in rice as seed treatment against sheath blight and brown spot diseases	PLANT PATHOLOGY
19.	Evaluation of lospel (tetraconazole 11.6% w/w 12.5% w/v sl) against loose smut of wheat as seed treatment	PLANT PATHOLOGY
20.	Evaluation of coded fungicide (bas 750 02f) against yellow rust of wheat	PLANT PATHOLOGY
21.	Evaluation of coded fungicide(bas 751 04f) against yellow rust of wheat	PLANT PATHOLOGY
22.	Efficacy of mahaveer 5 sc(fipronil) against sucking insect pests of cotton	Entomology
23.	Dissemination of integrated pest management strategies for whitefly on cotton in punjab	Entomology
24.	Evaluation of bioefficacy of pii-8007 20% sc against rice stem borers and leaf folders in rice	Entomology
25.	Evaluation of dinotefuron 20% sg against sucking insect pests on cotton	Entomology



26.	Bioefficacy & phytotoxicity evaluation of pyriproxyfen 10% ew in cotton	Entomology
27.	Evaluation of eco-win against sucking pests on cotton	Entomology
28.	Evaluation of scsp 835 se against whitefly and other sucking insect pests on cotton	Entomology
29.	Evaluation & bioefficacy of bas 440 011 for the control of whitefly & jassids on cotton	Entomology
30.	Evaluation of cotto-12 against sucking insect pests of cotton	Entomology
31.	Evaluation of christol tso against sucking insect pests of cotton	Entomology
32.	Evaluation of gaucho against sucking pests on green peas	Entomology
33.	Evaluation of belt expert (flubendiamide+thiacloprid) in cucurbits	Entomology
34.	Evaluation of dimethoate 30 ec for the bioefficacy phytotoxicity and safety to the natural enemies in cotton	Entomology
35.	Evaluation of movento energy (spirotetramate+imidacloprid) in cotton	Entomology
36.	Evaluation of solomon 300 od (betacyfluthrin 90 + imidacloprid 210 od) as foliar spray against aphids on wheat	Entomology
37.	Evaluation & bioefficacy of virtako 1.5 gr (chlorantraniliprole 0.5% + thiamethoxam 1.0%) against rice stemborers and leaf folder in rice	Entomology
38.	Evaluation of miticide (pim 014 20% wp) against red spider mites of brinjal	Entomology
39.	Efficacy evaluation of haloxyfop 10.8% ec(w/v) for weed control in mentha and residual effect on succeeding residual trials (urad bean/moong bean)	Agronomy
40.	Efficacy of laudis(tembotrine 420 for sc) for weed control in sugarcane and its residual effect on succeeding crop	Agronomy
41.	Bioefficacy of quizalofop ethyl 4% + oxyfluorfen 6% ec against weeds in onion	Agronomy
42.	Bioefficacy and phytotoxicity study of uph 115 in green gram	Agronomy
43.	Evaluation of basta(glufosinate ammonium 150 sl) in non crop area	Agronomy
44.	Evaluation of freedom for weed control in rice	Agronomy
45.	Efficacy evaluation of indaziflam 500 sc in citrus	Agronomy
46.	Bio efficacy and phytotoxicity of maxx 50% sc(flumioxazin)against weed flora in wheat	Agronomy

Annexure VI

Faculity Participation in international /National Seminar/ Symposia/Workshops/Trainings (2013-14 to 2017-18)

COAE&T		
International Conferences attended		
S.No	**Name of the faculty**	
Year 2015-16		
1.	Manjeet Singh	Asian Conference on Precision Agriculture *(ACPA)* held at South China Agricultural University, Guangzhou, China. November 16-20, 2015.
Year 2016-17		
2.	Manjeet Singh	International Symposium on Globalization Strategies of Agricultural Machinery for International Market.organized by Korean Society for Agricultural Machinery (KSAM) at Korea. Nov 1-4, 2016.
Year 2017-18		
3.	Manjeet Singh	Asian-Australasian Conference on Precision Agriculture (7ACPA), the 1st Asian-Australasian Conference on Precision Pasture and Livestock Farming (1ACPLF), and Digital-Farmer 2017 (DF2017) held in Hamilton, New Zealand. October 16-18, 2017.
List of National Symposia/Conferences/Seminars attended		
Year 2013-14		
4.	Manjeet Singh	National Seminar on Sugarcane in collaboration with National Federation of Co-operative Sugar Factories, New Delhi held at PAU, Ludhiana.October 15-17, 2013
5.	AseemVerma	National training on 'Ground and remote sensors based precision farming for small fields' at PAU, Ludhiana.March 18-28, 2014
6.	Jasvir Singh Gill	International Conference on Productivity & Sustainability – Shaping the Future, Baba Farid Group of Institutions, Bathinda. March 20, 21, 2014
7.	AseemVerma	Progressive Punjab Agriculture Summit at Mohali (Punjab)Feb. 16-19,2014.
8.	AseemVerma	Seminar on Motivation and Leadership in Educational Institutions at COAET, PAU Ludhiana. May 26, 2014.
9.	Shiv Kumar Lohan	Interactive Seminar on ISO 9001 Certification of laboratories by Mr. Amit Gupta, Chief Executive, ACS Registrars, Muzzaffar Nagar, UP held at PAU Ludhiana. Nov 15, 2013.
10.	Shiv Kumar Lohan	EIMA show, Punjab –status of Agricultural Mechanization in Punjab, India and scope of Italian machinery held at Park Plaza Hotel, Ludhiana on March 14, 2013
11.	N.K. Chhuneja	National Seminar on Sugarcane organized by PAU and National Federation of Cooperative Sugar Factories Ltd. (NFCSF), New Delhi at PAU Ludhiana. Oct. 17, 2013
12..	BaldevDogra	International exhibition and conference on agri-machinery and equipment at IARI, New Delhi. Dec 6, 2013
13.	BaldevDogra	Demonstration of farm machines at Progressive Punjab Agriculture Summit-2014.Feb 16-19, 2014.
14.	N.K. Chhuneja	EIMA show, Punjab –status of Agricultural Mechanization in Punjab, India and scope of Italian machinery held at Park Plaza Hotel, Ludhiana. March 14, 2013.
15.	Shiv Kumar Lohan	National Seminar on Sugarcane organized by PAU and National Federation of Cooperative Sugar Factories Ltd. (NFCSF), New Delhi. held at PAU Ludhiana. Oct. 17, 2013.

16.	Shiv Kumar Lohan	International Plant Nutrition institute- South Asia Program (IPNI), CIMMYT and BISA held at PAU Ludhiana. Nov. 14, 2013
17.	N.K. Chhuneja	Interactive Seminar on (ISO 9001 Certification of laboratories) by Mr. Amit Gupta, Chief Executive, ACS Registrars, Muzzaffar Nagar, UP held at PAU Ludhiana. Nov. 15, 2013
18.	N.K. Chhuneja	National conference on agricultural processing and management – opportunities of self-employment held at PAU Ludhiana. Jan. 28-29, 2014
19.	Gupta kalika and M S Alam	ISAE Annual Convention and International Symposium on Bio Energy Challenges and Opportunities held at ANGRAU, Hyderabad Jan 28-30,2013.
20.	M K Narang,	Attended interactive session on ISO: 9001 certification of labs organized by CEO, ACS registrar, Muzaffarnagar at PAU, Ludhiana on Nov 15, 2013
21.	Alam MS, Gupta Kalika, Ahuja Geetika and S K Gupta	47th ISAE Annual Convention and International Symposium on Bio Energy Challenges and Opportunities held at ANGRAU, Hyderabad. Jan 28-30,2013.
Year 2014-15		
22.	J P Singh, Sanjay Satpute	Annual Convention of ISAE and Symposium on Engineering Solutions for Sustainable Agriculture and Food Processing held at PAU, Ludhiana. Feb 23-25, 2015.
23.	J P Singh	Regional Seminar on Geospatial Technology in Natural Resource Management held at PRSC, Ludhiana.March 17-18, 2015.
24.	K G Singh	National Conference on "Floriculture and land Scaping for Urban and Rural prosperity" held at IARI, New Delhi.Feb 28-29, 2016.
25.	RajanAggarwal, Angrej Singh and Sanjay Satpute	XII Agricultural Science Congress on "Sustainable livelihood security for smallholder farmers" held at NDRI, Karnal. February 03-06, 2015.
26.	Anoop Kumar Dixit	Annual Convention of ISAE and Symposium on engineering solutions for sustainable agriculture and food processing at PAU, Ludhiana. Feb 23-25, 2015.
27.	Apoorv Prakash	Seminar on straw management system and happy seeders at Sangrur. Jan 9,2015.
28.	Apoorv Prakash	Annual Convention of Indian Society of Agricultural Engineers and Symposium on Engineering Solutions for Sustainable Agriculture and Food Processing at PAU, Ludhaina. Feb 23-25, 2015.
29.	BaldevDogra	Annual convention of ISAE and symposium on emerging solutions for sustainable agriculture and food processing, held at PAU Ludhiana. Feb 23-25, 2015
30.	Anoop Kumar Dixit	National seminar on "Augmenting processing and shelf life of perishable food products" at PAU, Ludhiana on Sept 26, 2014
31.	Anoop Kumar Dixit	Seminar on "Intellectual property business in Agricultural Technologies and knowledge products" at PAU, Ludhiana. Jan 15, 2015.
32.	Manjeet Singh	International Conference on Precision Agriculture (ICPA) held at Sacramento, USA. July 22-23, 2014.
33.	Manjeet Singh	Annual Convention of ISAE and International Symposium on Engineering Solutions for Sustainable Agriculture and Food Processing held at PAU, Ludhiana. Feb 23-25, 2015.
34.	N.K. Chhuneja	National Symposium Crop improvement for Inclusive Sustainable Development held at PAU Ludhiana. Nov. 7-9,2014.
35.	N.K. Chhuneja	National Symposium "Agricultural Diversification for Sustainable livelihood and Environmental Security" held at PAU Ludhiana. Nov 18-20, 2014.
36.	Arshdeep Singh	Annual Convention of ISAE and Symposium on Engineering Solutions for Sustainable Agriculture and Food Processing Feb 23-25, 2015.

37.	N.K. Chhuneja	National Symposium "Agricultural Diversification for Sustainable livelihood and Environmental Security" held at PAU Ludhiana. Nov 18-20, 2014.
38	AseemVerma.	Seminar on "Atomic energy for sustainable agriculture and happiness" at PAU, Ludhiana. Sept. 9, 2014.
39.	Shiv Kumar Lohan	National Symposium Crop improvement for Inclusive Sustainable Development held at PAU Ludhiana. Nov 7-9, 2014.
40.	Drs S. P. Sharma R. K. Dhall&Hira Singh	National seminar on "Augmenting processing and shelf life of perishable food products" at PAU, Ludhiana. Sept. 26, 2014.
41.	AseemVerma.	Seminar on "Geospatial technology in natural resource management" at PRSC, Ludhiana. March 17-18, 2015.
42.	Singh Jaspreet, M S Alam, Satish Kumar, Sandhya, Tarsem Chand, Rohit Sharma	ISAE Annual Convention and Symposium on Engineering Interventions in Conservation Agriculture held at MPAU&T, Udaipur from Feb 21-23,2014
43.	AnoopKumar Dixit	National Seminar on Augmenting Processing & shelf –Life of Prerishable Food Products. Organised by National Productivity Council, Delhi at PAU, Ludhiana, Sept26, 2014.
44.	Satish Kumar Tarsem Mittal	Seminar on "Atomic energy for Sustainable Agriculture and Happiness and Exhibition on NARC Technologies" at PAU, Ludhiana, Sept 9, 2014.
45.	PreetinderKaur	Seminar on 'Climate Change- Effects on Water Resources, Agriculture and Biodiversity'atSchool of Climate Change and Agricultural Meteorology in collaboration with Punjab Biodiversity Authority, Govt. of India. May 28, 2014.
46.	Tarsem Mittal	Attended Progressive Punjab Agriculture summit-2014 at ChapparChiri, Chandigarh by Punjab Govt on February 16-19, 2014.
47.	Tarsem Mittal	Attended national seminar on "Productivity issues in pulses milling – Future needs and challenges" held at India International Centre, New Delhi at National Productivity Council, New Delhi.Sept 19, 2014
Year 15-16		
48.	ArunKaushal	Regional Convention of Water Users Association's presidents at PAU, Ludhiana. August 25- 26, 2015
49.	Manjeet Singh	National seminar on Agriculture Resource Management for Sustainability and Eco-restoration organized by Society for Agriculture and Arid Ecology Research (SAARER) and ICAR-Central Institute of Arid Horticulture, Bikaner, Rajasthan. March 11-13, 2016.
50.	AnoopKumar Dixit	Seminar lecture on Food Security by Dr Robert L. Thompson (Former Assistant Secretary for Economics, US Department of Agriculture) at PAU, Ludhiana. Sept 25, 2015.
51.	AnoopKumar Dixit	Seminar on "Up-scaling energy efficiency and sustainable practices in agriculture sector" at PAU, Ludhiana. Nov 3-4,2015.
52.	AnoopKumar Dixit	Seminar on 'Application of Drone in Agriculture Presented by North East Centre for Technology Application and Reach (NECTAR), Department of Science and Technology at PAU, Ludhiana. Nov 4, 2015.
53.	AnoopKumar Dixit	Lecture and Presentation on "The state of agriculture in the Caribbean region: Prospects and challenges" delivered by Prof. Clement Sankat, Pro Vice Chancellor, University of West Indies, Port of Spain, Trinidad and Tobago at PAU, Ludhiana. Nov 4,2015.
54.	BaldevDogra	Seminar on **"**Up-scaling energy efficiency and sustainable practices in agriculture sector**"** organized at PAU, Nov 3-4, 2015.
55.	N.K. Chhuneja	Convention of ISAE and symposium on engineering solutions for sustainable agriculture and food processing held at PAU Ludhiana. Feb 23-25, 2015.
56.	Shiv Kumar Lohan	Platinum Jubilee Conference of Indian Society of Agricultural Economics held at PAU Ludhiana. Nov 19-21, 2015.

57.	Shiv Kumar Lohan	Convention of ISAE and symposium on engineering solutions for sustainable agriculture and food processing held at PAU Ludhiana. Feb 23-25, 2015.
58.	N.K. Chhuneja	Platinum Jubilee Conference of Indian Society of Agricultural Economics held at PAU Ludhiana. Nov 19-21, 2015.
59.	Jasvir Singh Gill	Conference on Innovations in Agricultural Mechanization- Development of Linkages among R&D Institutes – Industry – Farmers at VigyanBhawan, New Delhi. July 7-8, 2016.
60.	M S Alam,RohitSharma ,Geetika,JaspreetKaur, AmarjeetKaurSandhya, Surekha Bhatia	Annual Convention of ISAE and Symposium on Engineering Solutions for Sustainable Agriculture and Food Processing held at PAU, Ludhiana. Feb 23-25, 2015.
61.	Surekha Bhatia	Symposium on 'Engineering solutions for sustainable agriculture and food processing" at PAU, Ludhiana on Feb 23-25, 2015
62.	Surekha Bhatia	Northern Regional Convention for water user association on Participatory Irrigation Management at PAU, Ludhiana, Aug 25-26, 2015.
63.	Satish Kumar	Agricultural Science Congress on sustainable livelihood security of small holder farmers at NDRI, Karnal& NAAS New Delhi on Feb 3-6, 2015
64.	Satish Kumar	Annual ISAE Convention and Symposium on Engineering Solutions Sustainable Agriculture and Food Processing at PAU, Ludhiana on Feb 23-25, 2015
65.	Tarsem Mittal	Seminar on "Upscaling energy efficiency and sustainable practices in agriculture sector" at PAU Ludhiana. Nov. 3-4, 2015.
66.	PreetinderKaur	Regional Seminar on 'Geospatial Technology in Natural Resource Management' at Punjab Remote Sensing Centre, Ludhiana. March 17, 2015.
67.	PreetinderKaur	Seminar on 'Food and Feed Solutions' at Buchi India Pvt. Ltd. At Hotel Park Plaza, Ludhiana. June 19, 2015
68.	Sandhya	Annual Convention of ISAE & Symposium on Engineering Solutions for Sustainable Agriculture and Food Processing held at College of Agricultural Engineering & Technology, Punjab Agricultural University, Ludhiana from February 23-25, 2015.
69.	Satish Kumar	Progressive Punjab investor's Summit at Punjab Bureau of investment Promotion (Punjab Govt.)Oct 28, 2015
70.	Satish Kumar	ISAE Convention of Agricultural Engineering Symposium on "Agricultural Engineering in Nation Building : Contributions and Challenges" at College of Agricultural Engineering and Technology, Orissa University of Agriculture and Technology, Bhubaneswar (OUAT), Orissa Jan 19-21, 2016
Year 2016-17		
71.	Manjeet Singh	Conference on Innovations in Agricultural Mechanization-Development of Linkage among R&D Institutes-Industry-Farmers organized by Department of Agriculture, Cooperation and Farmers Welfare; Ministry of Agriculture and Farmers Welfare at VigyanBhavan, New Delhi. July 7-8, 2016.
72	N.K. Chhuneja	Seminar on 'Sensing and automation in agricultural machinery system' by Dr. Ajay Sharda, Precision Ag/machine System Engineer, Kansas State University, USA. held at PAU Ludhiana. June 15, 2016.
73.	Tarsem Mittal	Seminar talk by Dr.Pratibha Nair, Programme Coordinator, USIEF, New Delhi held at PAU Ludhiana. Feb. 20, 2017.
74.	Rajesh Goyal	Annual Convention of ISAE and National Symposium on the theme Agricultural Engineering for sustainable and climate smart agriculture held at CCS HAU, Hisar. Feb 16-18, 2017.
75.	Shiv Kumar Lohan	DST-Lockheed Martin India Innovation Growth Programme org. by IUSSTF Indo US S&T Forum, FICCI, Stanford Business, DST, Govt. of India. at PAU Ludhiana. Jan 11,2016.

76.	M Salam Sharma Rohit	Annual Convention of ISAE and Symposium on Agricultural Engineering in Nation Building: Contributions and Challenges held at Bhubaneswar, Orissa. Jan19-21, 2016.
2017-18		
77.	N.K. Chhuneja Shiv Kumar Lohan	Annual convention of ISAE held at CCS HAU Hisar. Feb 16-18, 2017.
78.	N.K. Chhuneja	Seminar talk on "Expectations from wheat on food security" held at PAU Ludhiana . March 9, 2017.
79.	N.K. Chhuneja	National Seminar on "Doubling Indian Farmers Income by 2022: Opportunities and Challenges" held at PAU Ludhiana. April 7,2017.
80.	A K Jain	Seminar "Managing Climate Risks in Agriculture: Big Data Provides New Opportunities" by DrPramodAggarwal (CIMMYT-India) at PAU Ludhiana. August 9, 2017.
81.	A K Jain	Seminar "Success through Collaboration in Digital Age" by DrHarjinderSandhu and DrSwarnDhaliwal at PAU Ludhiana. January 5, 2018.
82.	A K Jain	Seminar Talk on "Challenges in Agriculture : Some Policy Options" by DrMontek Singh Ahluwalia former Deputy Chairman of Planning Commission at PAU Ludhiana. March 9, 2018.
83.	J P Singh	National Conference on "Role of Geospatial Technologies to Bridge the Rural and Urban Divide held at PRSC, Ludhiana. February 21-23, 2018.
84.	N.K. Chhuneja	Seminar on "Precision Agriculture and Big Data: The Future of Farming" by Prof. R. Khosla, Robert E. Gardner, Professor of Precision Agriculture, Colorado State University, USA. held at PAU Ludhiana. July 13,2017.
85.	Shiv Kumar Lohan	International Conference on Mechanical and Production Engineering organized by South Asian Research Centre in association with Institute of Research and Journals Research Forum held at Chandigarh. July 16,2017.
86.	Shiv Kumar Lohan	International Conference on 'Gender Issues and Socio-Economic Perspectives for Sustainable Rural Development' GIRD-2017 held at CCS HAU Hisar. Oct 23-25, 2017.
87.	N.K. Chhuneja	International Multi-stream Conference on Research and Society organized by GGNIMT held at PAU Ludhiana. Oct 29,2017.
88.	N.K. Chhuneja	International Conference on 'Gender Issues and Socio-Economic Perspectives for Sustainable Rural Development' GIRD-2017 held at CCS HAU Hisar. Oct 23-25, 2017.
89.	N.K. Chhuneja	International Conference on Mechanical and Production Engineering organized by South Asian Research Centre in association with Institute of Research and Journals Research Forum held at Chandigarh . July 16,2017.
90.	Shiv Kumar Lohan	Seminar on "Precision Agriculture and Big Data: The Future of Farming" by Prof. R. Khosla, Robert E.Gardner, Professor of Precision Agriculture, Colorado State University, USA. held at PAU Ludhiana. July 13, 2017.
91.	Shiv Kumar Lohan	National Seminar on "Doubling Indian Farmers Income by 2022: Opportunities and Challenges" held at PAU Ludhiana April 7,2017.
92.	Shiv Kumar Lohan N.K. Chhuneja	Seminar talk on "Expectations from wheat on food security" held at PAU Ludhiana. March 9,2017.
93.	Arshdeep Singh	Agri Tech 2018 – Conference on Punjab Agriculture-Opportunities, Challenges and Way forward at GNDU Amritsar. May 4-5, 2018.
94.	M S Alam, D K Sharma	Annual Convention of ISAE and National Symposium on Agricultural Engineering for Sustainable and Climate Smart Agriculture held at CCS HAU, Hisar.Feb 16-18, 2017
95.	Surekha Bhatia	Punjab Science Congress at PAU, Ludhiana. Feb 7-9, 2018.

96.	Shiv Kumar Lohan	International Multi-stream Conference on Research and Society organized by GGNIMT held at PAU Ludhiana. Oct 29,2017.
List of National Workshops attended		
2013-14		
97.	RakeshSharda, Sanjay Satpute	Workshop on "Ecorestoration of lentic-lotic water systems: ILBM perspective" organized by Shrishti Environment and Sustainability Society in association with CGWB and NRCP, MoEFheld at DMCH, Ludhiana. January 07, 2014
98.	N.K. Chhuneja	Workshop on "Precision agriculture-concepts, tools and implementation road map in small holder systems in South Asia" organize by PAU, International Plant Nutrition institute- South Asia Program (IPNI), CIMMYT and BISA held at PAU Ludhiana. Nov 14, 2013.
99.	Shiv Kumar Lohan	Agricultural Officers Workshop for kharif crops held at PAU Ludhiana. Feb 24-25, 2014.
100.	Manjeet Singh	Workshop on Precision Agriculture-Concepts, Tools and Implementation Road Map in Small Holder Systems in South Asia in collaboration with BISA, Ludhiana and IPNI, New Delhi held at PAU, Ludhiana. November 11, 2013
101.	N.K. Chhuneja	Agricultural Officers Workshop for Rabi crops held at PAU Ludhiana. Aug. 23-24, 2013.
102.	N.K. Chhuneja	Agricultural Officers Workshop for kharif crops held at PAU Ludhiana. Feb. 24-25, 2014.
103.	Shiv Kumar Lohan	Research & Extension Specialist Workshop for Kharif Crops held at PAU Ludhiana. Feb. 13-14, 2013.
2014-15		
104.	AnoopKumar Dixit	Workshop of AICRP on FIM at TNAU, Coimbatore. Feb 4-6, 2015
105.	BaldevDogra	Workshop on Scope of Lab View in Agricultural Engineering, organised by SEEIT, PAU Ludhiana. Aug 5-6,2014.
106.	N.K. Chhuneja	Workshop of "AICRP an Ergonomics on ESA" at BKKSDapoli. Oct. 9-11, 2014.
107.	Shiv Kumar Lohan	DST-Lockheed Martin India Innovation Growth Programme, 2015. Organized by DST, Govt. of India, FICCI, Stanford Business, IUSSTF Indo US S&T Forum held at Hotel Park Plaza, Ludhiana. Dec 11,2014.
108.	Shiv Kumar Lohan	Workshop of "AICRP an Ergonomics on ESA" at Dr. BKKS Dapoli. Oct 9-11,2014
109.	Jasvir Singh Gill	Workshop on "Innovation for Inclusive Growth and Entrepreneurship Generation" at Chandigarh. July 23,2014.
2015-16		
110.	RajanAggarwal SamanpreetKaur Sanjay Satpute	Biennial Workshop on All India Coordinated Project on Irrigation Water Management, TNAU, Coimbatore. August 22-25, 2015.
111.	N.K. Chhuneja	Annual Workshop of AICRP on Maize held at PAU Ludhiana. April 4-6,2015.
112.	Apoorv Prakash	Sensitization workshop-cum-training on "Agricultural Engineering Technologies for Production and Post Production Agriculture" at CIAE, Bhopal. Jan 5-7, 2016.
113.	Satish Kumar	Workshop on sugarcane at Directorate of sugarcane development, Lucknow and PAU, Ludhiana on Oct 14, 2015
114.	Dr Sunil Garg Angrej Singh	Biennial Workshop of All India Coordinated Research Project on Plasticulture Engineering and Technology at SKUAST-K Srinagar. September 10-12, 2015.
115.	A K Jain	National Workshop on Agricultural Demand Side Management. January 18,2016, New Delhi
116.	K G Singh	Annual Workshop of All India Coordinated Research Project on Plasticulture Engineering and Technology at MPUAT, Udaipur.December 15-16, 2016

117.	Arun Kaushal	National Workshop on Natural Management for Climate Resilient Agriculture in lower Himalayas NWNRM at RRS BollowalSaunkheri,Punjab. Dec 22-23,2015.
2016-17		
118.	A K Jain	Workshop on Water-energy-agriculture nexus and crop residue burning issues in Punjab held at Chandigarh. March 3, 2017.
119.	A K Jain	Workshop on "JalKrantiAbhyan" org. by Central Groundwater Board. PAU, Ludhiana. October 21, 2016.
120.	Rajesh Goyal	Workshop on "E-learning Technologies for effective research, teaching and extension. Aug 17-23,2016.
121.	Shiv Kumar Lohan	Annual Workshop of AICRP on ESA held at New Delhi Dec 21-22, 2016.
122.	K G Singh	Workshop of All India Coordinated Research Project on Plasticulture Engineering and Technology at, Ranchi, Bihar Dec 5-6, 2017.
123.	N.K. Chhuneja	Annual Workshop of AICRP on ESA held at , New Delhi. Dec 21-22, 2016.
124.	RajanAggarwal, Anil Bhardwaj and Sanjay Satpute	Expert Group Monitoring Workshop for implementation of projects under the Sustainable Agriculture and Rural Transformation Holistic Initiative (SARTHI) Programme in association with Punjab State Council for Science & Technology at Amritsar. Feb 24, 2017.
125.	N.K. Chhuneja	DST-Lockheed Martin India Innovation Growth Programme, 2016 organised by IUSSTF Indo US S&T Forum, FICCI, Stanford Business, DST, Govt. of India. held at PAU Ludhiana. Jan 11, 2016.
126.	ApoorvPrakash	Sensitization workshop-cum-training on "Agricultural Engineering Technologies for Production and Post Production Agriculture" at CIAE, Bhopal. Jan 5-7,2016.
127.	Satish Kumar	Research and Extension specialist workshop for kharif crops at Directorate of Extension Education, PAU, Ludhiana on Feb 27-28, 2017
128.	PreetinderKaur	Workshop 'Global Science, Local Solutions- Building Clean Cold Chains to Double Farmers' Income Sustainably' at Science and Innovation Network, British High Commission, at New Delhi. March 2, 2017.
129.	PreetinderKaur	Workshop 'Global Science, Local Solutions- Building Clean Cold Chains to Double Farmers' Income Sustainably'at Science and Innovation Network, British High Commission, at New Delhi. March 2, 2017. Orientation Workshop on MATLAB at University Data Center, PAU, Ludhiana. August 8, 2016
130.	PreetinderKaur	Orientation Workshop on MATLAB at University Data Center, PAU, Ludhiana. August 8, 2016.
131.	Satish Kumar	Workshop of AICRP-PHET at ICAR & CIPHET, Ludhiana. March 7-9, 2017
2017-18		
132.	N.K. Chhuneja	Workshop on Intellectual Property Rights held at PAU Ludhiana. Feb 22, 2017.
133.	Satish Kumar	Research and Extension specialist workshop for vegetable, floriculture and sericulture at PAU, Ludhiana May 31- June 1, 2017.
134.	Satish Kumar	Workshop on Indian grain storage working group meeting on bulk storage at ICAR, New Delhi on June11-12 ,2017
135.	Satish Kumar	NPTEL awareness workshop at LPU, Jalandhar on Oct 12, 2017
136.	N.K. Chhuneja	Annual Workshop of AICRP on ESA at IIT, held at Kharagpur. Nov 28-29, 2017.
137.	Satish Kumar	Research and Extension specialist workshop for fruits, mushroom, agro forestry alongwith postharvest management, farm power and machinery, food technology and agricultural economics at Directorate of Extension Education, PAU, Ludhiana on Jan. 11-12, 2018
138.	Arshdeep Singh	Annual Workshop of AICRP on Farm Implements and Machinery held at UAS, Raichur. Dec 20-22, 2017.

139.	Arshdeep Singh	Research and Extension Specialists workshop for Kharif crops at PAU, Ludhiana. Feb. 21-22, 2018.
140.	Anoop Kumar Dixit	Workshop of AICRP on FIM at UAS, Raichur. Dec 20-22,2017.
141.	Surekha Bhatia	Workshop of AICRP on PHET at ICAR-CIPHET, Ludhiana. March 7-9, 2017.
142.	Apoorv Prakash	National workshop on "Popularization of remote sensing based maps & spatial information available with ISRO Bhawan& SIS-DP" at Ludhiana. Aug 11, 2017.
143.	Shiv Kumar Lohan	Annual Workshop of AICRP on ESA at IIT, held at Kharagpur. Nov28-29, 2017.
144.	Shiv Kumar Lohan	Workshop on Intellectual Property Rights held at PAU Ludhiana. Feb 22,2017.
145.	Shiv Kumar Lohan	Annual convention of ISAE held at CCS HAU Hisar. Feb 16-18, 2017.
National Trainings		
Year 14-15		
146.	Angrej Singh	Summer school "Recent Innovations for Improving Nutrient Use Efficiency through Integrated Nutrient Management in Major Field Crops" at Division of Agronomy, IARI, New Delhi.August 6 to 26, 2014.
147.	Sanjay Satpute	Training on "Aquifer Information System and Aquifer Management Plan" at CGWB-NW Region, Chandigarh. Oct 27-31, 2014
148.	Sanjay Satpute	Winter School training on "Applications of Sensors, Nano-Sensors, Wireless Sensor Network and Instrumentation in Precision/Conservation Agriculture" at ICAR-CIAE, Bhopal. Dec 3-23, 2014
149.	AseemVerma.	Training programme on "Remote sensing, geographical information system and global positioning system" at Punjab Remote Sensing Centre, Ludhiana. Feb 2-20, 2015
150.	N.K. Chhuneja	DST-Lockheed Martin India Innovation Growth Programme, 2015. Organized by DST, Govt. of India, FICCI, Stanford Business, IUSSTF Indo US S&T Forum held at Hotel Park Plaza, Ludhiana. Dec 11, 2014
151.	ApoorvPrakash	Winter school on "Application of Sensors, Nano-sensors, Wireless Sensor Network and Instrumentation in Precision/Conservation Agriculture" at CIAE, Bhopal. Dec 3-23, 2014.
2015-16		
152.	Angrej Singh	Training on, "Sustainable Development and Management of Ground Water Resources" held at PAU, Ludhiana July13-17, 2015.
153.	Apoorv Prakash	Training on "Precision Technologies for Fruits & vegetables" at PAU, Ludhian. Aug 7-8, 2015.
154.	Preetinder Kaur	Training of Trainers Workshop" organized by FICSI in collaboration with the City College of Plymouth, UK at Bangalore. Feb 11-12, 2016.
155.	HarpreetKaur	Winter School on "Recent Advances in Development of Automatic Systems/ Machines for Secondary Agriculture" CIPHET, Ludhiana Nov. 18 - Dec. 08, 2015.
156.	Angrej Singh	Training on, "Advances in micro irrigation and fertigation technologies for improving water and nutrient use efficiency", held at HPKV, Palampur.Oct. 1-10, 2015
157.	Manjeet Singh	Brain storming Session for policy paper on Practical and Affordable Approaches for Precision Farm Equipment and Machinery organised by National Academy of Agricultural Sciences (NAAS) at New Delhi. September 30, 2015.
158.	K.B Singh	Training on Application of isotopes in hydrology and water resources at NIH Roorkee. Feb 29- March 4, 2016.
159.	Sanjay Satpute	CAFT training on "Applications of Computer Algorithms and Statistical Software Packages in Agriculture" at ICAR-IASRI, New Delhi. Dec 18, 2015 to Jan 7, 2016.
160.	Ashwinder Kaur Dhaliwal	Summer school on "Novel Approaches and Technologies for Processing and Value Addition of Agricultural produce" being organized at ICAR – CIPHET, Ludhiana. Aug 4-24, 2015.

2016-17		
161.	NileshBiwalkar AminaRaheja RajanAggarwal	Attended Green House Fitter and Micro-irrigation Technician organised by Agriculture Skill Council of India.March 6-8,2017 .
162.	Sandhya	Training course on "Recent approaches in crop residue management and value addition for entrepreneurship development" at IGFRI, Jhansi, UP. July 14- August 3, 2016
163.	Tarsem Mittal	Training programme under "JalKrantiAbhiyan" held at PAU Ludhiana. Oct 21, 2016.
164.	Ashwinder Kaur Dhaliwal	Training course on "Production protocol for biocontrol agents, microbial biopesticides and quality analysis of microbial biopesticides" organized at National Institute of Plant Health Management, Rajendernagar, Hyderabad. August 18, Sept 7, 2016.
165.	Ashwinder Kaur Dhaliwal	Brain storming session on 'Agrochemicals and spray technology' at PAU Ludhiana. Nov 22, 2016.
166.	NileshBiwalkar Samanpreet Kaur	Short course on "Advances in Engineering Tools and Techniques for Precision Agriculture" at CIAE. Bhopal. Jan 10-19, 2017.
167.	Lokesh Jain	Short term course on "E-learning Technologies for Effective Teaching Research and Extension". Guru Nanak Dev University, Amritsar. August 17-23, 2016.
168.	Lokesh Jain	GIAN Course on "Computer Security from the Data Science Prospective". IIT Ropar.December 18 - 30, 2017.
169.	Rajesh Goyal	Orientation course on "Effective Teaching, research and extension" at PAU Ludhiana. Sept. 27 to Oct. 7, 2016.
170.	Surekha Bhatia	Training on "Precision Technologies for Fruits & vegetables" at PAU, Ludhiana. Aug 7-8,2015.
171.	Surekha Bhatia	Model Training Course on "Processing, Value addition and Entrepreneurship Development in Agri- Bussiness" at CIPHET from November 14-21, 2016.
172.	Samanpreet Kaur Amina Raheja	OutrreachProgramme of IIRS on UAV Remote Sensing and Applications at PRSC, Ludhiana. July 3-7, 2017.
2017-18		
173.	K G Singh	Training of Master Trainers for Skill India Programme.at PAU Ludhiana. Feb19-2, 2018,
174.	Apoorv Prakash	Training Programme on "Applications of Remote Sensing and GIS" at PRSC Ludhiana. Aug 28 to Sep 15, 2017.
175.	Sandhya	Summer school on "Advance Strategic Processing Techniques for oilseeds to combat protein- energy malnutrition and augment farmers' income" at CIPHET, Ludhiana. Aug 1-21, 2017.
176.	BaldevDogra	Training on adjustment and optimization of combine harvester: comprehensive straw management begins with harvest by Christian Bachnicke, DEULA-Nienburg, Germany at PAU, Ludhiana. April 25, 2017.
List of National Meetings		
2014-15		
177.	RajanAggarwal and Sanjay Satpute	Meet of AICRP on Water Management & Biennial Scientists Meet of AICRP on Groundwater Utilization" held at CSK HPKV, Palampur. June 24-27, 2014
178.	Sanjay Satpute	"USAID Funded Agriculture Innovation Project (AIP) Planning Meet" organised by AVRDC-The World Vegetable Centre, Hyderabad and PAU, Ludhiana. October 08-10, 2014
2015-16		
179.	N.K. Chhuneja	Annual Review Meeting of AICRP on ESA held at PAU Ludhiana on 26-27.11.2015



180.	ManinderArora	Progressive Punjab Investors Summit meet in ISB, Mohali Oct 28, 2015.
181.	BaldevDogra	Brain storming meeting on promotion of pulses in Indo- Gangetic plains. Panelist in session on mechanization and developmental issues. Aug 31, 2015.
182.	RajanAggarwal SamanpreetKaur	Meeting of Expert Committee of National Innovations in Climate Resilent Agriculture held at New Delhi. June 15, 2016.
2016-17		
183.	Anoop Kumar Dixit BaldevDogra	MAC meeting of the scheme "Rotavator refinements-design modifications and development" at CSIR-CMERI, Ludhiana. April 27, 2017.
184.	Preetinder Kaur	Stakeholders Meeting 'Food Processing Fund in NABARD for providing affordable credit to Mega Food Parks (MFPs) and individual units within Designated Food Parks'at NABARD, Punjab Regional Office, Chandigarh. April 28, 2016.

COA		
S.no	**Name of the faculty**	**List of International Symposia/Conferences/Seminars attended**
Year 2013-14		
1.	S S Kukal	Multi-disciplinary Knowledge for Water Disaster Management World Association of Soil & Water Conservation at Chiang Rai, Thailand from September 4-6, 2013
2.	Dr. Kuldeep Singh	12th International Wheat Genetics Symposium at Yokohama, Japan on September 8-14, 2013
3.	Dr PK Chhuneja	International Apicultural Congress, the APIMONDIA-2013 APIMONDIA on September 28-October 4, 2013 Kiev, at Ukraine
4.	Dr. Kuldeep Singh	7th international Rice Genetics Symposium at Manila Philippines from November 5-7, 2013
5.	Dr.Amarjeet Kaur, Dr.Poonam A.Sachdev,	International Conference on, "Nutritional Therapies against Lifestyle Related Disorders" University of Agriculture, Faisalabad, Pakistan from May 29-30, 2014 at Faisalabad, Pakistan.
6.	Dr. Kuldeep Singh	XXII Plant and Animal Genome Conference at San Diego, USA from January 9 to 13, 2014
Year 2014-15		
7.	Dr Rajeev Sikka	Soil in the City Conference Illinois water environment association at Chicago, USA on June 29-July 2, 2014,
8.	Dr Sandeep Singh	International Horticultural Congress by ISHS, Belgium at Brisbane, Australia held on August 17-22, 2014
9.	Drs H. S. Rattanpal & Sandeep Singh	International Conference on Citriculture" by Bahauddin Zakariya University, Multan, Pakistan Multan, Pakistan held on February 11-13, 2015
10.	Dr M S Bhullar	7th International Weed Science Congress by International Weed Science Society and Czech Weed Science Society Prague, at Czech Republic, held on June 19-25, 2016
Year 2015-2016		
11.	Dr Sandeep Singh Dr H S Rattanpal	International Symposium on Fig ISHS, Belgium Naples, Italy August 31-September 3, 2015
12.	Dr Baljit Singh	Ready-to-eat Foods using Extrusion Processing-Technology and Innovation for Domestic and Export Market Assocom, India and Wenger Manufacturing, USA on January 27-27, 2016
Year 2016-2017		
13.	Drs. G. S. Mangat and Jagjeet Singh Lore	4th International Conference on "Plant Genomics" OMICS, International conference series at Brisbane, Australia held on July 14-15, 2016
14.	Dr C S Aulakh	India-Mauritius Global Partnership Conference India Mauritius Trade & Cultural Friendship Forum Balaclava, Mauritius on July24-27, 2016
15.	Dr Vikas Jindal	XXV International Congress of Entomology Entomological Society of America Sept 25 -Sept30, 2016, held on Orlando, USA
16.	Kalia, A., Chen, I-Cheng., Akbulut, M. and Gomes, C. L.	International Conference of Institute of Food Technologists (IFT2016) Chicago, USA on July 16-19, 2016
17.	Dr. Ruma Devi	8th Annual Agroforestry Symposium Enhancing Health, Conservation and Livelihoods: Medicinal Plants in Agroforestry Bond Life Sciences Building, University of Missouri, Columbia, USA Jan 26, 2017
18.	Dr. Ruma Devi	1st Annual MU Dupont Pioneer Plant Science Symposium Bond Life Sciences Building, University of Missouri, Columbia, USA Feb 2nd 2017

19.	Dr. Ruma Devi	34th Annual Symposium IPG 2017, Root Biology University of Missouri, Columbia, USA held on June 7-9, 2017
20.	Dr. Ruma Devi	Local Auxin Meeting Tyson Research Centre, Washington University, St Louis, Missouri, USA held on June 12, 2017
21.	Vikas Jindal	10th Arthropod Genomics Symposium Eck Institute for Global Health University of Notre Dame, USA held on June 8-11, 2017
Year 2017-18		
22.	MS Bhullar	26th Asian-Pacific Weed Science Society Conference by Asian-Pacific Weed Science Society at Kyoto, Japan held on September 19-22, 2017
23.	Dr Simerjeet Kaur	26th Asian-Pacific Weed Science Society Conference by Asian-Pacific Weed Science Society at Kyoto, Japan held on September 19-22, 2017
List of International Workshops attended		
Year 2013-14		
24.	Dr. P.S.Sandhu	15th International Sclerotinia workshop Huazhong Agricultural University, Wuhan, China at Huazhong Agricultural University, Wuhan, China on August 20-24, 2013.
25.	Dr. Rupinder Kaur	Workshop on Update meeting under BMZ project regarding safeguarding Asian rice production from a rapidly warming climate IRRI, Phillipines held on October 21-29, 2013 at IRRI, Phillipines
26.	Rajni Sharma	Workshop on Women in Agroforestry Forest Department, Nepal held on November 28-29, 2013, at Kathmandu, Nepal.
27.	Dr. Kuldeep Singh	National workshop on genomics in crop improvement at MDU Rohtak from February, 27-28, 2014.
28.	Dr. Satinder Kaur	BGRI workshop and Borlaug summit on wheat for food security at Obregon, Mexico on March 20 - April 1, 2014.
List of International Meetings		
Year 2013-14		
29.	Dr. Parveen	General Research Meeting September 27 - 30, 2013, at Lisbon, Portugal held on September 27 - 30, 2013
30.	Dr. Johar Singh	Annual awardees meeting of project "BREAD: An alternate dwarfing gene system to improve abiotic stress tolerance in cereals" Bill and Malinda Gates Foundation Seattle, USA October 31, 2013 to held on November 1, 2013 at Seattle, USA
31.	S S Kukal	Plenary Meeting and Symposium on 'Rice for Tomorrow Sustainable Rice Platform (UNEP) at Bangkok Thailand from November 25-26, 2013
32.	Dr M S Bhullar	54th meeting of "Weed Science Society of America" Vancouver, Canada at Vancouver, Canada February held on 3-6, 2014
Year 2014-15		
33.	Dr. Dharminder Pathak	6th Meeting of the Asian Cotton R&D Network International Cotton Advisory Committee, Washington D.C.; Cotton Development Board, Bangladesh; Bangladesh Agriculture Research Council at Dhaka (Bangladesh) from June 18-20, 2014
34.	Drs V. S. Sohu, G. S. Mavi, Damanjeet Kaur & Ritu Bala	Annual Review and Work Plan Meeting on BMZ and CSISA Wheat Breeding (Objective 4) Projects by CIMMYT Kathmandu, Nepal on September 10-14, 2014
35.	Dr V. S. Sohu	2014 Generation Challenge Program (GCP) General Research Meeting by CIMMYT, Mexico Rayong, Thailand on October 7-10, 2014

Year 2015-16		
36.	Dr SS Kukal	Advisory Committee Member of Sustainable Rice Platform (UNEP) by Fundraising Strategy Workshop Sustainable Rice Platform (UNEP) at Bangkok, Thailand held on March 24-25, 2016
Year 2016-2017		
37.	Drs S S Kandhola and Pankaj Sharma	Annual group meeting of sunflower, sesame and niger ICAR-Indian Institute of Oilseeds Research and ICAR New Delhi UAS, Raichur, Karnataka from on April 14-16, 2016
38.	Dr. Beant Singh	Monogram University of Bristol, UK University of Bristol, UK held on April 4-6, 2017
List of National Symposia/Conferences/Seminars attended		
Year 2013-14		
39.	Dr Amandeep Singh Brar	Progressive Punjab Agriculture Summit-2014 Punjab Govt. at Chapar Chiri, Mohal Punjab held on February 18, 2014
40.	Dr P.P. Singh Dr G.S. Rattan Dr P.P.S.Pannu, Dr.P.S.Sekhon Dr.Vineet Kuamr Dr N.K.Dhillon Dr.P.P.K.Chahal Dr. Jaspal Kaur Ms. Amrinder Kaur	National Symposium on Changing Disease Scenario and Management Approaches for Sustainability of Agriculture Indian Society of Plant Pathologists, at SKUAST Srinagar held on October 26-27, 2013.
41.	Dr S S Walia	17th Punjab Science Congress on "Science and Technology for Sustainable Growth" at Punjab Technical University, Jalandhar on February 14-16, 2014
42.	Dr Smriti Sharma	Climate change-effects on water resources, agriculture and Biodiversity at Punjab Agricultural University, Ludhiana May 28, 2014
43.	Dr Ramesh Arora Dr Jaspal Singh Virk Dr Vijay Kumar Dr Ravinder Singh Chandi	National Seminar on Reorientation of Agricultural Research to Ensure National Food Security at (Haryana) CCS Haryana Agricultural University, Hisar held on January 6-7, 2014
44.	Dr S S Walia	National Seminar on "Reorientation of Agricultural Research to Ensure National Food Security" CCS HAU, Hisar at CCS HAU, Hisar on January 6-7, 2014
45.	Dr Manmeet Brar Bhullar	National Symposium on Emerging Trends in Eco-friendly Insect Pest Management at Tamil Nadu Agricultural University, Coimbatore (Tamil Nadu) held on January 22-24, 2014
46.	Dr C S Aulakh	International seminar on "Indo-Dutch Cooperation in Potato Chain-Focus on Production, Storage, Processing and Export" POSCON and JPGA,at Jalandhar on April 18, 2014
47.	Rajni Sharma	ISTS-IUFRO Conference on Sustainable Resource Management for Climate Change Mitigation and Social Security ISTS Solan (HP) at IT Park, Chandigarh held on March 13 to 15, 2014
48.	RIS Gill	World Congress on Agroforestry WAC, Nairobi Kenya at New Delhi on February 10-14 2014,
49.	Sanjeev K Chauhan	**SAHYOG Conference and Brokerage Event on Bio-economy** TERI Shrishti Environment and Sustainable Society at New Delhi, India New Delhi on February 3-4, 2014
50.	Sanjeev K Chauhan	ISTS-IUFRO Conference on Sustainable Resource Management for Climate Change Mitigation and Social Security FCRI Mettupalayam (TN). at IT Park, Chandigarh held on March 13 - 15, 201 4

51.	Dr Vikas Jindal, Dr Paramjit Kaur Dr P.C. Pathania	2nd Annual National Conference of on Science: Emerging Scenario & Future Challenges-II (SESFC-II)" Him Science Congress Association at Himalayan Forest Research Institute, Shimla, Himachal Pradesh held on May 17-18, 2014
52.	Dr.R.K.Kalra	International Congress on Agriculture, Food Engineering and Environmental Sciences-Sustainable Approaches at Jawaharlal Nehru University, New Delhi on March 29-30, 2014
53.	Harmeet Singh Saralch	ISTS-IUFRO Conference on Sustainable Resource Management for Climate Change Mitigation and Social Security ISTS Solan (HP) at IT Park, Chandigarh held on March 13 - 15, 2014
54.	Dr. Dharminder Pathak	International Conference on Biodiversity, Bioresources and Biotechnology Association for the Advancement of Biodiversity Science, Society for Applied Biotechnology, at Imperial Scientific Publishing; Mysore held on January 30-31, 2014
55.	Dr. U. S. Tiwana	National Conference on" Emerging problems and recent advances in applied sciences" at Ch. Charan Singh University, Meerut held on February 8-9, 2014
56.	Dr.Amarjeet Kaur	National Conference on, "Emerging Horizons in Science and Technology organized by Sri Guru Granth Sahib World University, Fatehgarh Sahib and delivered lecture on, " Cereal based health foods" at Granth Sahib World University, Fatehgarh Sahib January 17-18, 2014
57.	Dr.Prabhjot Kaur	National Seminar on Role of Mandi Board in Rural Development Society of Economics and Development and Punjab Mandi Board at PAU, Ludhiana on March 3, 2014
58.	Dr P.K. Chhuneja Dr Anureet Kaur Chandi Dr Amit Choudhary	Second National Conference on Brassicas for Addressing Edible oil and Nutritional security PAU, Ludhiana held on February 14-16, 2014
59.	Dr Balwinder Singh Dr P.K. Chhuneja Dr Neelam Joshi Dr Jaspal Singh Dr Harminder Kaur Dr Anureet Kaur Dr Prasad Burange Dr PC Pathania Ms Gaganjyot	International Conference on Entomology Department of Zoology and Environmental sciences, at Punjabi University, Patiala held on February 21-23, 2014
60.	Dr H.S.Grewal Dr Kushal Singh	National Symposium on Emerging Trends in Botanical Sciences at Department of Botany, Punjabi University, Patiala on February 17-18, 2014
61.	Dr Paramjit Kaur	Second International Conference on Agricultural and Horticultural Sciences at Hyderabad (Telangana). Hyderabad held on February 3-5, 2014
62.	Dr Simerjeet Kaur	Biennial Conference of "Indian Society of weed Science on " Emerging Challenges in Weed Management" Indian Society of Weed Science, Directorate of Weed Science Research (DWSR), Jabalpur at Directorate of Weed Science Research at (DWSR), Jabalpur held on February 15-17, 2014
63.	Dr Tarundeep Kaur	Biennial Conference of "Indian Society of weed Science on " Emerging challenges in Weed Management" Indian Society of Weed Science, Directorate of Weed Science Research (DWSR), Jabalpur of Weed Science Research (DWSR), Jabalpur on February15-17, 2014

64.	Dr Navjyot Kaur	Biennial Conference of "Indian Society of weed Science on " Emerging Challenges in Weed Management" Indian Society of Weed Science, at Directorate of Weed Science Research (DWSR), Jabalpur on February 15-17, 2014
65.	Dr.R.K.Kalra Dr.Dharminder Singh Dr.V.K.Rampal	International Conference on Extension Educational Strategies for Sustainable Agricultural Development-A Global Perspective International Society of Extension Education at University of Agricultural Sciences, Bangalore UAS, Bangalore on December 5-8, 2013
66.	Dr Pervinder Kaur	Biennial Conference of Indian Society of weed Science on " Emerging Challenges in Weed Management" Indian Society of Weed Science, at Directorate of Weed Science Research (DWSR), Jabalpur on February 15-17, 2014
67.	Dr Roopinder Singh	National Seminar on "Reorientation of Agricultural Research to Ensure National Food Security" CCS HAU, Hisar at CCS HAU, Hisar on January 6-7, 2014
68.	Dr.Poonam A.Sachdev	National Conference on, "Emerging Horizons in Science and Technology organized by Sri Guru Granth Sahib World University, Fatehgarh Sahib and delivered lecture on, "Recent Development of post harvest processing of fruits and vegetables" at Sri Guru Granth Sahib World University, Fatehgarh Sahib held on January 17-18, 2014
69.	Dr. Damanjit Kaur and Dr. Ritu Bala	National Symposium on "Changing disease Scenario and management approaches for sustainability in agriculture" at Sher-e-Kashmir University of Agricultural Sciences & Technology – Kashmir, Srinagar held on October.26-27, 2013
70.	Dr.Preeti Ahluwalia	National Conference on Emerging Horizons in Science and Technology at Sri Guru Granth Sahib World University, Fatehgarh Sahib held on January 17-18, 2014
71.	Dr. Jagjeet Singh Lore	Brain storming Session on "Strategic Management of Yellow Rust and karnal Bunt of wheat in North Western Plains and Hill Zone of India INSOPP (Indian Society of Plant Pathologists) at PAU, Ludhiana. on July 23, 2013
72.	Dr. Madhu Meeta	International conference on crop productivity and sustainability- shaping the future Baba Farid College, Department of Agriculture, Bathinda held on March 20-21, 2014
73.	Dr. Jyoti Jain	Brain storming Session on "Strategic Management of Yellow Rust and karnal Bunt of wheat in North Western Plains and Hill Zone of India - INSOPP (Indian Society of Plant Pathologists). PAU, Ludhiana, on July 23, 2013
74.	Dr. Jagjeet Singh Lore	Annual Review and Planning Workshop of the project Stress Tolerance Rice for Africa and South Asia (STRASA) at International Rice Research Institute, Philippines. NASC Complex, New Delhi on May, 20-23, 2014
75.	Dr. G. Mahajan	Biennial Conf. of Indian Soc. Weed Sci. on "Emerging Challenges in Weed Management" Directorate of Weed Sci. Res., Jabalpur on February 15-17, 2014
76.	Dr. Neerja Sharma	International Conference on Role of Plant Biochemistry and Biotechnology in Food and Nutritional Security" and "XII Convention of the Indian Society of Agricultural Biochemists" The Society of Agricultural Biochemists at Sri Venkateswara University, Tirupati. on on December 11-14, 2013

77.	Drs. S.K.Banga, K.S.Brar, V.Sardana, S.K.Dhillon, P.S.Sandhu, Sarwan Kumar, Pushp Sharma, Pankaj Sharma, Gurpreet Kaur, Chhaya Attri, Sukhpreet Singh and Sanjula Sharma	2nd National Brassica conference on "Brassicas for Addressing Edible Oil and Nutritional Security"Society for rapeseed –Mustard Research, Bharatpur at PAU, Ludhiana held on February.14-16, 2014
78.	Dr. Mahesh Kumar	National seminar on "Reorientation of Agricultural research to Ensure National Food Security" at Chaudhary Charan Singh Haryana Agricultural University, Hisar Chaudhary Charan Singh Haryana Agricultural University, Hisar held on January 6-7, 2014
79.	Dr. Jawala Jindal	South Asia Biosafety Conference" Biotech Consortium India Limited (BCIL) and Centre for Environmental Risk Assessment (CERA). at New Delhi held on September 18-19, 2013
80.	Dr Mandeep Hunjan	International conference on Bacterial blight CSIR-Center for Cellular and Molecular Biology, Hyderabad held at CCMB, Hyderabad held on December 2-4, 2013
81.	Dr N.K.Dhillon Dr.P.P.K.Chahal	Symposium on "Nematode: A Friend and Foe of Agri-Horticultural Crops Dr. Y.S. Parmar University of Horticulture and Forestry, at Nauni, Solan held on November 21-23, 2013
82.	Jassal HS	The Clay Minerals Society of India at Regional Centre, NBSS & LUP (ICAR), IARI, New Delhi held on September. 27-28, 2013Attended Change- Effects on Water Resources, Agriculture and Biodiversity PAU, Ludhiana PAU, Ludhiana held on May28, 2014
83.		National Symposium on Precision Horticulture for Small and Marginal Farmers at IGKV, Raipur on June 24-27, 2014.
84.	Dr. Kuldeep Singh	National Conference on Science of Omics for Agricultural Productivity: Future Perspective at GB Pant University of Agri. & Tech., Pantnagar held on March 4-6, 2014
85.	Dr. Kuldeep Singh	4th International Conference on Bacterial Blight of Rice at CCMB Hyderabad, India held on December 2 -4, 2013
86.	Dr. Kuldeep Singh	Indraprastha International Conference on Biotechnology 2013 Guru Gobind Singh Indraprastha University Guru Gobind Singh Indraprastha University, Dwarka, New Delh held on October 22 -25, 2013
87.	Sandeep Sandhu K K Gill	Attended International conference on Chemical, environment and bioprocess engineering Krishi Sanskiriti, Delhi JNU, New Delhi held on December 20-22, 2013
88.	Dr. Yogesh Vikal	International symposium on Rice Functional Genomics at New Delhi held on November 20 -22 , 2013
89.	Som Pal Singh	International Event on India Water Forum Event TERI India Habitat Center, New Delhi held on October 28-30, 2013
90.	Dr.Amarjeet Kaur	National Conference on Innovative Techniques in the Development of Functional Foods and Nutraceuticals (NCFFN-14) and delivered lecture on, " Dietary supplements, Functional and Multi-functional Foods, Health Benefits of Different Common Nutrients and Methods to Enhance Active Components in Foods" at Deptt. of Food Engg. & Technology, Sant Longowal Institute of Engg. & Technology, held on Februrary 14-15, 2014
91.	Dr. Usha Bajwa,	National Conference on Innovative Techniques in the Development of Functional Foods and Nutraceuticals (NCFFN-14) and delivered lecture on,"Designer Foods- An Overview Deptt. of Food Engg. & Technology, Sant Longowal Institute of Engg. & Technology, Longowal held on Februrary 14-15, 2014

92.	Dr.Savita Sharma,	National Conference on Innovative Techniques in the Development of Functional Foods and Nutraceuticals (NCFFN-14) and delivered lecture on, " Role of Phytochemicals in Human Health" at Deptt. of Food Engg. & Technology, Sant Longowal Institute of Engg. & Technology, Longowal held on Februrary 14-15, 2014
93.	Drs. Sarvjeet Singh, Ravinder Singh, Inderjit Singh, Navneet Aggarwal and H.K.Cheema	International Conference on Crop Productivity & Sustainability at Baba Farid College, Bathinda (Pb) on March 20-21, 2014
94.	Dr. Jasvir Singh	National Seminar at Chaudhary Charan Singh Haryana Agricultural University, Hisar on January 6-7, 2014
95.	Dr. Jagjeet Singh Lore	4th International Conference on Bacterial Blight of Rice" at Centre of Cellular Molecular Biology, Hyderabad, India, on December 2-4, 2013
96.	Dr. G.K. Taggar	International Conference on Entomology- ICE 2014 Deptt. Zoology & Environmental Sciences at Punjabi University, Patiala on February. 21-23, 2014
97.	Dr. (Mrs) Veena Khanna	International symposium on 'Frontier discoveries and innovations in Microbiology and its Interdisciplinary Relevance Deptt. of Micro-biology at Maharashi Dayanand Uni., Rohtak on November 17-20, 2013
Year 2014-2015		
98.	19 faculty members	National Symposium on "Agricultural Diversification for Sustainable Livelihood and Environmental Security" by Indian Society of Agronomy and Department of Agronomy, PAU, Ludhiana at PAU, Ludhiana held on November 18–20, 2014.
99.	Drs Krishan Kumar Vashist, S. S. Walia, C. S. Aulakh, Simerjeet Kaur, Tarundeep Kaur, & Amandeep Singh Brar	12th Agricultural Science Congress at National Dairy Research Institute (NDRI), Karnal held on February 3-5, 2015
100.	Drs P. S. Shera & Rabinder Kaur	Launch-cum-Orientation Workshop of Network Project on Conservation of Lac Insect Genetic Resources" by ICAR at Institute of Natural Resins and Gums, Ranchi held on August 27-28, 2014
101.	Drs P. K. Chhuneja, Jaspal Singh, Harminder K Deosi & Amit Choudhary	International Symposium on "Conservation and Management of Pollinators for Sustainable Agriculture and Ecosystem Services" by V Sivaram Research Foundation, Bangalore at NASC Complex, New Delhi held on September 24-26, 2014
102.	Dr K. S. Sangha	National Seminar on "Augmenting Processing and Shelf Life of Perishable Food Products" by National Productivity Council, New Delhi at PAU, Ludhiana held on September 26, 2014
103.	Drs K. S. Suri, Jaspal Singh, Vijay Kumar, P. S. Shera & Vikas Jindal	National Symposium on "Entomology as a Science and IPM as a Technology—The Way Forward" by Entomological Society of India at Central Agricultural University (CAU), Arunachal Pradesh held on November 14-15, 2014
104.	Drs Neelam Joshi & Rabinder Kaur	International Conference on "Changing Scenario of Pest Problems in Agri-horti Ecosystem and their Management" at Rajasthan College of Agriculture, MPUAT, Udaipur held on November 27-28, 2014
105.	Drs Ramesh Arora, K. S. Suri, Vijay Kumar, Vikas Jindal, Rubaljot Kooner, Smriti Sharma, S. K. Sahoo, Ravinder Singh Chandi & Anureet Kaur Chandi	National Symposium on "Agrochemicals for Food and Environmental Safety" by Society of Pesticide Science India at Indian Agricultural Research Institute, New Delhi held on January 28-30, 2015
106.	30 faculty members	4th Congress on Insect Science" by INSAIS, ICAR & PAU, Ludhiana at PAU, Ludhiana on April 16-17, 2015

107.	Dr Anu Kalia	National Symposium on "Crop Improvement for Inclusive Sustainable Development" at PAU, Ludhiana on November 7-9, 2014
108.	Dr Anu Kalia	8th International Conference on "Mushroom Biology and Mushroom Products" by NAAS at New Delhi on November 19-22, 2014
109.	Dr Kiran Jeet	Chandigarh Science Congress (CHASCON-2015) (State level conference) organized by Panjab University in collaboration with Academic and Research Institutes in the Chandigarh Region Panjab University, Chandigarh held on February 25-27,2015
110.	Dr Kiran Jeet	4th National Conference on "Advanced Materials and Radiation Physics" by Department of Physics, SLIET, Longowal Longowal held on March 13-14, 2015
111.	Drs R. K. Dhaliwal, R. K. Kalra, Manmeet Kaur, Dharminder Singh, V. K. Rampal, Lavleesh Garg & Pankaj Kumar	7th National Seminar on "Sustainable Rural Livelihood: Technological and Institutional Perspective" at Sher-e-Kashmir University of Agricultural Sciences & Technology, Jammu, Chatha held on January 8-10, 2015
112.	Dr N. K. Arora	Attended Sixth Indian Horticulture Congress- 2014 at Coimbatore held on November 5-9, 2014
113.	Drs Anita Arora Gagandeep Kaur & M. S. Gill	National Symposium on "Crop Improvement for Inclusive Sustainable Development" at PAU, Ludhiana held on November 7- 9, 2015
114.	Dr Monika Gupta	12th Agricultural Science Congress at NDRI, Karnal held on February 3-6, 2015
115.	Mr Parminder Singh	7th National Seed Congress" at National Seed Research and Training Centre, Varanasi held on September 25-27, 2014
116.	Drs Amarjit Singh, Sandeep Jain & Daljit Buttar	National Symposium on "Crop Improvement for Inclusive Sustainable Development" PAU by Crop Improvement Society of India, PAU, Ludhiana along with Indian Society of Genetics and Plant Breeding, Indian Society of Plant Genetic Resources, at PAU Ludhiana on November 7-9, 2014
117.	Drs G. S. Rattan, P P S Pannu, Vineet Kumar, N. K. Dhillon, PPK Chahal, Ms Amrinder Kaur & Mr Parminder Singh	National Symposium on "Plant Health for Sustainability in the Field and Horticultural Crops" by Indian Society of Plant Pathologists, PAU, Ludhiana Citrus Research Station, Dr YSR University of Horticulture, Tirupati on November 18-20, 2014
118.	Dr P. S. Sekhon	4th India International Potato Expo 2015" by Indian Chamber of Commerce and FAO at Chandigarh on January 15-16, 2015
119.	All members of wheat research team	International Seminar on "Enhancing Wheat and Barley Production with Special Emphasis on Nutritional Security" by JNKVV, Jabalpur and DWR JNKVV, Jabalpur on August 24, 2014
120.	Dr Guriqbal Singh	National Conference on "Pulses: Challenges and Opportunities under Changing Climate Scenario" by Indian Society of Pulses Research and Development JNKVV, Jabalpur on September 29 - October 1, 2014
121.	Dr Jayesh Singh	International Symposium on "New Dimensions in Agrometeorology for Sustainable Agriculture" by Association of Agro-meteorologists, Anand, India G.B. Pant University of Agriculture & Technology (GBPUAT) , Pantnagar on October 16 – 18, 2014
122.	46 faculty members and all members of wheat research team	National Symposium on "Crop Improvement for Inclusive Sustainable Development" PAU, PAU, Ludhiana on November 7-9, 2014
123.	All Pulses Scientists and three faculty members	National Symposium on "Agricultural Diversification for Sustainable Livelihood and Environmental Security" at PAU, Ludhiana held on November 18 – 20, 2014
124.	Dr Daman Jeet Kaur	National Symposium on "Plant Health for Sustainability in the Field and Horticultural Crop" by Indian Society of Plant Pathologists CRS, at Dr YSR Horticultural University, Tirupati held on November 18-20, 2014

125.	15 faculty members	12th Agricultural Science Congress at NDRI, Karnal held on February 3-6, 2015
126.	Dr Dharminder Pathak	5th International Conference on "Next Generation Genomics and Integrated Breeding for Crop Improvement" at International Crops Research Institute for Semi-Arid Tropics (ICRISAT), Hyderabad held on February 18-20, 2015
127.	Dr Gurpreet Kaur	2nd National Seminar on "Sustainable Agricultural Development" by Society of Economic Development PAU, Ludhiana held on March 3, 2015
128.	Dr S. S. Kandhola	ICAR's Annual Group Meet of All India Coordinated Research Network on Potential crops at Orissa University of Agriculture & Technology (OUAT), Bhubaneswar April 10-11, 2015
129.	Drs Gaurav Kumar Taggar, Ravinder Singh, H. K. Cheema & Beant Singh	4th Congress on Insect Science (CIS-4) at PAU, Ludhiana April 16-17, 2015
130.	Drs L.K. Dhaliwal & Sarabjot K. Sandhu	International Symposium on "New Dimensions in Agriculture for Sustainable Agriculture" by Association of Agro-meteorologists at GBPUAT, Pantnagar October 16-18, 2014
131.	Drs L.K. Dhaliwal, P.K. Kingra & Som Pal Singh	National Symposium on "Agriculture Diversification for Sustainable Livelihood and Environmental Security" at PAU, Ludhiana November 18–20, 2014
132.	Drs L.K. Dhaliwal & Som Pal Singh	12th Agricultural Science Congress on Sustainable Livelihood Security for Small Farmers at NDRI, Karnal February 3-6, 2015
133.	Drs S.S. Kukal, M.J. Singh & M.S. Kahlon	Symposium on NRM and Sustainable Hill Farming" at SKUAST, Jammu July 23- 24, 2014
134.	Dr H.S. Thind	IFAD-IRRI Traveling Seminar and Workshop at PAU, Ludhiana held on August 29 -September 6, 2014
135.	Dr Neena Chawla	National Symposium on "Nutritionally Sensitive and Environmentally Sustainable Agriculture for India's Food and National Security; Challenges and Opportunities" at National Academy of Agricultural Research Management, Hyderabad held on August 23, 2014
136.	Drs S. P. Sharma R. K. Dhall & Hira Singh	National Seminar on "Augmenting Processing and Shelf Life of Perishable Food Products" by National Productivity Council, New Delhi at PAU, Ludhiana held on September 26, 2014
137.	Dr M. S. Dhaliwal	6th Indian Horticulture Congress" by Horticultural Society of India at TNAU, Coimbatore held on November 6- 9, 2014
138.	Drs V. K. Vashisht & S. P. Sharma	National Symposium on "Emerging Problems" by Central Potato Research Institute (CPRI), Shimla at CPRI, Shimla held on November 1- 2, 2014
139.	Drs Mamta Pathak & V. K. Vashisht	National Symposium on "Crop Improvement for Inclusive Sustainable Development" by CISI, ISGPB, ISPGR, ICAR, MTAI & PAU at PAU, Ludhiana held on November 7-9, 2014
140.	Drs Neena Chawla & Mamta Pathak	XII Agricultural Science Congress" by ICAR, New Delhi and NDRI, Karnal NDRI, Karnal held on February 3-6, 2015
141.	Dr S. K. Jindal	49th Annual Convention of ISAE" and Symposium on "Engineering Solutions for Sustainable Agriculture and Food Processing by Indian Society of Agricultural Engineers" at PAU, Ludhiana held on February 23-25, 2015
List of National Workshops attended		
142.	All members of wheat research team	53rd All India Coordinated Wheat and Barley Improvement Project Workshop at Jawaharlal Nehru Krishi Vishwavidyalaya (JNKVV), Jabalpur on August 22-25, 2014



143.	Dr Beant Singh	Interactive Workshop on Wheat and Barley Aphids and their Management" at Indian Institute of Wheat & Barley Research, Karnal held on November 24, 2014
144.	Drs L.K. Dhaliwal & Som Pal Singh	PSCT Workshop cum-Interactive Meeting" by Punjab State Council for Science & Technology (PSCT), Chandigarh at PSCT, Chandigarh March 17, 2015
145.	Drs Som Pal Singh & K.K. Gill	TROPMET 2015" by IMD and Panjab University, Chandigarh at Panjab University, Chandigarh February 15-18, 2015
146.	Drs M. S. Dhaliwal S. K. Jindal & Abhishek Sharma	Asian Solanaceous Round Table- 2014" by Asia & Pacific Seed Association (APSA) at Hotel The Lalit Ashok, Bengaluru held on September 9-10, 2014
Year 2015-16		
147.	Dr Sandeep Kaur	4th Congress on Insect Science (CIS-4) - Entomology for Sustainable Agriculture" at PAU, Ludhiana held on April 16-17, 2015
148.	Dr Rajinder Singh	National Symposium on "Modern Agro-technologies for Nutritional Security and Health" at Dr YS Parmar, University of Horticulture and Forestry, Solan held on April 21-23, 2015
149.	Dr C S Aulakh	National Seminar on, 'Organic farming: Necessity and Feasibility.Asian Education Institute & DST at Patiala held on August 14, 2015
150.	Dr K S Saini	Natural Resources Management: Ecological Perspectives Indian Ecological Societies: International Conference-2016 at SKUAST- Jammu held on February 18-20, 2016
151.	Dr M S Bhullar	25th Asian-Pacific Weed Science Society Conference by Asian-Pacific Weed Science Society (APWSS) and Indi Soc Weed Science (ISWS) at Hyderabad held on October 13-16, 2015
152.	Dr S S Walia	3rd National Seminar on Market Imperfections, Farmers Distress and Agrarian Crisis in India Society of Economics and Development at Punjab Agricultural University, Ludhiana . held on April 17, 2016
153.	Vikas Jindal	Conference on Insect Biodiversity Studies: Where does India stand in the Global Map Entomological Society of India Central University of at Kerala, Kasargod. India, held on Mar 29-31, 2016
154.	Dr P.K. Chhuneja	National Conference on Entomology at Punjabi University, Patiala held on October 29-30. 2015
155.	Dr Poonam Sachdev	4th KCC 2016 Conference on "Chemistry and Life Sciences" at Kuwait held on March 20-22, 2016
156.	Dr Savita Sharma and Dr Kamaljit Kaur	National Conference on "Innovative Techniques in Food Product and Processing Technologies" at SLIET, Longowal held on October 9–10, 2015
157.	Dr Savita Sharma and Dr Baljit Singh	First International Conference on Advances in Food Science & Technology (ICAFST – 2015) 2015Institute of Holistic Medical Sciences (IHMS) and Institute of Macromolecular Science & Engineering (IMST), at Kottayam, Kerala, India. held on November 20-22, 2015
158.	Sanjeev K Chauhan	IES International Conference 2016 on Natural Resource Management : Ecological Perspectives SKUAST of Jammu, India in collaboration with Indian Ecological Society, Ludhiana on February 18-20, 2016
159.	Dr. R.K. Dubey	International Symposium on Sustainable Horticulture at Mizoram University, Mizoram on March 14-16, 2016

160.	Dr S K Jawandha Dr Harminder Singh Dr PPS Gill Dr J S Brar Dr MS Gill Dr A Thakur	National Conference on Temperate fruits and Nuts – A way forward for enhancing productivity and quality Horticulture Society of India and ICAR at ICAR-CITH, Srinagar on November 6-9, 2015,
161.	Dr Sandeep Singh Dr H S Rattanpal	National Symposium on Sustainable Citrus Production: Way Forward CCRI, Nagpur on November 27-29, 2015.
162.	Dr Sandeep Singh	National Seminar on Agriculture Resource Management for Sustainbiity and Eco-restroration CIAH, at Bikaner, Rajasthan on March 11-13, 2016
163.	Dr Jaspal Kaur	National Symposium on Climate Challenges:Status and Management of Plant Diseases on Indian Society of Plant Pathologists at College of Horticulture, Rajendranagar, Hyderabad on December 1-3, 2015
164.	Drs R.S.Gill, P.S. Sarao, J.S. Lore and Renu Khanna	International Rice Symposium by CAR-IIRR at IIRR, Hyderabad on November 18-20, 2015
165.	Dr (Mrs.) Jyoti Jain	National symposium on "Climate Challenges: Status and Management of Plant Diseases" from . INSOPP at Sri Laxman National Konda Telangana State Horticultural University, Hyderabad on December 1-3, 2015
166.	Dr Virender Sardana, P S Sandhu, Pushp Sharma, Sarwan Kumar and Pankaj Sharma	14th International Rapeseed CongressOrganized by Groupe Consultatif International de Recherche sur le Colza (International Consultative Group for Research on Rapeseed) and Ag-West Bio Inc and Canola Council of Canada. at Saskatoon, Saskatchewan, Canada,. on July 5-9, 2015
167.	Dr Harleen Kaur	6th International Conference Plant, Pathogens and People at NASC Complex, New Delhi, India on February 23 – 27, 2016.
168.	Dr. P.S. Sekhon Dr. G.S. Rattan Dr. Narinder Singh Dr. NarpinderKaur Dr. D.S. Butter Dr. Sandeep Jain Ms. AmrinderKaur Dr. GurbirKaur	National Symposium & Annual Meeting of the Inidan society of Plant Pathologists, "Climate Challenges: Status and Management of Plant Diseases" at Sri KondaLakshmanTelangana, Horticultural University, Rajendranagar, Hyderabad. Indian Society of Plant Pathologists (INSOPP) on December 1-3, 2015
169.	Dr. Rajinder Singh Dr. V.K.Vashisht Dr. Ruma Devi	National Seminar ICAR-IGFRI, Jhansi (U.P.) on February 20-2, 2016
170.	Dr SS Kukal	National Dialogue on Efficient nutrient management for improving soil health by TAAS, at Indian Agricultural Research Institute, New Delhi; on September. 28-29, 2015
171.	Dr HS Thind Dr DK Benbi Dr Deedar Singh Dr SS Kukal Dr SP Saini Dr JS Manchanda Dr R Sikka Dr SS Dhaliwal Dr RS Gill Dr BS Sekhon Dr GS Dheri Dr Sandeep Sharma	80th Annual convention of the Indian Society of Soil Science by Indian Society of Soil Science, New Delhi at University of Agricultural Sciences, GKVK, Bangalore on December. 5-8, 2015

172.	Dr HS Thind Dr HS Jassal Dr SS Kukal Dr SS Dhaliwal Dr MS Kahlon Dr KB Singh	National Workshop on Natural Resource Management for Climate Resilient Agriculture in Lower Himalayas by Soil Conservation Society of India; at RRS Ballowal Saunkhri, PAU on December 22-23, 2015
173.	Dr MS Hadda Dr SS Kukal	National Seminar on Soil Health Management Soil Conservation Society of India at Bihar Agricultural University , Sabour held on January. 28-29, 2016
174.	Dr MS Hadda	National Conference on Natural Resource Management in Arid and Semi-arid Ecosystem for Climate Resilient Agriculture Soil Conservation Society of India at SKRAU, Bikaner held on February. 17-19, 2016;
175.	Dr. Kulbir Singh	National Symposium on Tranformation Indian Agriculture Towards Food and Nutritional Security. ICAR-IGFRI, Jhansi held on February 20-21, 2016
Year 2016-2017		
176.	Dr Kamaljit Kaur	International Conference on "Growing trends in food technology and nutrition for public health care" International Institute of Food and Nutritional Sciences at JNU, New Delhi on May 26-27, 2016
177.	Dr Gurteg Singh Uppal Dr H S Rattanpal	National conference on "Fruit breeding in tropics and subtropics- An Indian perspective" ICAR Indian Institute of Horticulture Research, Bengaluru, Karnataka ICAR-IIHR, Hesaraghatta, Bangalore on April 27 to 29, 2016
178.	Dr Sandeep Singh	"Tephritid Seminar 2016-Understanding Tephritids in Toto: Taxonomy, Ecology, Quarantine & Management" at IIHR, Bangalore on May 27,2016
179.	Dr Dharminder Pathak	World Cotton Research Conference -6 International Cotton Advisory Committee, International Cotton Researcher's Association Goiania, at Brazil on May 2-6, 2016
180.	Dr MS Kahlon	International Conference on Agriculture, Horticulture and Plant Sciences International Journal of Tropical Agriculture; New Delhi held on June 25-26, 2016
181.	Drs. P.S. Sandhu, Jyoti Jain, Harleen Kaur, Jaspal Kaur & Ritu Bala	National Symposium on Challenges to Plant Pathologists under Changing Disease Scenario Indian Society of Plant Pathologists, PAU, Ludhiana at Goa University, Goa held on October 5-7,2016
182.	Dr. Pushp Sharma	National conference on Basic and applied researches in plants and microbes UGC New Delhi, Botanical Society, Punjabi University, Patiala Punjabi University, Patiala held on November3-5, 2016
183.	Dr Dharminder Pathak	Ist International Agro-biodiversity Congress 2016 Bioversity International, Indian Society of Plant Genetic resources at New Delhi held on November 6-9, 2016
184.	Drs. Buta Singh Dhillon & Gurpreet Kaur	4th International Agronomy Congress Indian Society of Agronomy at IARI, New Delhi held on November 22-26,2016
185.	Dr. Harpreet Kaur Cheema	Climate change adaptation and mitigation strategies for sustainable agriculture ICAR SKNAU, Jobner, Rajasthan held on November 24. – December 2. 2016
186.	Dr. Hari Ram	Innovative and Current Advances in Agriculture and Allied Sciences (ICAAAS – 2016) Society for Scientific Development in Agriculture and Technology, Meerut and Prof Jayashankar Agricultural University Hyderabad held on December 10-11. 2016
187.	Dr. Harpreet Kaur Virk	Recent Innovations on Organic Farming Division of Agronomy, IARI, New Delhi IARI, New Delhi held on January 2-9., 2017

188.	Dr. Ramanna Koulagi	Climate Smart Agriculture for Nematode Management Nematological Society of India, IARI, New Delhi at ICAR-Central Coastal Agricultural Research Institute Ela, Old Goa held on January 11-13. 2017
189.	Dr. Virender Sardana	Climate smart technologies for enhancing vegetable oil production Indian Society of Oilseeds Research, Hyderabad Indian Institute of Oilseeds Research, Hyderabad 19-20, 2017
190.	Dr Dharminder Pathak	Seminar on "Enhancing awareness of the threat of root-lesion nematodes in India" University of Southern Queensland, Australia and supported by the Australian Government through Australia-India Council of the Department of Foreign Affairs and Trade New Delhi held on February 3, 2017
191.	Drs. K.S. Brar, P.S. Sandhu, S.K. Sandhu, Virender Sardana, Pushp Sharma, Sarwan Kumar, Chhaya Atri and Sanjula Sharma	3rdNational Brassica Conference Society for Rapeseed-Mustard Research, Bharatpur IARI, New Delhi held on February 16-18, 2017
192.	Drs. Sarvjeet Singh and Jagmeet Kaur	Inter Drought -V International Conference ICRISAT, Patnacheru Hyderabad held on February 21 – 25, 2017
193.	Dr Ajmer Singh Brar	National Symposium-AGMET-2016 on "Climate driven Food Production Systems-Agrometeorological Interventions" Tamil Nadu Agricultural University, Coimbatore at TNAU, Coimbatore on December 20-22,2016
194.	Dr C S Aulakh	4th International A-gronomy Congress- Agronomy for sustainable management of natural resources, environment, energy and livelihood security to achieve zero hunger challenge.Indian Society of Agronomy held on November 22-25, 2016New Delhi
195.	Dr C S Aulakh	Seminar on ' Quality seed potato production' MHZPC Giga Majra, Mohali held on November 4,2016
196.	Dr C S Aulakh	Seminar on 'Ensuring farmers' welfare through traditional organic farming'. MoA&FW and NCOF New Delhi held on October 7, 2016
197.	Dr J S Kang Dr Harmeet Singh	Fourth International Agronomy Congress On Agronomy for Sustainable Management of Natural Resources, Environment, Energy and Livelihood Security to Achieve Zero Hunger Challenge New Delhi, India Indian Society of Agronomy held on November 22-26, 2016,
198.	Dr Navjyot Kaur	ISWS Biennial Conference, "Doubling Farmers' Income by 2022: The role of Weed Science"Indian Society of Weed Science MPUAT, Udaipur held on March 1-3, 2017
199.	Dr Simerjeet Kaur	Recent Advances in weed management strategies NIPHM, Hyderabad held on November 29-30, 2016
200.	Dr Simerjeet Kaur	ISWS Biennial Conference, "Doubling Farmers' Income by 2022: The role of Weed Science"Indian Society of Weed Science, MPUAT, daipur held on March 1-3, 2017.
201.	Dr Pardeep Kumar Chhuneja	International Conference on Entomology Punjabi University, Patiala Punjabi University, Patiala held on December 3-5, 2016
202.	Drs K.S. Sangha, P.S. Shera and Sudhendu Sharma	Fifth National Conference on "Biological Control: Integrating Recent Advances in Pest and Disease Management"Society for Biocontrol Advancement/ ICAR-NBAIR, Bengaluru ICAR-NBAIR held on February 9-11, 2017
203.	Dr. Kiranjeet Kaur Dhatt Dr. R.K. Dubey	7th Indian Horticultural congress -2016 Horticulture Society of India, New Delhi at IARI, New Delhi held on November 15-18, 2016
204.	Dr. Kiranjeet Kaur Dhatt	Applications of Radioisotopes and Radiation Technology in Industry Healthcare and Agriculture Thapar University, Patiala, Punjab held on November 28-29, 2016



205.	Dr M.I.S Gill Dr. N.K Arora	7th Indian Horticulture Congress 2016 Horticulture Society of India From on November 15-18, 2016.
206.	Dr Parampal Singh Gill	International Conference on Technological Advancement for Sustainable Agriculture and Rural Development Society for Plant Research on February20-22, 2017
207.	Dr. Jaspreet Kaur Dr.Swati Kapoor	National Workshop on, 'Bio-entrepreneurship and bio-enterprise creation Biotech onsortium India Limited, New Delhi, Mohali Biotech Park, Punjab State Council for Science & Technology, Chandigarh Centre of Innovative and Applied Bioprocessing, Mohali on September 2-3, 2016
208.	Dr Kamaljit Kaur	International symposium and 7th Conference of Indian Meat Science Association GADVASU, Ludhiana on November 10-12, 2016
209.	Dr.Amarjeet Kaur, Dr. Jaspreet Kaur, Ms. Jagbir Rehal, Dr.Swati Kapoor	25th Convention of Food Scientists & Technologists on food processing for sustainable agri. & industry Association of Food Scientists and Technologists (India), Mysuru and Guru Nanak Dev University, Amritsar, Punjab 2016 Guru Nanak Dev University, Amritsar on November 10-12,.2016
210.	Dr. Amarjeet Kaur	National Seminar on, "Recent Trends in Food Processing" & delivered a lecture on "Post Harvest Value Addition of Food Crops." Jointly organized by IICPT and Central University of Punjab at Central University of Punjab Bathinda on December.9, 2016
211.	Dr. R I S Gill, Dr. Baljit Singh, Dr. Ashwinder Kaur Dhaliwal, Mr. Ashok K Dhakad, and Dr. Sapna Thakur	National Symposium on 'Agroforestry for environmental challenges, sustainable land use and biodiversity conservation options' ICAR-Central Agroforestry Research Institute, Jhansi at CAFRI Jhansi on December 3-5t, 2016
212.	Dr Rakesh Garg	Indian Science Congress Indian Science Congress Association at SV University, Tirupati on January 3-7, 2017
213.	Kaur, M., Kalia, A., Thakur, A. and Jawandha, S. K.	National Conference on Innovative Food Processing and Attended Technologies for food and Nutritional Security CIPHET, PAU Campus, Ludhiana, Punjab on September 29-30,, 2016
214.	Mavi, M. S., Singh, G. and Sekhon, B. S.	81st Annual Convention of Indian Society of soil science ISSS/RVSKV, Gwalior on October 20-23,,2016
215.	Sharma, S., Choudhary, O. P., Neemisha, Saini, S.P. and Sharma, N.	National Seminar on Developments in Soil Science: 2016, 81st Annual Convention by Indian Society of Soil Science R.V.S.K.V.V., Gwalior on October 20-23, 2016
216.	Mavi, M. S., Singh, G. and Sekhon, B. S.	81st Annual Convention of Indian Society of Soil Science RVSKVV, Gwalior, India on . on October 20-23, 2016
217.	Kiran Jeet	4th IAPT Symposium on Physics" Department of Physics, Punjab University, Chandigarh, Punjab on November 4-6, 2016
218.	Kumar, Y., Mehta, N., Chatli, M. K., Vishwakarma, R.K. and Kalia, A.	International Symposium & 7th Conference of Indian Meat Association on New horizons for augmenting meat production and processing to ensure nutritional security, food safety and environmental sustainability GADVASU, Ludhiana, Punjab held on November 10-12, 2016
219.	Sharma, S.P., Kalia, A. and Sharma, D. Kaur, H., Kaur, N.	National Conference onFood Security Issues andEnvironmental Challenges for Indian Agriculture in the next decades Panjab University, Chandigarh held on November 19-20, 2016
220.	Kaur, G.	Symposium on Applications of Radioisotopes and Radiation Technology in Industry , Healthcare and Agriculture.National Association for Application of Radioisotopes & Radiation in Industry (NAARRI) organized at Thapar University , Patiala, Punjab. held on held on November 28-29, 2016

221.	Kaur, M., Kalia, A. and Thakur, A.	National Conference on Trends in Nanobiotechnology (NCTN-2016)CCS Haryana Agricultural University, Hisar, India held on November 29-30, 2016
222.	L K Dhaliwal	Agronomy for Sustainable Management of Natural Resources, Environment, Energy and Livelihood Security to Achieve Zero Hunger Challenge"Indian Society of Agronomy ICAR-IARI, Pusa Campus, New Delhi, India during on November 22–26, 2016.
223.	L K Dhaliwal	Third Users conference on Weather & Climate Extremes in North-west India- Issues & Challenges.Metrological Centre, Chandigarh on March 16, 2017
224.	Dr Baljit Singh & Dr. RIS Gill	National Workshop on Agroforestry strategies for climate change mitigation and adaptation Forest College and Research Institute, Mettupalayam at Forest College and Research Institute, Mettupalayam (TNAU) on March 21-22, 2017
225.	Singh, S. and Kalia, A.	National Conference on Recent advances on microbial biotechnology: Application in industry and society Layallpur Khalsa College, Jallandhar, Punjab, India held on February 23-24, 2017
226.	Dr. P.S. Sekhon Dr. G.S. Rattan Dr. Narinder Singh Dr. NarpinderKaur Dr. D.S. Butter Dr. Sandeep Jain Ms. AmrinderKaur Dr. Gurbir Kaur Dr. Ritu Rani Dr. Vineet Kumar Dr. Mandeep Singh	National Symposium & Annual Meeting of the Inidan society of Plant Pathologists"Challenges to Plant Pathologists under Changing Disease Scenario" at Department of Botany, Goa University, Taleigao Plateau, Goa Indian Society of Plant Pathologists (INSOPP) PAU, Ludhiana and Department of Botany, Goa University, Taleigao Plateau, Goa held on October 5-7, 2016
227.	Dr S P Sharma	National Conference on Innovative food processing technologies for food and nutritional security.ICAR-CIPHET, Ludhiana. held on held on September 29-30, 2016,
228.	Dr. S P Sharama	XXIX Annual National Conference of Environmental Science Academy on 'Food Security Issues and Environmental Challenges for Indian Agriculture in the next decades'.Panjab University, Chandigarh 19-20 held on November, 2016
229.	Dr. S P Sharama	National Conference on Recent Advances in Microbial Biotechnology: Application in Industry and Society.Lyallpur Khalsa College, Jalandhar. held on February23-24, 2017
230.	Dr R K Dhall	Radioisotopes and Radiation Technology in Industry, Health care and Agriculture Thapar University, Patiala held on November 28-29, . 2016
231.	Dr. Mamta Pathak	Enhancing awareness of the threat of root lesion nematodes in India" IARI, New Delhi held on February 3,2017
232.	Dr. Mamta Pathak	1st International Agro-biodiversity Congress ICAR, New Delhi, India held on November 6-9, 2016
Year 2017-2018		
233.	Dr.Lavleesh Garg Dr.Manmeet Kaur Dr.Dharminder Singh Dr.Lavleesh Garg	Fourth National Seminar on Doubling of Indian Farmers Income by 2022: Opportunities and Challenges Society of Economics & evelopment held on April 1, 2017 PAU
234.	Dr Mandeep Singh Gill	National Conference on Perspectives of Challenges and Options in Litchi Production and Utilization NRC on Litchi,Muzzaffarpur,Bihar NRC on Litchi,Muzzaffarpur,Bihar on June 6-7, 2017

235.	Dr Parampal Singh Gill	Global Agriculture and Innovation Conference Hi-tech orticultural Society on November27-29, 2017
236.	Dr. Avtar Singh, Dr Rakesh Garg and Mr Ashok K Dhakad	Commonwealth Forestry Conference 2017: Forests for Prosperity and Posterity. Commonwealth Forestry Association, United Kingdom and Forest Research Institute, Dehradun at FRI Dehradun on April 3-7, 2017
237.	Dheri, G.S.	XIII Agricultural Science Congress on the theme "Climate Smart Agriculture"National Academy of Agricultural Sciences held on February 21-24 2017 at UAS, Bengaluru
238.	Dr A S Dhatt	7th Indian Horticultural Congress,Horticultural Society of India IARI, New Delhi held on November 15-18, 2017
239.	Drs A S Dhatt, Neena Chawla, Sandeep Kaur, Abhiskek Sharma, , Kulbir Singh, Dilbag Singh, Sukhjeet Kaur	Workshop Annual workshop AICRP-VC IIHR, Bangalore held on June 24-27, 2017
240.	K S Saini	National conference on " Alternate Farming Systems to enhance farmers income", by Indian Ecological Society Himachal Chapter, YSP University of Horticulture and Forestry, Nauni, Solan held on September 19-21, 2017.
241.	Simerjeet Kaur	National seminar on "Agrometeorology for sustainable Agriculture" by CCSHAU, Hisar held on October 12-14, 2017
242.	Thakar Singh	National Agronomy Congress on "Redesigning Agronomy for nature conservation and economic empowerment" by Pantnagar Agronomy Society, GBPUA &T, Pantnagar held on February 20-22, 2018
243.	Dr Pardeep K. Chhuneja	Workshop for Online Counselling/Admissions for Academic Session 2017-18 by ICAR, at NASC, New Delhi held on January 16-17, 2017
244.	Dr Pardeep K. Chhuneja, Dr Jaspal Singh & Dr Amit Choudhary	Punjab AgriFood Conclave by PAU, Ludhiana held on May 16, 2018
245.	Dr Jaspal Singh & Dr Amit Choudhary	XVI AZRA International Conference on "Applied Zoological Research for Sustainable Agriculture and Food Security" by BHU, Varanasi held on February 09-11, 2018
246.	Dr Sudhendu Sharma	Training of Master Trainers' by Agricultural Skill Council of India at PAU, Ludhiana held on February 19-21, 2018
247.	Vikas Jindal	International Conference Applied Zoological Research for Sustainable Agriculture and Food Security by Applied Zoological Research Association at Banaras Hindu University, Varanasi held on Feb 9-11, 2018
248.	Dr Paramjit Kaur	Punjab Science Congress by PAU, Ludhiana held on February 7-9, 2018
249.	Dr Ravinder Singh Chandi	Seminar on the occasion of Golden Jubilee Celebration of IFFCO at Shree Guru Nanak Dev Bhawan, Ludhiana held on August 21, 2017
250.	Dr Ravinder Singh Chandi	Research and Extension Specialists' Workshop for Rabi Crops by PAU, Ludhiana held on August 31 & September 1, 2017
251.	Dr Ravinder Singh Chandi	Attended Sankalp Se Sidhi- Kisan Sammelan by KVK Samrala held on September 7, 2017
252.	Dr Ravinder Singh Chandi	Interaction meeting of faculty with the scientists of Punjab Remote Sensing Centre, PAU, Ludhiana held on September 11, 2017
253.	Dr Ravinder Singh Chandi	District Level Farmers Training Camp for *rabi* crops by State agriculture department, Ludhiana held on October 03, 2017
254.	Dr Ravinder Singh Chandi	Training workshop on Simulation modeling in agricultural research: modeling plant disease epidemics and yield losses by Department of Plant Pathology, PAU, Ludhiana held on November 13-15,, 2017

255.	Dr Ravinder Singh Chandi	Indo-US Symposium: Curbing whitefly-plant virus pandemic- the departure from pesticides to genomics solutions by PAU, Ludhiana held on Dec. 4-5, 2017
256.	Dr Ravinder Singh Chandi	21st Punjab Science Congress: Scientific Advances for Inclusive Development and Environmental Protection by PAU, Ludhiana held on February 7-9, 2018
257.	Dr Ravinder Singh Chandi	Research and extension specialists workshop for kharif crops by DEE, PAU, Ludhiana held on February 21-22, 2018
258.	Dr Ravinder Singh Chandi	Research & Extension Specialists Workshop for Vegetable, Floriculture & Sericulture alongwith Post Harvest Management, Farm Power & Machinery, Food Technology & Agri-Economics by PAU, Ludhiana held on May 10-11, 2018
259.	Dr Ravinder Singh Chandi	Conference on Trends, Challenges & Opportunities in Agro & Food Processing Industry in Punjab (Punjab Agri Food Conclave) by Confederation of Indian Industry, Govt. of Punjab and PAU, Ludhiana held on May 16, 2018
260.	Dr Vijay Kumar	International conference on 'Applied Zoological Research for Sustainable Agriculture and Food Security by Applied Zoologist Research Association (AZRA), Bhubaneswar, Odhisa at Banaras Hindu University, Varanasi, India held on February 9-11, 2018
261.	Dr Bharathi Mohindru	21st Punjab Science Congress" Scientific advances for Inclusive development and environmental protection" by Punjab Agricultural University, Ludhiana under the aegis of Punjab Academy of Sciences, Patiala held on February 7, 2018
262.	Dr Bharathi Mohindru	XVI AZRA International Conference "Applied Zoological Research for Sustainable Agriculture and Food Security" by Applied Zoologists Research Association (AZRA), Bhubaneswar, Odhisa and Department of Entomology & Agricultural Zoology, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi held on Feb 9-11, 2018
263.	Dr Anureet Kaur Chandi	Research and Extension Specialists' Workshop for Rabi Crops by PAU, Ludhiana held on August 31st & 1st September, 2017
264.	Dr Anureet Kaur Chandi	Indo-US Symposium: Curbing whitefly-plant virus pandemic- the departure from pesticides to genomics solutions by PAU, Ludhiana held on Dec 4-5th 2017
265.	Dr Anureet Kaur Chandi	21st Punjab Science Congress: Scientific Advances for Inclusive Development and Environmental Protection by PAU, Ludhiana held on February 7th-9th, 2018
266.	Dr Anureet Kaur Chandi	Research and extension specialists workshop for kharif crops by DEE, PAU, Ludhiana held on February 21-22nd, 2018
267.	Dr Anureet Kaur Chandi	Research & Extension Specialists Workshop for Vegetable, Floriculture & Sericulture alongwith Post Harvest Management, Farm Power & Machinery, Food Technology & Agri-Economics, PAU, Ludhiana held on May 10-11th, 2018
268.	Dr B K Kang, Dr Sanjay Kumar Sahoo, Dr Kousik Mandal	21st Punjab Science Congress by Punjab Agricultural University, Ludhiana held on February 7-9, 2018
269.	Dr Smriti Sharma	Indo-US Symposium 2017: Curbing Whitefly-Plant Virus Pandemics: The Departure from Pesticides to Genomics Solutions by Punjab Agricultural University, Ludhiana held on Dec 4-5th 2017
270.	Dr Smriti Sharma	Research and extension specialists workshop for kharif crops by DEE, PAU, Ludhiana held on February 21-22, 2018

271.	Dr Smriti Sharma	Research & Extension Specialists Workshop for Vegetable, Floriculture & Sericulture alongwith Post Harvest Management, Farm Power & Machinery, Food Technology & Agri-Economics by PAU, Ludhiana held on May 10-11th, 2018
272.	Dr.Manmeet Kaur Dr.Lopamudra Mohapatra	National Seminar on Agro metrology for Sustainable Development with special emphasis on Agrometerological Practices for Climate Resilient Farming and Food Security by Association of Agrometrologists, CCS Haryana Agricultural University, Hissar, India held on October 12-14, 2017
273.	Dr.Prabhjot Kaur Dr.Dharminder Singh Dr.Lavleesh Garg Dr.Pankaj Kumar	Towards Sustainable Role of Technology, Policy Planning and Implementation" India, by Indian Society of Economics and Development, Deptt. of Economics and Sociology, PAU, Ludhiana held on April 5, 2018
274.	Dr.Dharminder Singh	21st Punjab Science Congress by Punjab Academy of Sciences and PAU held on February 7-9, 2018
275.	Monika Gupta	21st Punjab Science Congress, Punjab Agricultural University, Ludhiana held on February 7 to 9, 2018
276.	Anita Arora	National Symposium on "Biorational Approaches in Plant Disease Management by YS Parmar University of Horticulture & Forestry, Nauni, Solan held on October 27-28, 2017
277.	Drs. G.S. Mangat, J.S. Lore, Neerja Sharma and P.S. Sarao	International Symposium *on* Frontiers of Rice Research for Improving Productivity, Profitability and Climate Resilience by ICAR-NRRI, Cuttack held on Feb 6-9, 2017
278.	Dr. Dharminder Pathak	Seventh Asian Cotton Research and Development Network (ACRDN) Meeting by International Cotton Advisory Committee, Washington DC (U.S.A.) at Nagpur (Maharashtra) held on Sept. 15-17, 2017
279.	Dr. Ritu Bala,	National Symposium on "Biorational approaches in plant disease management" by Department of Plant Pathology, Dr YSP University of Horticulture and Forestry , Nauni, Solan held on Oct. 27-28, 2017
280.	Dr. Harleen Kaur	Simulation Modelling in Agricultural Research: Modelling Plant Disease Epidemics and yield Losses, by Department of Plant Pathology & Indian Society of Plant Pathologist, PAU, Ludhiana held on November 13-15, 2017
281.	Drs. , S.K. Dhillon Dharminder Pathak, Neha Gupta, Vineeta Kaila	Indo-US Symposium on " Curbing whitefly-plant virus pandemics-the departure from pesticides to genomics solutions" by P.A.U. Ludhiana and The University of Arizona, Tucson, U.S.A held on December 4-5, 2017
282.	Dr. Harinderjeet Kaur	ICAR sponsored winter school "Technological innovations in processing and by-product utilization of agricultural produce" by CIPHET, Ludhiana held on Dec. 04-24, 2017
283.	Drs. Ritu Bala and G.S. Mavi	Pre season training on saarc Surveillance Tool Box To attend SAARC Surveillance Tool Box by Department of Plant Breeding and Genetics, PAU, Ludhiana in collaboration with IIWBR, Karnal and Sathguru Management Consultants Pvt. Ltd., Hyderabad held on Dec. 12, 2017
284.	Dr. Dharminder Pathak	To attend ICAC-13th Meeting of the Inter-Regional Cooperative Research Network on Cotton for the Mediterranean and Middle East Regions by International Cotton Advisory Committee, Washington DC (U.S.A.) at Luxor, Egypt held on Feb. 2-6, 2018

285.	Drs.Virender Sardana, Pushp Sharma, Sanjula Sharma, Surinder K Sandhu, Gurpreet Kaur, J.S. Chawla, Gurjit Kaur, Harleen Kaur, Tosh Garg, Gagandeep, Jawala Jidal, S.K. Dhillon, Neha Gupta, Vineeta Kaila	21st Punjab Science Congress by Punjab Academy of Sciences, Patiala at PAU, Ludhiana held on Feb.7-9, 2018
286.	Drs. G.S. Mangat, and Jagjeet Singh Lore	International Hybrid Rice Symposium, 2018 by IRRI, Philippines at Indonesia held on Feb. 27- March 1, 2018
287.	Drs. Gurjit Kaur and J S Chawla	Maize Summit by FICCI at New Delhi held on March 21, 2018
288.	Dr.Jagjeet Singh Lore	International Conference on Novel Applications of Biotechnology in Agriculture Sectors: Towards Achieving Sustainable Development Goal by Department of Plant Pathology, BHU and IRRI at Banaras Hindu University, Varanasi held on March 20-21, 2018
289.	Drs. Gurjit Kaur and J S Chawla	Agri Summit by FICCI at Amritsar held on April 6-7, 2018
290.	Maize scientists	61st annual maize workshop by CSKHPKV, Hill Agricultural Research and extension centre, Bajaura (H.P.) held on April 7-9,2018
291.	Drs. Gurjit Kaur and J S Chawla	Punjab Agri. and Food Conclave by PAU, Ludhiana held on May 16, 2018
292.	Drs. Pushp Sharma, Virender Sardana, Sanjula Sharma, SurinderK.Sandhu, P.S.Sandhu and Sarwan Kumar	24th AICRP-RM meet at RARI, Durgapura-Jaipur by ICAR DRMR, BHaratpur at RARI, Durgapura-Jaipur held on Aug.3-5,2017
293.	B.B. Vashisht CB Singh RK Gupta G S Dheri Dhanwinder Singh R Sikka	*National Seminar on "Developments in Soil Science* – 2017" by Indian Society of Soil Science at Amity University, Kolkata (WB) held on December 11-14, 2017
294.	Kiran Jeet	Poster presentation in 5th IAPT Student Symposium on Physics by Punjab University, Chandigarth, Punjab held on 10–12 November, 2017.
295.	Kiran Jeet	Punjab Science Congress by Punjab Agricultural University, Ludhiana held on February 7-9, 2018
296.	Gurkirat Kaur	Scientific Advances for Inclusive Development and Environmental Protection., by Punjab Science Congress at PAU, Ludhiana held on February, 7-9, 2018
297.	Gurkirat Kaur	National Conference on Emerging and Sustainable technologies in Food Processing (ESTFP) by SLIET, Longowal held on 15-16th March, 2018.
298.	Madhu Dhingra	21st Punjab Science Congress on "Scientific Advances for Inclusive Development and Environmental Protection" by Punjab Agricultural University, Ludhiana held on February 7-9, 2018.

299.	Kaur, P.*, Sharma, S., Kalia, A., Sodhi, H.S. and Kapoor, S.	4th International Conference on Reuse and Recycling of Materials and their products (ICRM-2018) by Mahatma Gandhi University, Kottayam, Kerala at International and Inter-University Centre for Nanoscience and Nanotechnology (IIUCNN), Mahatma Gandhi University, Kottayam, Kerala, India held on March 9-11, 2018
300.	Sharma, S.P.*, Kaur, H., Kalia, A. and Kaur, N.	National Conference on food and Nutritional security through vegetable crops in relation to climate (NCVEG-17) by ICAR-IIVR, Varanasi held on December 9-11, 2017
301.	Kaur, H.*, Tandon, R., Kalia, A. and Maini, C.	International Conference on Nanobiotechnology for agriculture: From research to Innovation by TERI, New Delhi held on November 20- 21, 2017
302.	Maini, C.*, Tandon, R., Kalia, A. and Kaur, H.	International Conference on Nanobiotechnology for agriculture: From research to Innovation by TERI, New Delhi held on November 20-21, 2017
303.	Kaur, H.*, Kalia, A. and Sharma, S.P.	3rd International Conference on Bioresource and Stress Management (3rd ICBSM) by State Institute of Agricultural management Durgapura, Jaipur, Rajasthan, India held on November 8-11, 2017
304.	Kalia, A*., Rohini, Luthra, K., Sharma, S.P., Dheri, G.S., Taggar, M.S. and Gomes, C.	International Symposium on Horticulture: Priorities and emerging trends by ISHS and IIHR Bengaluru, India held on September 5-8, 2017
305.	Sharma, S.P., Devi, S., Kalia, A*. and Dhaliwal, S.S.	International Symposium on Horticulture: Priorities and emerging trends by ISHS and IIHR Bengaluru, India held on September 8, 2017
306.	Kaur, H.*, Sharma, S.P., Kaur, N. and Kalia, A.	International Symposium on Horticulture: Priorities and emerging trends by ISHS and IIHR, Bengaluru, India held on September 5-8, 2017
307.	M S Kahlon	International Conference on bioresources and stress management by RKM Foundation, ICAR and Society for bioresources and stress management held on November 8-11, 2017
308.	Jagdish Singh and Barun Biswas	National Seminar on Agrometeorology for Sustainable Development with special emphasis on Agrometeorological Practices for Climate Resilient Farming and Food Security by CCS HAU Hisar, Haryana held on October 12-14, 2017
309.	M K Sidhu S P Sharma	National Conference on "Food and Nutritional Security through Vegetable Crops in Relation to Climate Change" by IIVR, Varanasi held on December 9-11, 2017
310.	A S Dhatt, Kulbir Singh, Abhishek Sharma, Ravinder Chandel, Sukhjeet Kaur, Dilbag Singh, Ruma Devi	Annual Group meeting by AICRP (VC) RARI, Durgapura Jaipur held on May 18-21, 2018
311.	A S Dhatt & All faculty members	IXth All India Network Research Project on Onion and Garlic Group Meeting by ICAR-DOGR and PAU, Ludhiana held on June 8-10, 2018
312.	Dr. Abhishek Sharma, Dr S K Jindal, Dr. Kulbir Singh, Dr. Mamta Pathak	Indo-US symposium 2017 by PAU, Ludhiana held on December 4-5, 2017
313.	A S Dhatt & All faculty members	21st Punjab Science congress-2018 by PAU, Ludhiana held on February 07-09, 2018
314.	Dr. S P Sharma	International Symposium on Horticulture: Priorities and Emerging Trends by International Society for Hort. Sci., Belgium at IIHR, Bangalore held on September 5-8, 2017

315.	Dr P K Kingra And Dr Sompal	National Conference on "Role of Geospatial Technologies to bridge the Rural and Urban divide" by Punjab Remote Sensing Centre, Ludhiana held on February 22-23, 2018
316.	Dr P K Kingra And Dr Sompal	21st Punjab Science Congress on, "Scientific advances for inclusive development and environmental protection by PAU, Ludhiana held on February7-9, 2018.
317.	DrPrabhjyot Kaur, Dr S S Sandhu and Dr Harpreet Singh:	National Seminar on Agrometeorology for Sustainable Development with special emphasis on Agrometeorological Practices for Climate Resilient Farming and Food Security (AGMET 2017) by CCSHAU, Hisar held on October 12-14, 2017
318.	Dr. Premjit Singh Dr. K.K. Dhatt Dr. Madhu Bala Dr. Shalini Jhanji	XXVI Annual Group Meeting of AICRP on Floriculture by ICAR at IIHR, Bengaluru held on August 3-5, 2017
319.	Dr. R.K.Dubey	ISMPP International conference on plant health for human welfare by University of Rajasthan, Jaipur held on Nov. 1-4, 2017
320.	Dr. R.K.Dubey	National symposium on recent advances on Floriculture and urban horticulture in global perspective by Bidhan Chandra Krishi Viswavidyalaya, Kalyani (WB) held on January 4-5, 2018
321.	Dr. R.K.Dubey	National conference on Floriculture for rural and urban prosperity in the scenario of climate change by CAU-CAE & PHT, Ranipool, Gangatok, Sikkim held on Feb. 16-18, 2018
322.	Dr. H.S. Grewal Dr. Premjit Singh Dr. K.K. Dhatt Dr. Parminder Singh Dr. R.K. Dubey Dr. Madhu Bala Dr. Shalini Jhanji	21st Punjab Science Congress on "Scientific Advances for Inclusive Development and Environmental Protection) by Punjab Academy of Sciences, Patiala held on February 7-9, 2018
323.	Dr. H.S. Grewal Dr. Premjit Singh Dr. K.K. Dhatt Dr. Parminder Singh Dr. R.K. Dubey Dr. Ranjit Singh Dr. Madhu Bala Dr. Shalini Jhanji	Research & Extension Specialist Workshop for Vegetables, Floriculture & Sericulture alongwith Post Harvest Management, Farm Power & Machinery, Food Technology & Agri- Economics by PAU, Ludhiana held on May 10-11, 2018

List of National Workshops/meetings attended

Year 2013-14

1.	Dr Amandeep Singh Brar	Regional workshop on "Precision agri-concepts, tools and implementation. Road map on small holding systems in south Asia" PAU, IPNI, CIMMYT, BISA held on November 11, 2013, at PAU, Ludhiana
2.	Sanjeev K Chauhan	National Workshop on dendro-biomass based power generation at FCRI Mettupalayam held on March 21-22, 2014
3.	Dr Tarundeep Kaur	Summer School on "Machinery for Natural Resource Management and Technologies" ICAR at Deptt. of FMPE,COAE&T, PAU Ludhiana on August 29 - September 18, 2013
4.	Sanjeev K Chauhan	Workshop cum Conference on Eco-restoration of Lentic– Lotic Systems NAIP New Delhi at Dumra Auditorium, DMC Ludhiana held on January 7-8, 2014

5.	Dr C S Aulakh	Workshop on, "Potato cultivation in Punjab"WUR Netherlands & POSCON at Jalandhar held on December 4, 2013
6.	Dr. Damanjit Kaur	Workshop on IPM in Wheat at National Institute of Plant Health Management, at Hyderabad. held on June 25, 2014
7.	Dr. Simarjit Kaur	Regional Information Workshop on Barley activities under CRP3.6 Dry Land Cereal at Project Directorate of Wheat Research, Karnal held on May 19, 2014
8.	Dr. R.S. Gill	Annual Review and Planning Workshop of the project Stress Tolerance Rice for Africa and South Asia (STRASA) International Rice Research Institute, Philippines NASC Complex, New Delhi, on May 20-23, 2014
9.	Dr Amandeep Singh Brar	Workshop on "Cultivation of medicinal plants in Punjab and their marketing at Dayanand Ayurvedic College, Jalandhar held on April 11, 2014,
10.	Dr. Kuldeep Singh	National workshop on genomics in crop improvement at MDU Rohtak held on February 27-28, 2014,
11.	Dr. Ruchika Bhardwaj	49th annual workshop on Pearl Millet at RARI, Durgapura, Jaipur held on March 13-15, 2014
12.	Rajni Sharma	Workshop on Women in Agroforestry Forest Department, Nepal, at Kathmandu, Nepal. held on November.28-29, 2013
13.	Dr PK Chhuneja & Dr Jaspal Singh	Buyer's-Seller's Meet on Honey Lupin Human Welfare & Research foundation, Bharatpur in Collaboration with NIAM, at Bharatpur Jaipur held on February 28, 2014
14.	Dr Balwinder Singh, Ms Gagan Jyot, Mr Sanjay Kumar Sahoo	8th Annual workshop on Monitoring of Pesticide Residues at National at Bidhan Chandra Krishi Viswa Vidyalaya, Kalyani, West Bengal held on May 23, 2014
15.	Dr Jaspal Singh	Attended Workshop on Promotion of Honey bee keeping in Haryana Haryana Farmers' Commission, Govt. of Haryana held on June 24, 2014
List of National Meetings		
16.	Dr M.S. Dhaliwal Dr. Kulbir Singh Dr. A.S. Dhatt Dr. Neena Chawla Dr. Rajinder Singh Dr Mamta Pathak Dr Sandeep Kaur Dr Abhisek Sharma	Group meeting of All India Co-ordinated Research Project (Veg. Crops) ICAR at IGKV Raipur on June 23-25, 2014
17.	Dr Amandeep Singh Brar	Annual review meeting of centrally sponsored scheme-NHM-development of spices Directorate of Arecanut and Spice Development, Calicut, Kerala Kerala Agriculture University, at Thrissur, Kerala from held on June 24–25,2014.
18.	Drs MS Mavi, Rajeev Sikka, BS Sekhon, SS Dhaliwal, Jagdeep Singh, Dinesh Kumar, MPS Khurana, Dhanwinder Singh	78th Annual Convention of Indian Society of Soil Science Indian Society of Soil Science at CAZRI, Jodhpur held on October. 23-26, 2013
19.	Drs. G.S. Mangat, R. S. Gill, J.S. Lore, G. Mahajan, P.S. Sarao, Neerja Sharma, R. Khanna and Navjot Sidhu	Brain storming meeting on Dry direct seeded rice: traits, varieties and future prospects IRRI-PAU at PAU, Ludhiana on March 20-21, 2014

20.	Dr M S Bhullar	XXI Annual Review Meeting of "All India Coordinated Research Project on Weed Control" DWSR, Jabalpur DWSR, at Jabalpur held on February 12, 2014
21.	Dr. Premjit Singh Dr. Kushal Singh, Dr. K.K. Dhatt, Dr H.S.Grewal.Sh. Ranjit Singh Dr H.S.Muker Dr.P.K.Sharma	XXIII Group Meeting of AICRP Directorate of floricultural research at PAU, Ludhiana on February 25-27, 2014
22.	Dr. Manmeet Brar Bhullar; Dr. Paramjit Kaur	XIIIth Biennial Group Meeting of AINP on Agricultural Acarology ICAR at RARI, SKRAU, at Durgapura, Jaipur July 11-12, 2013
23.	Dr Smriti Sharma	Interactive Stakeholder's Group meeting on Climate change Punjab Agricultural University, Ludhiana at Punjab Agricultural University, Ludhiana held on August 2, 2013
24.	Dr Balwinder Singh, Ms Gagan Jyot, Mr Sanjay Kumar Sahoo	All India Network Project on Pesticide Residues Bidhan Chandra Krishi Viswa Vidyalaya, at Bidhan Chandra Krishi Viswa Vidyalaya, Kalyani, West Bengal held on May 24, 2014
25.	Dr C S Aulakh	Annual Group Meeting of "Network Project of Organic Farming" PDFSR, Modipuram at Bajaura held on May 19-20, 2014
26.	Dr Jaspal Singh Virk, Dr P.S. Shera Dr Neelam Joshi Dr Rabinder Kaur	XXIII Biocontrol Workers Group Meeting on All India Coordinated Research Project on Crop Pests and Weeds NBAII, ; Bangalore & ICAR New Delhi at OUAS, Bhubaneswar (Odisha) on June 27-28, 2014
27.	Drs. Sarvjeet Singh and Ravinder Singh	Rabi Pulses Scientists Meet at IIPR, Kanpur February.28 – on March1, 2014
Year 2013-14		
List of National Trainings attended		
28.	Dr Amandeep Singh Brar	State level training on "Direct Seeded Rice" May 27, 2014 at Deptt. of Agronomy, PAU, Ludhiana held on May 27, 2014
29.	Dr C S Aulakh	Advanced Faculty Training on "Management technologies for improving soil quality and crop productivity" ICAR at Dept. of Soils, PAU, Ludhiana. held on October 9 -29, 2014
30.	Dr. Simarjit Kaur	Training on Management of Plant Genetic Resources at National Bureau of Plant genetic Resources (NBPGR), New Delhi held on September16 to 25, 2013
31.	Dr. Renu Khanna	11th International Symposium on Rice Functional Genomics- Sustaining Food and National Security, at NIPGR, New Delhi, on November. 20-23, 2013
32.	Drs. U.S. Tiwana, Rahul Kapoor,Upasana Rani and Meenakshi Goyal	National Group Meet of All India Coordinated Research Project on Forage Crops – Rabi 2013-14 at JNKVV, Jabalpur, MP held on September 7-8.2013
33.	Drs. US Tiwana, Rahul Kapoor,Upasana Rani and Meenakshi Goyal	National Group Meet of All India Coordinated Research Project on Forage Crops – Kharif 2014 at SKRAU, Bikaner, Rajasthan held on March 7-8.2014
34.	Drs. R.S. Sohu, and U.S. Tiwana	44th Annual Sorghum Group Meet at TNAU, Coimbatore held on April 28-30, 2014
35.	Drs. Jagmeet Kaur and Inderjit Singh	Review and Planning Meeting of NICRA project Director CRIDA at IIPR, Kanpur September 25, 2013



36.	Dr. Jagjeet Singh Lore	49th Annual Rice Research Group Meeting held at the Directorate of Rice Research, Hyderabad Directorate of Rice Research, Hyderabad, India. on April 6 - 8, 2014
37.	Dr. Jagjeet Singh Lore	National Workshop on 'Climate Controlled Green House for Agricultural Research" at CDAC, Mohali on July 11, 2013
38.	Dr. P.S.Sandhu	15th International Sclerotinia workshop Huazhong Agricultural University, Wuhan, China held on August 20-24, 2014
39.	Dr Jawala Jindal	Workshop on "The Scientist as Public Communicator" and "Understanding Test Protocols- Design, Reporting and Data Interpretation Biotech Consortium India Limited (BCIL) and Centre for Environmental Risk Assessment (CERA). New Delhi held on September 20,2013
40.	Dr. Gurjit Kaur Gill	Field day on Maize germplasm at Winter Nursery Centre Directorate of Maize Research, Hyderabad on March 15-16, 2014.
41.	All members of wheat research team	53rd All India Coordinated Wheat and Barley Improvement Project Workshop at Jawaharlal Nehru Krishi Vishwavidyalaya (JNKVV), Jabalpur on August 22-25, 2014
List of National workshops		
2014-15		
42	Dr Beant Singh	Interactive Workshop on Wheat and Barley Aphids and their Management" at Indian Institute of Wheat & Barley Research, Karnal held on November 24, 2014
43	Drs L.K. Dhaliwal & Som Pal Singh	PSCT Workshop cum-Interactive Meeting" by Punjab State Council for Science & Technology (PSCT), Chandigarh at PSCT, Chandigarh March 17, 2015
44	Drs Som Pal Singh & K.K. Gill	TROPMET 2015" by IMD and Panjab University, Chandigarh at Panjab University, Chandigarh February 15-18, 2015
45	Drs M. S. Dhaliwal S. K. Jindal & Abhishek Sharma	Asian Solanaceous Round Table- 2014" by Asia & Pacific Seed Association (APSA) at Hotel The Lalit Ashok, Bengaluru held on September 9-10, 2014
List of National Meetings		
46	Dr K. S. Sangha	National Meeting on "New/Safer Molecules and Biocontrol Technologies for Integrated Pest Management" at National Bureau of Agricultural Insect Resources, Bangalore held on February 23, 2015
47	Drs K. S. Sangha & P. S. Shera	National Entomologists' Meet at Indian Institute of Natural Resins and Gums, Ranchi held on February 5-7, 2015
48	Drs K. S. Sangha & Rabinder Kaur	ICAR's Annual Review Meeting of Network Project on Conservation of Lac Insect Genetic Resources at Kerala Forest Research Institute (FRI), Thrissur held on March 10, 2015
49	Dr Sandeep Singh	ICAR's Group Meeting of Scientists Working in AICRP (Citrus) at National Research Centre for Citrus, Nagpur held on September 2- 3, 2014
50	Dr Sandeep Singh	North East Agri- Fair at CAU, Arunachal Pradesh held on November 13-15, 2014
51	Dr Sandeep Singh	ICAR's Group Discussion of Scientists Working in AICRP on Fruits at MPUAT, Udaipur held on February 26 - March 1, 2015
52	Drs Virender Sardana, P. S. Sandhu, Pushp Sharma & Sarwan Kumar	21st Annual Group Meet of Rapeseed-Mustard Research Workers at Bidhan Chandra Krishi Viswa vidyalaya, Nadia on August 20-22, 2014

53	Drs Jagmeet Kaur, Poonam Sharma, Sarvjeet Singh, Guriqbal Singh, Inderjit Singh, Ravinder Singh, Asmita Sirari & Navneet Aggarwal	ICAR's Annual Group Meet of AICRP on Chickpea August 30 –at Rajasthan Agricultural Research Institute, Durgapura on September 1, 2014
54	Drs T. S. Bains and Ravinder Singh	ICAR's Annual Group Meet of AICRP on Summer Pulses Research Complex, Goa held on November 21 – 23, 2014
55	Dr L.K Dhaliwal	DST's Sixth Meeting of Programme Advisory Committee on Atmospheric Sciences at CSIR-National Institute of Oceanography, Goa July, 30-31, 2014
56	10 faculty members	79th Annual Convention of Indian Society of Soil Science 2014, at ANGRAU, Hyderabad held on November 24-27
57	Dr M. S. Dhaliwal	Agriculture Innovation Project (AIP) Planning Meet by AVRDC- PAU at PAU, Ludhiana held on October 8-10, 2014
58	Dr R.K. Dhall	Brain Storming Session on "Crop Improvement, Production Technology, Seed Production and Processing Of Garlic" at National Horticultural Research & Development Foundation, Nasik held on November 29, 2014
59	Drs Balwinder Singh, Gagan Jyot & Kousik Mandal	9th Annual Workshop on "Monitoring of Pesticide Residues at National Level" at Kerala Agricultural University, Vellayani on May 28, 2015
60	Drs Balwinder Singh, Gagan Jyot & Kousik Mandal	23rd Annual Workshop on "All India Network Project on Pesticide Residues" at Kerala Agricultural University, Vellayani on May 29, 2015
Year 2015-16		
61	Dr C S Aulakh	Attended Group monitoring workshop of SARTHI Project of SEED Division of DST Chandigarh held on January 28-29, 2016
62	Dr C S Aulakh	Attended Workshop on organic farming: Concerns about crop productivity and soil health ICAR-IIFS, Deptt of Agri, Coop and Farmers welfare, GOI at Modipuram held on January 7, 2016
63	Dr C S Aulakh	Annual workshop of Network Project on Organic Farming ICAR-IIFS, Modipuram at Udaipur held on August 19-2, 2015
64	Dr Anureet Kaur Chandi	Research and Extension Specialists Workshop for Rabi crops DEE, PAU Ludhiana; at PAU, Ludhiana. held on August 27-28, 2015
65	Dr Anureet Kaur Chandi	Research and Extension Specialists Workshop for Kharif crops DEE,PAU Ludhiana, at PAU Ludhiana held on February 23-24, 2016
66	Dr. J. S. Kular and Dr. Ravinder Singh Chandi	Research and Extension Specialists Workshop on Fruits, Mushroom, Agro-forestry, along Post Harvest Management, Farm Power & Machinery, Food Technology & Agri-Economics DEE, PAU Ludhiana; PAU Ludhiana held on January 20-21, 2016
67	Dr P.K. Chhuneja	Workshop of Fifth Deans Committee of ICAR ICAR at PAU, Ludhiana held on November 23-24, 2015
68	Dr. A.S.Dhatt Dr. Kulbir Singh Dr. R.K.Dhall	Workshop on "Innovative Technology for onion and garlic" for post harvest management at NHRDF, Karnal on March 9-10, 2016



List of National Meetings		
69	Drs K. S. Sangha, Neelam Joshi, P. S. Shera, Rabinder Kaur & Sudhendu Sharma	ICAR's XXIV Biocontrol Workers' Group Meeting of AICRP on Biocontrol of Crop Pests at Tamil Nadu Agricultural University (TNAU), Coimbatore on June2-3, 2015
70	Dr Sandeep Singh	Round Table on Conogethes Punctiferalis and Allied Species (Series 1) by IIHR, Bengaluru at PAU, Ludhiana held on May 22, 2015
71	Drs G. S. Mangat, Navjot Sidhu, J. S. Lore, P. S. Sarao & G. Mahajan	50th Golden Jubilee Rice Research Group Meeting by ICAR at Directorate of Rice Research, Hyderabad April 11-15, 2015
72	Drs S. K. Dhillon, Pankaj Sharma & Sukhpreet Singh	Annual Group Meeting of Sunflower at OUAT, Bhubaneshwar April 16-18, 2015
73	Drs B. S. Gill, Poonam Sharma & Navneet Aggarwal	Attended ICAR's Annual Group Meet of AICRP on Soybean at Amravati May 9 – 11, 2015
74	Drs Jagmeet Kaur, Veena Khanna, Sarvjeet Singh, T. S Bains, Guriqbal Singh, Inderjit Singh, Ravinder Singh & Asmita Sirari	CAR's Annual Group Meet of AICRP on Pigeonpea and MULLaRP at Birsa Agricultural University, Ranchi May 22 – 24, 2015
75	Dr G. Mahajan	Annual Meet of NAAS at NASC Complex, New Delhi June 4, 2015
76	Dr L.K Dhaliwal	DST's Sixth Meeting of Programme Advisory Committee on Atmospheric Sciences at CSIR-National Institute of Oceanography, Goa July, 30-31, 2014
77	Drs Kulbir Singh, T. S. Dhillon, Rajinder Singh, Abhishek Sharma, Sandeep Kaur & Neena Chawla	XXXIIIrd Group Meeting of AICRP(VC) at Indian Institute of Vegetable Research, Varanasi May 19-24, 2015
78	Dr S S Walia	32nd Biennial Group Meeting of All India Coordinated Research Project on Integrated Farming Systems at Assam Agricultural University, Jorhat . held on December 15-18, 2015
79	Dr Amarjeet Kaur, Dr S. S. Thind, Dr Usha Bajwa, Dr P. S. Ranote, Dr Savita Sharma, Dr Poonam Sachdev,Dr Baljit Singh, Dr Preeti Ahluwalia, Ms Jagbir Rehal and Dr Kamaljit Kaur	Progressive Punjab Investors Summit – 2015 Govt, of Punjab held on October 28, 2015
80	Dr Preeti Ahluwalia	CNE on Diabetes and nutritional Management at Dayanand Medical College & Hospital December 19, 2015
81	R I S Gill	Regional Consultation on Agroforestry : the Way Forward. at TAAS New Delhi on October 8-10, 2015
82	Sanjeev K Chauhan	The 3rdACMECS Bioenergy Workshop Future Development of ACMECS Bioenergy: Regional Plan and Standardization. at Kasetsart University, Bangkok at Ubon Ratchathani, Thailand on December 8-11, 2015

83	Dr MIS Gill Dr H S Rattanpal Dr Anita Arora Dr NK Arora Dr Gagandeep Kaur Dr Sandeep Singh	Third Group Discussion of AICRP (Fruits) ICAR and PAU Ludhiana March 3-6, 2016, at PAU, Ludhiana. on March 3-6, 2016,
84	Dr Gurpreet Singh Makkar	Brain Storming Meeting on Promotion of Pulses in Indo-Gangetic Plains of India" The Indian Society of Pulses Research & Development in collaboration with Punjab Agricultural University, Ludhiana at PAU Ludhiana on August 31, 2015
85	Drs Surinder Sandhu, Virender Sardana, P S Sandhu, Pushp Sharma and Chhaya Atri	22nd Annual Group Meeting of AICRP on Rapeseed-Mustard Research workers'ICAR-Directorate of Rapeseed-Mustard Research, Bharatpur and ICAR, New Delhi at Institute of Agricultural Management (SIAM), Durgapura, Jaipur on August 3-5 th, 2015
86	Dr Anureet Kaur Chandi	Research and Extension Specialists Workshop for Vegetables, Floriculture and Sericulture alongwith Post Harvest Management, Farm Power Machinery, Food Technology and Agri-Economics DEE, PAU Ludhiana at PAU Ludhiana held on May, 30-31, 2016:
87	Dr. Manmeet B Bhullar	Workshop of AINP on Agricultural Acarology by ICAR at AAU, Johrat held on April 27-29,2016
88	Dr Manmeet B Bhullar and Dr Paramjit Kaur	10th Annual workshop on "Monitoring of Pesticides Residues at National Level PAU, Ludhiana also Attended 24th Annual workshop of "All India Network Project on Pesticide Residues held on May 25-27, 2016
89	Drs J.S. Chawla, Gurjit Kaur, Jawala Jindal, Preeti Sharma, Harleen Kaur and Tosh Garg	59th annual maize workshop IIMR and ICAR, New Delhi at UAS, Bengaluru on April 10-12, 2016
90	Dr Surinder Sandhu and K S Brar	Annual group meeting of groundnut ICAR-Indian Institute of Groundnut Research and ICAR New Delhi UAS, Junagarh (Gujarat) from on April 16-19, 2016
91	Drs. Sarvjeet Singh & Poonam Sharma	Indo- US bilateral workshop on "Genomic Approaches for Yield Enhancement & Biological Nitrogen Fixation in Chickpea NASC Complex New Delhi NASC Complex New Delhi held on January 29-31, 2017
92	Dr C S Aulakh	Group monitoring workshop of SARTHI Project of SEED Division of DST DST Amritsar on February 24-25, 2017
List of National Workshops		
2016-17		
93	Dr C S Aulakh	IV Biennial workshop of AICRP-IFS ICAR-IIFS, Modipuram SKUAST, Jammu held on December 20-22, 2016
94	Dr C S Aulakh	Workshop on Organic Farming. Punjab Agri Export Corporation Ltd, Chandigarh. held on September 10, 2016Chandigarh
95	Dr K S Sangha	Workshop on "Beneficial insects and bees - A hidden treasure in the agro and horticultural sector in India" The Kingdom of Netherland in collaboration with Koppert Biological Systems Hotel Taj, New Delhi held on August 22,2016,.
96	Drs K.S. Sangha and Sudhendu Sharma	4th Workshop/ Coordination Committee Meeting of "Network Project on Conservation of Lac Insect Genetic Resources" AAU, Jorhat and IINRG, Ranchi AAU, Jorhat held on July 6-7, 2016

97	Dr. Jaspreet Kaur	National Workshop on, "Cooperative learning for producing high quality dairy professionals"Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana. on March 17, 2017
98	Dr. Mamta Pathak	International workshop to develop Climate Resilient Cereals PAU, Ludhiana held on November 2-5, 2016
99	Dr. Mamta Pathak	Workshop on Intellectual Property Rights PAU, Ludhiana held on February 22, 2017
List of National Meetings		
100	Dr. Premjit Singh Dr. Kiranjeet Kaur Dhatt, Dr. Madhu Bala, Dr. Shalini Jhanji	AICRP Group Meeting on Floriculture Directorate of Floricultural Research at Rajahmundry, Andhra Pradesh June 28,. to on July 2,. 2016
101	Drs G.S. Mangat, R.S. Gill, G. Mahajan, P.S. Sarao, J.S. Lore Renu Khanna and Dharminder Bhatia	51st Rice Research Group Meeting ICAR at IGKV, Raipur on April 2–4, 2016
102	Dr. A.S.Dhatt Dr. Kulbir Singh Dr. V.K.Vashishst Dr. Mamta Pathak Dr. Sandeep Kaur Dr. Sukhjeet Kaur Dr. Abshishek Sharma	Group meeting on "All India Coordinated Vegetable Improvement Project" (VC) at ICAR, New Delhi on May 10-13,2016
103	Drs. S. K. Sandhu, Virender Sardana, P.S. Sandhu, Pushp Sharma, Chhaya Atri and Sanjula Sharma	23rd Annual Group Meeting of All India Coordinated Research Project on Rapeseed –Mustard Workers ICAR–Directorate of Rapeseed-Mustard Research, Bharatpur, ICAR, New Delhi at DUVASU, Mathura held on August 5-7., 2016
104	All scientists of Wheat section	55th All India Wheat &Barley research worker's meet at CCSHAU, Hisar held on August 21-24,, 2016
105	Drs. Sarvjeet Singh, Jagmeet Kaur, Poonam Sharma, Ravinder Singh, Inderjit Singh, Upasana Rani	Annual Group Meet of AICRP on chickpea ICAR ARS at Gulbarga held on September 1-3, 2016
106	Dr. Ruchika Bhardwaj	National Group Meet of All India Coordinated Research Project on Pearl Millet –Kharif 2017 ICAR PAU, Ludhiana held on March 28-29, 2017
107	Dr Pardeep Kumar Chhuneja Dr Jaspal Singh Dr Harminder Kaur Deosi Dr Amit Choudhary	Bennial Group Meeting of AICRP (HB&P) Dr YSUH&F University, Solan Dr YSP UH&F University , Nauni, Solan held on October 14-16, 2016,
108	Drs K.S. Sangha, Neelam Joshi, Parminder Singh Shera and Rabinder Kaur	"Brainstorming Session on Agrochemicals and Spray Technology" Department of Entomology PAU Ludhiana PAU Ludhiana held on November 22,2016
109	Dr Jaspal Singh Dr Amit Choudhary	Neonicotinoids Project Interface meeting PC cell, AICRP (Honey Bees & Pollinators), IARI, New Delhi IARI, New Delhi held on March 22,2017
110	Dr Dharminder Pathak	Brain Storming Session on "Fifty Years of Cotton Research - Lessons Learnt and the Way Forward" ICAR-Central Institute for Cotton Research, AICRP on Cotton, and Indian Society for Cotton Improvement at ICAR-CICR Regional Station, Coimbatore held on November 9-10. 2016

List of National Meetings		
2017-18		
111	Drs.U.S. Tiwana, Rahul Kapoor, Meenakshi Goyal and Ashlesha	National Group Meet of All India Coordinated Research Project on Forage Crops –kharif 2017 ICAR CSK HPKV, Palampur held on April 18-19 2017
112	Dr. S.S. Khandhola and Pankaj Sharma	Annual Group Meeting of Sunflower, Sesame and Niger Indian Institute of Oilseeds Research , Hyderabad & ICAR, New Delhi HAU, Hisar held on April 20-22, 2017
113	Drs. Devinder Pal Singh and Harpreet Kaur	National Group meet of All India Coordinated Sorghum Improvement Project ICAR Mahatama Gandhi Krishi Vishvadalay Bangluru held on April 22-24, 2017
114	Dr. K.S. Brar	Annual Group Meeting of Groundnut workers ICAR-Indian Institute of Groundnut Research and ICAR , New Delhi UAS , Dharward on April 24-26, 2017
115	Drs. Poonam Sharma, Ravinder Singh, B.S. Gill, Asmita Sirari, Harpreet Kaur Virk	47th Annual group meet of AICRP on Soybean ICAR GBPUA&T, Pantnagar on May 2-4, 2017
116	Drs. Sarvjeet Singh, Guriqbal Singh, Veena Khanna, T. S. Bains, H. K. cheema	Annual Group Meet of AICRP on MULLaRP ICAR GBPUA&T, Pantnagar on May 6-8, 2017
117	Drs. Jagmeet Kaur, Veena Khanna, Inderjit Singh, Gaurav Taggar	Annual Group Meet of AICRP on Pigeonpea ICAR Dr. RPCAU, Samastipur, Bihar on May 19-21, 2017
118	Dr C S Aulakh	Natural Farming Summit Sri Institute of Agril Sciences & Technology Bangalore May 9-10,2017
119	Dr Ravinder Singh Chandi	Brain Storming Session on 'Management of Paddy Straw' Department of Farm Machinery and Power Engineering, PAU, Ludhiana Farmers' Service Centre, PAU, Ludhiana February 7,2017
120	Drs K S Sangha, Neelam Joshi, Parminder Singh Shera, Rabinder Kaur and Sudhendu Sharma	26thAnnual Group Meeting of All India Coordinated Research Project on Biological Control of Crop Pests Dr YSPUHF, Nauni (Solan) and ICAR-NBAIR, Bengaluru Dr YSPUHF, Nauni (Solan) held on May 16-17, 2017
121	Drs A S Dhatt, Madhu Sharma, Abhishek Sharma	VIIIth Annual Group meeting of All India Network Research Project on Onion and Garlic at Rajasthan Agricultural Research Institute (RARI), Durgapura, Jaipur held on July 1-2, 2017



COHS		
List of International Symposia/Conferences/Seminars attended		
Year 2013-2014		
S.No	**Name of the faculty**	
1.	Drs Jasvinder Sangha, BalwinderSadana, and Kiran Grover	International Conference on Nutritional Therapies against Lifestyle Related Disorders, May 29-30, 2014
Year 2014-15		
2.	Dr Variander Randhawa	Trilateral Programme for Food Security, managed by US, Department of Agriculture and funded by US agency for international development, November 9-14, 2014
3.	Dr Kiran Grover	Participation in Global Forum for Innovation in Agriculture. Food Control Authority, Abu Dhabi UAE, March 09-11, 2015
List of International Workshops attended		
Year 2015-16		
4.	Dr Kiranjot Sidhu	Modeling for women entrepreneurs' organized and funded by Asian Productivity Organization, Japan, June 18-23, 2016
List of National Symposia/Conferences/Seminars attended		
Year 2013-2014		
5.	Dr.Tejpreet Kang,	1st International Conference of Indian Psychometric and Educational Research Association September 21-22, 2013 Harprasad Institute of Behavioural Studies, Agra
6.	Drs. Deepika Vig and Sarita Saini	National Seminar on "Fostering Global Competencies in Higher Education" October 26, 2013 National Assessment and Accreditation Council Bangalore and Chandigarh College of Education
7.	Dr. Anita Kochhar	45th Annual Conference of Nutrition Society of India November. 21-22, 2013 National Institute of Nutrition, Hyderabad
8.	Dr. Jatinder K. Gulati	International Conference on 'Women Development November 22, 2013 Women's Studies Centre, Punjabi University, Patiala
9.	Dr. Kiran Grover	46th Annual Conference of Indian Dietetics Association December 12-14, 2013 Maharashtra Institute of Technology, Pune
10.	Dr. Anita Kochhar	International Conference on Multidisciplinary Health Care January 12, 2014 AIIMS, New Delhi
11.	Drs Ritu Mittal and Preeti Sharma	National Seminar on 'Life Skills and Development' February 12, 2014 Women Study Centre, Government College for Girls, Panchkula
12.	Drs. Sonika Sharma and Ritu Mittal	APICON – 69th Annual Conference of Physician of India at G.K. Resort, Ludhiana Feb. 21, 2014. Dayanand Medical College & Hospital, Ludhiana
13.	Drs.Tejpreet Kang and Asha Chawla	17th Punjab Science Congress February 14-16, 2014 Punjab Technical University, Jalandhar
14.	Drs.Tejpreet Kang, Seema Sharma, Rippen Gill Jassal and Asha Chawla	1st International and 3rd Indian Psychological Science Congress February 24-25, 2014 Department of Psychology, P. G. Govt. College, Chandigarh
15.	Drs.Jasvinder K Sangha, Jatinder K. Gulati, Deepika Vig and Sarita Saini	3rd International conference on Human Values In Higher Education February 28 - March 2, 2014 Punjab Technical University, Jalandhar, IIT Varanasi, IIT Hyderabad and Royal University of Bhutan
16.	Drs Harinder Saggu, Devinder Kaur, Harminder Saini, and Prerna Sharma,	Two days workshop on 'Creative Draping" March 18 and 19, 2014 Pearl Academy, Noida in the Department of Apparel and Textile Science, PAU, Ludhiana

17.	Dr.Tejpreet Kang	International Congress on Agriculture, Food Engineering and Environmental Sciences- Sustainable Approaches March 29-30, 2014 Jawaharlal Nehru University, New Delhi
18.	Dr. Jatinder K. Gulati	National conference on Crystallizing the Identity of Human Development as a Discipline October 17-19, 2013 Maharaja Sayaji Rao University of Barada, Vadodara
Year 2014-2015		
19.	Dr.Ritu Gupta	International Conference on Ergonomics Intervention for Reducing Work Related Musculo Skeletal Disorders among Women involved in Papad Rolling Activity. August, 1-3, 20143rd Recoup International Conference, Bangalore
20.	Dr Jatinder K Gulati	Under National Action and Coordination Group (NACG) – India Initiative on Ending Violence Against Children in India August 4, 2014, Child Welfare Council, Punjab, Voluntary Health Association Punjab and Daanish Foundation at Guru Nanak Bhawan, Ludhiaana
21.	Dr Tejpreet Kang	National Conference on Threats to Human Rights : The Intervention Strategies by Global Society Sep 21-22,2014 Indian Psychometrics and Educational Research Association, Patna at Harprasad Institute of Behavioral Studies, Agra
22.	Drs Tejpreet Kang , Seema Sharma, Sarita Saini and Deepika Vig,	3rd International Conference on 'Psychology and allied Sciences' September 25-27, 2014 Indian Association of Health, Research and Welfare & Amity Institute of Psychology and Allied Sciences, Amity University, Noida at Amity University, Noida, Uttar Pradesh
23.	Nine Faculty Members	National Seminar on 'Augmenting Processing and Shelf Life of Perishable Food Products' Sept 26, 2014 PAU Ludhiana
24.	Drs Sumeet Grewal and Surbhi Mahajan	International Conference on 'Technical Textiles and Non Wovens' November 6-8, 2014 Indian Institute of Technology, Delhi.
25.	Twenty two Faculty Members	46th National Conference of Nutrition Society of India on 'Nutritional Approaches for Combating Non Communicable Diseases' Nov 6-8, 2014 DMC & Hospital, Ludhiana, and NSI Hyderabad
26.	Drs. Anita Kochhar, Jaswinder Brar and Navjot Kaur	International Conference on 'Innovative Bakery Products Dec.12-13 2014 Hotel Taj, New Delhi
27.	Drs. Anita Kochhar and Sonika Sharma	Silver Jubilee Seminar on 'Present Status and Future Strategies For Processing and Value Addition of Agricultural Commodities' Dec.19-20 2014, CIPHET Ludhiana
28.	Dr.Balwinder Sadana	Annual National Conference of IDA Dec 20-21 2014 IDA, New Delhi
29.	Dr. Sonika Sharma	47th Annual National Conference of Indian Dietetics Association Dec 20-21 2014 AIIMS New Delhi
30.	Drs.Ritu Mittal, and Preeti Sharma	Sensitization workshop on 'Societal fellowship scheme' of DST, GOI for women empowerment February 4, 2015 Punjab State Council for Science and Technology, Chandigarh at Punjab University, Chandigarh
31.	Drs.Ritu Mittal, and Preeti Sharma	Seminar on "Green Marketing: a changing paradigm in contemporary marketing" February 6-7, 2015 ICSSR N.W. Regional center, Chandigarh and Arya College, Civil lines, Ludhiana
32.	Drs Vandana Gandotra and Surinderjit Kaur	18th Punjab Science Congress Feb 7-9, 2015 Punjab Academy of Sciences at DeshBhagat college, Gobindgarh
33.	Dr.Preeti Sharma	Training on Technology Impact analysis and New Methods in Extension Education February 17-21, 2015 ICAR-NAARM, Hyderabad at Directorate of Extension Education, PAU, Ludhiana
34.	Dr.Surinderjit Kaur	UGC Sponsored Seminar March 20, 2015 GHG Khalsa College, GurusarSudhar

Year 2015-2016		
35.	Drs Sandeep Bains and Sumeet Grewal	International Conference on 'Application of Nano – Materials in Textiles Enhancing health, Wellbeing and Sustainability – Opportunities, Challenges and Future Directions' April 23 – 25, 2015 Anchor Institute, Department of Textile Engineering, Maharaja Sayojirao, University of Baroda, Vadodra.
36.	Dr.Tejpreet Kang	International conference on Agricuture, Food Engineering and Environmental Sciences- Sustainable Approaches May 9-10 2015 Krishi Sanskriti at Jawaharlal Nehru University, New Delhi
37.	Six Faculty Members	CME on 'Critically ill Patients' Sept 4, 2015 Govt Medical College & Hospital, Chandigarh
38.	Drs Tejpreet K Kang and Seema Sharma	International Conference on 'Changing Perspectives and Challenges of Teacher Education' Sep 26-28, 2015, Indian Psycho-metrics and Educational Research Association, Patna at Harprasad Institute of Behavioral Studies, Agra
39.	Drs Kiranjot Sidhu and Kanwaljit Kaur	Platinum Jubilee Conference of the Indian Society of Agriculture Economics Nov. 19 to 21, 2015, Deptt. of Economics and Sociology PAU, Ludhiana
40.	Eight Faculty Members	CNE on Diabetes and its Nutritional Management Dec 19, 2015 Indian Dietetic Association, Ludhiana Chapter at DMC & Hospital, Ludhiana
41.	Dr Deepika Vig	Make in India –Campaign for inclusive Growth –Initiatives and Challengers' January 4-5, 2016 Department of Commerce & ICSSR, New Delhi at Aligarh Muslim University, Aligarh.
42.	Drs Sonika Sharma, Neerja Singla and Renuka Aggarwal	International Conference on 'Recent Advances in Emerging Technologies-ICRAET-2016' Feb 23-24, 2016 Shri Guru Granth Sahib World University, Fatehgarh Sahib
43.	Drs Sarita Saini and Vandana Kanwar	One day National Conference on 'Recent Trends in Environment, Science and Technology' March 11, 2016 PSCST, Chandigarh at University School of Sciences, Rayat-Bahra University, Mohali, Punjab
44.	Dr Tejpreet K. Kang	National Seminar on 'Gender Equality for Sustainable Development' March 21 - 22, 2016 ICSSR, New Delhi at Central University of Punjab, Bathinda
Year 2016-2017		
45.	Drs Ritu Mittal and Preeti Sharma	3rd National Seminar on 'Market Imperfections, Farmers Distress and Agrarian Crisis in India' April 7, 2016 Society of Economics and Development PAU, Ludhiana
46.	Drs K Brar and Harminder Saini	International Conference on 'Redefining Textiles-Cutting edge Technology' April 8-10, 2016 Department of Textile Technology, Dr B R Ambedkar National institute of Technology, Jalandhar
47.	Drs Tejpreet K. Kang and Kiranjot Sidhu	Management Development Programme on 'Strategies of Enhancing of the Research Managers of PAU' April 26-30, 2016 ICAR-NAARM, Hyderabad at PAU, Ludhiana
48.	Drs Anita Kochhar, Sonika Sharma, Neerja Singla and Ms. Renuka	National Conference on 'Innovative Food Processing Technologies for Food and Nutrition Security' Sept. 29-30, 2016 CIPHET, Ludhiana
49.	Dr Kiran Bains	National Conference on 'Technologies in Sustainable Food Systems' October 7-8, 2016 SLIET, Longowal, Sangrur.
50.	Dr Sonika Sharma	1st Annual National Conference of Indian Society of Clinical Nutrition on 'Nutrition in Clinical Practices: An emerging Perspective' October 14-16, 2016 AIIMS, New Delhi

51.	Dr Kiran Grover	48th Annual National Conference ofNutrition Society of India Nov 4-5, 2016 St. Johns Research Institute, Koramalgala, Bangalore.
52.	Drs Jaswinder Brar and Harpreet Grewal	Nestle Healthy Kids Workshop Nov. 16, 2016 Nestle India Ltd.,Gurugram
53.	Drs Tejpreet Kang and Asha Chawla	World Conference on 'Wisdom Society – Learning to Live Wise' Nov.25-26, 2016 Global Education Research Association (GERA) at Visva Bharti Shantiniketan, West Bangal
54.	Drs Surinderjit Kaur and Ritu Gupta	14th International Conference of Humanizing Work and Work Environment-2016 Dec. 9-11, 2016 NIT, Jalandhar
55.	Dr Kiran Bains	4th Bio-processing India (BPI)- International Conference Dec. 15-17, 2016 CIAB, Mohali
56.	Drs Sandeep Bains and Sumeet Grewal	National Seminar on 'Recent Advances in Textile Finishing' Dec.17, 2016 Central Institute for Research on Cotton Technology and Indian Fibre Society (CIRCOT), Mumbai
57.	Drs Anita Kochhar, Kiran Grover, Jaswinder Brar, Sonika Sharma, Harpreet Grewal, Neerja Singla, Navjot Kaur, Ms. Renuka and Ms Poonam Bakhetia	CNE on 'Liver/GI disorders – Nutrition Interventions' Dec. 24, 2016 DMC&H, Ludhiana
58.	Dr Sumeet Grewal	CODE- Conference on Design Feb.3, 2017 School of Fashion and Design, GD GoenkaUniv, Gurgaon
59.	Dr Neerja Singla	XXII Biennial Workshop of 'AICRP on Home Science' Feb 10-11, 2017 AAU, Jorhat ,(Assam)
Year 2017-2018		
60.	Dr Sumeet Grewal	National Seminar on 'Art and Beauty: Tradition to Modernity' April 1, 2017 UGC Sponsored Dev Samaj College for Women, Ferozepur
61.	Dr Surabhi Mahajan	Comprehensive Integrated Scheme for Power loom Sector Development April 1, 2017 NITRA Power loom Centre, Ludhiana in association with Regional Office of Textile Commissioner, Amritsar
62.	Drs Tejpreet Kang, Seema Sharma, Ritu Mittal and Sukhdeep Kaur	4th National Seminar 2017 on 'Doubling farmer's income by 2022: Opportunities and Challenges' April 7, 2017 Society of Economics and Sociology, PAU, Ludhiana
63.	Drs Anita Kochhar, Sonika Sharma, Neerja Singla, Navjot Kaur and Ms Poonam Bahetia	CNE on 'Protein and Fibre: its role in satiety' May 21, 2017 DMC&H, Ludhiana
64.	Mrs Rajdeep Kaur and Dr Sandeep Bains	Golden Jubilee National Seminar on Promotion of Skills and Technologies for Sustainable Rural development in India August 31-1September 2017 Ministry of Human Resource Development, Govt. of India, and NABARD Chandigarh
65.	Drs Tejpreet Kang, Seema Sharma, Vandana Kanwar and Mrs. Ritu Mahal	National seminar on "Reproductive health advances for adolescents" Sept 8-9, 2017 Department of Zoology, Punjab Agricultural University, Ludhiana
66.	Drs Sonika Sharma and Harpreet Kaur	World Food India -2017 – Sampada Yojana Sept 12, 2017/ Guru Nanak Bhavan, Ludhiana Ministry of Food Processing Industries

67.	Drs Tejpreet Kang, Seema Sharma, Deepika Vig and Vandana Kanwar	4th International and 6th Indian Psychological Science Congress on Psychological Well Being: Reflection Across the Culture Sept 18-20, 2017/ Dept of Psychology , Panjab University, Chandigarh Panjab University, Chandigarh
68.	Dr J K Gulati	Women in Agriculture October 17, 2017 at ATTARI , ICAR, PAU Campus
69.	Nine faculty members	Golden Jubilee International conference on 'Gender Issues and Socio-Economic Perspectives for Sustainable Rural Development' October 23-25, 2017at I. C. College of Home Sciences, CCSHAU, Hisar
70.	Drs Anita Kochhar, Sonika Sharma, Neerja Singla and Mrs.Poonam Bakhetia	CNE on Good Diet for Healthy Heart December 9, 2017/ Dayanand Medical College & Hospital, Ludhiana
71.	Dr Neerja Singla Mrs Poonam Bakhetia	2nd CNE on Liver/GI Disorders- Nutrition Interventions, December 24, 2017/ Dayanand Medical College & Hospital, Ldh
72.	Drs J K Gulati	32nd Biennial Conference of Home Science Association of India on 'Family and Community Science-A Catalyst for Sustainable Development Goals.' February1-3, 2018 at College of Home Science, MPUAT, Udaipur
73.	26 Faculty members	21st Punjab Science Congress on "Scientific Advances for Inclusive Development and Environmental Protection" February 7-9 , 2018/ Punjab Agricultural University, Ludhiana
74.	Dr J K Gulati	National Seminar 'Contextual Scenario of Factors Predicting Psychological Wellbeing of Women and Girl Child' February 24, 2018 , CIS KanyaMahavidyalya, Fatehpur
75.	Drs Anita Kochhar, Sonika Sharma, Neerja Singla, Navjot Kaur,Sukhdeep Kaur and Mrs Poonam Bakhetia	National Conference on 'Promoting Entrepreneurial Growth Through Innovative Approaches in Food Processing Sector' March 16-17, 2018/ , Central Institute of Post Harvest Engineering and Technology, Ludhiana
76.	Drs Anita Kochhar, Sonika Sharma, Navjot Kaur, Harpreet Kaur and Mrs Poonam Bakhetia	Punjab Agri Food Conclave May 16, 2018,PAU, Ludhiana Govt. of Punjab
List of National Workshops/meetings attended		
Year 2013-2014		
77.	All faculty members	Awareness workshop on Children with Learning Disabilities in Main Stream Schools November 6, 2013 Potentials: Centre for Human Development, and Child Development Society
78.	Drs. Anita Kochhar and Sonika Sharma	CNE-Clinical Dietetics and Nutrition 2013 November 7 Apollo Hospital, Ludhiana, 2013
79.	Drs BalwinderSadana Neerja Singla	Unit Meeting of AICRP on Home Science FN Component, 12-13 June 2013, ICAR, New Delhi at CSKHPKVV Palampur
Year 2014-2015		
80.	Dr Sandeep Bains	Commonwealth Parliamentary (CPA) Workshop for Chairpersons on 'Parliamentary Agriculture Committee for the India, Asia and South East Asia Regions' Oct 29 -31, 2014 Institute of the University of Greenwich and Govt of Punjab at Hotel Punjab Legislative Assembly, Chandigarh
Year 2015-2016		
81.	Dr Asha Chawla	Workshop on 'Guidance and Counselling' October 5-10, 2015 Director of Research, MPUAT, Udaipur
82.	Dr Surabhi Mahajan	Brainstorming Session on 'Collaboration of Industry and Academic Institutes' Oct 15, 2015 Knitwear Club Ludhiana

83.	Drs Sandeep Bains, Sumeet Grewal and Surabhi Mahajan	Workshop on 'Occupational Mapping, Functional Analysis cum Validation for Quality Control and Testing Sector' Feb 6, 2016 Consortium of BTRA, NITRA & SITRA in association with Textile Sector Skill Council. Hotel A, Ludhiana
Year 2016-2017		
84.	Drs Seema Sharma, Deepika Vig and Dr Sarita Saini	Workshop on 'Fostering Psychosocial Development of Children: The Importance of Early Years' April 9, 2016 Post-Graduate Institute of Medical Education and Research (PGIMER), Chandigarh.
85.	Dr Sandeep Bains	Brainstorming Workshop on 'Bridging gaps in gender Research' June 1-2, 2016 ICAR - CIWA, Bhubneshwar
86.	Drs Kiranjot Sidhu and Sandeep Bains	Training cum Workshop of Scientists of ICAR-CIWA and AICRP on Home Science Nov.26-27, 2016 ICAR – Central Institute for Women in Agriculture (CIWA), Bhubneshwar
Year 2017-2018		
87.	Drs Sandeep Bains and Kanwaljit Brar	Workshop on Ludhiana Knitted Apparel Cluster – A Smart Cluster May 12, 2017 Apex Cluster Development Services (Clusterkraft) under MSME Cluster Intervention Programme f Small Industries Development Bank of India, Ludhiana
88.	Mrs Rajdeep Kaur	National Workshop on Popularisation of Remote sensing based maps and spatial information August 11, 2017 Indian Society of Remote Sensing-Ludhiana Chapter at Guru Nanak Bhawan, Ludhiana
89.	Drs Sarita Saini Sonika Sharma	Workshop on 'Child Rights and Protection' October 3-5, 2017, National Institute of Public Cooperation and Child Development (NIPCCD), New Delhi
90.	Dr Ritu Gupta	Training programme-cum-unit meeting of Family Resource Management Component under AICRP project December 4–6 2017 College of Home Science, GBPUA&T Pantnagar
91.	Dr Neerja Singla Mrs Poonam Bakhetia	Unit Meeting of All India Coordinated Research Project on Home Science December, 14-15, 2017, IARI, New Delhi
92.	Dr Neerja Singla and Mrs Poonam Bakhetia	Diabetes: A Complete Care Update"- One Day Certificate course Workshop May 6, 2018/ Spice Cube, Ludhiana
93.	Dr Neerja Singla and Mrs Poonam Bakhetia	Review meeting of All India Coordinated Research Project on Home Science April 9-10, 2018/ CIW A Bhubaneswar, Odisha

Research stations		
List of National Symposia/Conferences/Seminars/workshops attended		
S.No	**Name of the faculty**	**Event**
2013-14		
1.	Dr. K.S. Thind	Group meeting of AICRP sugarcane, Vishakhapatnam, 25-10-13 to 26-10-13
2.	Dr. K.S. Thind	National seminar on sugarcane, New Delhi 15-10-13 to 17-10-13
3.	Dr. Gulzar Singh Sanghera	National Seminar on Sugarcane , PAU, Ludhiana Oct 15-17, 2013
4.	Dr. Gulzar Singh Sanghera	Plant Breeders and Pathologists Meet, SBI (ICAR), Regional Station, Karnal, 4 Feb, 2014
5.	S C Sharma, Vivek Sharma, Vijay Kumar, Rakesh Sharma	International Conference on Advances in Water Resources Development and Management, 23-27 Oct 2013, Panjab University, Chandigarh
6.	Rakesh Kumar Sharma	International Conference on Entomology, 21-23 Feb, 2014, Punjabi University, Patiala,
7.	Dr Pankaj Rathore	Annual Group meeting, All India Coordinated Cotton Improvement Project, April 7-9, 2014 at PAU Ludhiana
8.	Dr. Rajinder Kumar	10 days Orientation course on "*Effective Teaching Research and Extension*". Punjab Agricultural University, Ludhiana (India) from August 20 to 30, 2013
9.	Dr. Rajinder Kumar	21 days ICAR sponsored training on "*Recent Advances in Stored Product Insect Pest Management*". Tamil Nadu Agricultural University, Coimbatore (India) from 13th November to 3rd December, 2013
10.	Dr. Rajinder Kumar	21 days ICAR sponsored training on "*Measurement and Management of Resistance to Chemical Pesticides*". Acharya N G Ranga Agricultural University, Hyderabad (India) from 27th May to 16th June, 2014
11.	**Dr. Rajinder Kumar**	*NationalSeminar on Sugarcane,* Punjab Agricultural University, Ludhiana from 15-17 October, 2013
12.	**Dr. Rajinder Kumar**	*National Seminar on Recent advances and Challenges in Sugarcane* Research,University of Agricultural Science, GKVK, Bangalore at Mysore during January 23-24, 2014
13.	**Dr. Rajinder Kumar**	Annual Workshop on "*All Indian Coordinated Cotton Improvement Project*". Punjab Agricultural University (India) during April 7-9, 2014
14.	**Sh Onkar Singh**	"*NationalSeminar on Sugarcane*" Organized by National Federation of Cooperative Sugar Factories Limited New Delhi and Punjab Agricultural University, Ludhiana , PAU, Ludhiana 15-17 October, 2013.
15.	**Dr Satnam Singh**	National Symposium on Changing Disease Scenario and Management Approaches for Sustainability in Agriculture October 26-27th, 2013, Division of Plant Pathology, SKUAST-K Shalimar.
16.	**Dr Satnam Singh**	ICAR Short Course on Nanotechnology and Plant Disease Management June 18-27, 2013 at Department of Nano Science & Technology, Directorate of Natural Resource Management, Tamil Nadu Agricultural University, Coimbatore- 641003
17.	Dr Satnam Singh	Computational and Statistical Advances in Bioinformatics for 'omics' Data January 21- February 10 2014 at Centre for Agricultural Bioinformatics, Indian Agricultural Statistics Research Institute, New Delhi-110012

18.	**Dr Satnam Singh**	One day workshop on Whitefly as a Vector of Begomoviruses: An Emerging Threat to Vegetable Crops and Cotton Department of Plant Breeding and Genetics, PAU, Ludhiana on 26th July, 2013
19.	**Dr Satnam Singh**	Annual group meeting of All India Coordinated Cotton Improvement Project, April 7 to 9 2014, PAU, Ludhiana
20.	Dr Suneet Pandher	Annual Group meeting, All India Coordinated Cotton Improvement Project April 7-9, 2014 at PAU Ludhiana
Year 2014-15		
21.	**Dr. Gulzar Singh Sanghera**	Training on Novel Genomic Tools and Breeding Approaches for Sugar Crops Improvement, ICAR-IISR, RaeBareli Road, Lucknow (U.P.) September 09-29, 2014
22.	Dr Suneet Pandher	National symposium "Crop Improvement for Inclusive Sustainable Development" Nov. 7-9, 2014 at PAU Ludhiana
23.	Dr Suneet Pandher	4th Congress on Insect Science Punjab Agricultural University, Ludhiana April 16-17, 2015
24.	Dr Suneet Pandher	Annual Group meeting, All India Coordinated Cotton Improvement Project April 8-10, 2015 at TNAU Coimbatore
25.	Dr. Rajinder Kumar	Group meeting of All India Coordinated Research Project Sugarcane ICAR-Indian Institute of Sugarcane Research, RaeBareli Road, Lucknow - 226002 (U.P.) during 1-2 November, 2014
26.	Dr. Rajinder Kumar	National Symposium on "*Crop Improvement for Inclusive Sustainable Development*" Punjab Agricultural University, Ludhiana during November 7-9, 2014
27.	**Dr. Gulzar Singh Sanghera**	Training on Seed Production and Quality Assurance , ICAR in collaboration with Director Seeds, PAU, Ludhiana January, 15-16, 2015.
28.	Dr. Gulzar Singh Sanghera	Group meeting of All India Coordinated Research Project Sugarcane organized, ICAR-IISR, RaeBareli Road, Lucknow 1-2 November, 2014
29.	Dr Kuldeep Singh	"IISR-Industry Interface on Research and Development Initiatives for Sugarbeet in India" organized by IISR, Lucknow and ASTI, Lucknow at Sugarbeet 28-29 May, 2013, Breeding Outpost of IISR, IVRI Campus, Mukteswar, Nanital
30.	Dr. Gulzar Singh Sanghera	National Symposium on Crop Improvement for Inclusive Sustainable Development, PAU, Ludhiana November 7-9, 2014.
31.	Dr. Gulzar Singh Sanghera	Plant Breeder's and Pathologist's Meet of North West, North Central & North Eastern Zones under AICRP on Sugarcane, RRS (PAU), Gurdaspur, 6th February, 2015
32.	A.K Khokhar	National Symposium on Agriculture Diversification, for Sustainable Livelihood and Environmental Security", Punjab Agricultural University, Ludhiana from November 18–20, 2014.
33.	A.K. Khokhar Vivek Sharma	National Symposium on "Natural Resource Management and Sustainable Hill Farming Syastem for Livelihood Security" SKUAST- Jammu from July 23 – 24, 2014.
34.	Dr Pankaj Rathore	National Symposium on "Dryland Farming and Food Security in India" August 30-31, 2014 at RajmataVijayaraje Scindia KrishiVishwaVidyalyaGawalior (MP)
35.	Dr. Rajinder Kumar	Group meeting of All India Coordinated Research Project Sugarcane ICAR-Indian Institute of Sugarcane Research, RaeBareli Road, Lucknow - 226002 (U.P.) during 1-2 November, 2014

36.	Dr. Rajinder Kumar	National Symposium on "*Crop Improvement for Inclusive Sustainable Development*" Punjab Agricultural University, Ludhiana during November 7-9, 2014
37.	Dr. Rajinder Kumar	International Conference on "*Changing scenario of pest problems in agri-horti ecosystem and their management*" Maharana Partap University of Agriculture and Technology Udaipur, Rajasthan (India) during November 27-29, 2014.
38.	Dr. Rajinder Kumar	Plant Breeder's and Pathologist's Meet of North West, North Central & North Eastern Zones under AICRP on Sugarcane ,Regional Research Station (PAU), Gurdaspur (Punjab) held on 6th February, 2015
39.	Dr. Rajinder Kumar	4th*Congress on Insect Science*organized by Indian Society for the Advancement of Insect Science in collaboration with Department of Entomology, Punjab Agricultural University, Ludhiana Punjab Agricultural University, Ludhiana (India) during April 16-17, 2015
40.	Sh Onkar Singh	"National Training Workshop on Principals & Practices of Direct Seeded Rice organized by CCS HAU Hisar, PAU Ludhiana & University of Adelaide, Australia, CCSHAU Karnal & PAU Ludhiana from Sept. 22 to Oct. 1, 2014
41.	Sh Onkar Singh	Group meeting of All India Coordinated Research Project Sugarcane Indian Institute of Sugarcane Research, RaeBareli Road, Lucknow – 226002 (U.P.) from November 1-2, 2014
42.	Sh Onkar Singh	2 days training on "Seed Production and QualityAssurance" organized by ICAR in collaboration with Director Seeds, Punjab Agricultural University, Ludhiana ,PAU, Ludhiana from January, 15-16, 2015
43.	Sh Onkar Singh	Plant Breeder's and Pathologist's Meet of North West, North Central & North Eastern Zones under AICRP on Sugarcane ,PAU Regional Research Station, Gurdaspur (Punjab) held on 6th February, 2015
44.	Sh Onkar Singh	7 days training programme on "Varietal identification, Insect pest and Disease management in Sugarcane" Regional Research Station, Kapurthala during 11.05.2015 to 17.05.2015
45.	Dr Bipen Sharma	National seminar on Sugarcane New Delhi, 15-10-13 to 17-10-13
46.	Dr Pankaj Rathore	National symposium "Crop Improvement for inclusive sustainable development" Nov. 7-9, 2014 at PAU Ludhiana
47.	Dr Pankaj Rathore	All India Coordinated Research Project on Sugarcane Inter-zonal Breeders and Pathologist Meet, Feb. 6-7, 2015 at PAU Regional Research Station, Gurdaspur
48.	Dr Pankaj Rathore	Annual Group meeting, All India Coordinated Cotton Improvement Project, April 8-10, 2015 at TNAU Coimbatore
49.	Dr. Lenika Kashyap	Participated in Plant Breeder's and Pathologist's Meet of North West, North Central & North Eastern Zones under AICRP on Sugarcane Regional Research Station (PAU), Gurdaspur (Punjab) held on 6th February, 2015
50.	**Dr Satnam Singh**	National Symposium on Dryland Farming and Food Security in India from August 30-31, 2014 at RajmataVijayarajeScindiaKrishiVishwavidyalaya, Gwalior, India.
51.	**Dr Satnam Singh**	National Symposium on Crop Improvement for Inclusive Sustainable Development November 7-9, 2014, Punjab Agricultural University, Ludhiana
52.	Dr Sudhir K Mishra	Annual Review Meeting (ARM) of GKMS and FASAL project , 08-12 Nov., 2014 BAU, Ranchi
53.	Dr Sudhir K Mishra	New Dimensions in Agrometeorology for Sustainable Agriculture (NASA) 16 -18 Oct., 2014, GBPUAT., Pantnagar

2015-16		
54.	**Dr. Rajinder Kumar**	National conference on organized by Department of Zoology and Environmental Science in collaboration with Association of Entomologist Punjabi University, Patiala, Punjab (India) during October 29-30, 2015
55.	Dr Sudhir K Mishra	Development of Climatic Risk Management tools in Agriculture using Extended Range Forecast 15-20 Dec., 2015 IIT , Bhubaneswar, Odisha
56.	Dr Sudhir K Mishra	Annual Review Meeting (ARM) of GKMS and FASAL project 23-25 Nov., 2015 , UAS, Dharwad, Karnataka
57.	Dr Sudhir K Mishra	Implications of climate change on pedagogical issues of water resources management. 21 Sep - 11 Oct, 2015 , JAU, Junagadh (Gujarat)
58.	Dr Sudhir K Mishra	Effective Teaching, Research and Extension, 18-28 August, 2015, PAU, Ludhiana
59.	Dr Satnam Singh	Effective Teaching, Research and Extension, 18-28 August, 2015, PAU, Ludhiana
60.	Dr. Rajinder Kumar	Group meeting of All India Coordinated Research Project Sugarcane Sugarcane Research Institute Rajendra Agricultural University, Samastipur (Bihar) during 15-16 December, 2015
61.	Dr Suneet Pandher	Annual Group meeting, All India Coordinated Cotton Improvement Project April 7 to 9, 2016 at NAU Surat
62.	Dr Suneet Pandher	Annual Group Meeting of OPMAS-NCIPM NCIPM, Pusa Campus, New Delhi, 2nd Mar.,2016
63.	Dr. Rajinder Kumar	QRT meeting(Report of 2009-2014) ,ICAR-Indian Institute of Sugarcane Research Lucknow (U.P.)during 25 April, 2016.
64.	Manmohanjit Singh, Vijay Kumar, vivek Sharma, Anil Khokhar, D S Rana, Rakesh Kumar Sharma and K K Sharma	National Workshop on Natural Resource Management for climate resilient agriculture in lower Himalayas. RRS (PAU), Ballowal Saunkhri in collaboration with soil conservation society of India. 22 -23 Dec, 2015
65.	Sh Onkar Singh	5 days training programme on "Varietal identification, Insect pest and Disease management in Sugarcane" sponsored by Sugarfed Punjab. Regional Research Station, Kapurthala during 6-10 September, 2015
66.	Dr Pankaj Rathore	Annual Group meeting, All India Coordinated Cotton Improvement Project, April 7 to 9, 2016 at NAU Surat
67.	Dr Pankaj Rathore	National Symposium on "Future Technologies : Indian Cotton in the Next Decade" December 17-19, 2015 at Acharya Nagrajuna University, Guntur
68.	Sh. Gurpret Singh	Orientation course on "Effective Teaching, Research and Extension" August 18-28, 2015 at College of Home Science, PAU, Ludhiana
69.	Sh. Gurpret Singh	Workshop on sugarcane , October 14, 2015 at Dept. of Plant Breeding & Genetics, PAU, Ludhiana
70.	Sh. Gurpret Singh	Annual Group Meeting, All Indian Coordinated Research Project on Sugarcane, December 15-16, 2015 at RAU, Pusa, Samastipur, Bihar
71.	Sh. Gurpret Singh	Orientation course on "Effective Teaching, Research and Extension" August 18-28, 2015 , PAU, Ludhiana
72.	Sh. Gurpret Singh	Workshop on sugarcane, October 14, 2015 at Dept. of Plant Breeding & Genetics, PAU, Ludhiana

73.	Sh. Gurpret Singh	Annual Group Meeting, All Indian Coordinated Research Project on Sugarcane December 15-16, 2015 at RAU, Pusa, Samastipur, Bihar
74.	Sh. Gurpret Singh	Breeders' meet of All Indian Coordinated Research Project on Sugarcane, January 29, 2016 at E.I.D. Parry, Nellikuppum, T.N.
75.	Dr Ashok Kumar	Orientation course on "IPM in important crops", organized by NCIPM, Hyderabad & ATARI, Zone-1, PAU, Ldh. 20.08.15 to 22.08.15, PAU, Ludhiana
76.	Dr Ashok Kumar	Training programme on "Establishment of mother cultures of different Bio control agents and micorrhiza" 21.04.2016 to 23.04.2016, NIPHM, Hyderabad
2016-17		
77.	Dr Rajinder Kumar	21 days ICAR sponsored training on Biotechnological and Conventional Tools for Biotic and Abiotic Stresses Management in Sugarcane".ICAR-Sugarcane Breeding Institute, Coimbatore from 7th December to 27th December 2016
78.	Dr Ashok Kumar	Orientation course on " Effective Teaching, Research and Extension"27.9.2016 to7.10.2016, PAU, Ludhiana
79.	Dr Ashok Kumar	Training on "Pest surveillance"23.11.2016 to 30.11.2016, NIPHM, Hyderabad
80.	Dr Ashok Kumar	Training of trainers (ToT) for Beekeepers, 06.03.2017 to 08.03.2017, PAU, Ludhiana
81.	Dr Ashok Kumar	2nd capacity building participatory planning workshop for Nodal officers of Unnat Bharat Abhiyan.31.03.2017-03.04.2017 NIRDPR, Hyderabad
82.	Sh Gurpreet Singh	Workshop on Intellectual Property Rights, February 22, 2017 at PAU, Ludhiana
83.	Sh Gurpreet Singh	Annual Convention of North India Sugarcane and Sugar Technologist Association (NISSTA), May 12-13, 2017 at IISR, Lucknow
84.	Sh. Gurpret Singh	Workshop on Intellectual Property Rights, February 22, 2017 at PAU, Ludhiana
85.	Sh. Gurpret Singh	Annual Convention of North India Sugarcane and Sugar Technologist Association (NISSTA), May 12-13, 2017 at IISR, Lucknow
86.	Dr Sudhir K Mishra	Annual Review Meeting (ARM) of GKMS and FASAL project 14 to 17 Dec., 2016 OUAT, Bhubaneswar
87.	Dr Sudhir K Mishra	Annual Convention and Technical Expo-2016 12 - 13 May 2017 ICAR-IISR .Lucknow (UP)
88.	Dr Pankaj Rathore	Brain storming session on "Fifty years of cotton research – lessons learnt and the way forward" Nov. 9-10, 2016 at CICR Regional Station, Coimbatore
89.	Dr Pankaj Rathore	Annual Group meeting, All India Coordinated Cotton Improvement Project, April 8 to 10, 2017 at TNAU Coimbatore
90.		International Conference and Exhibition on "Sugarcane Value Chain Vision 2025 Sugar".Vasantdada Sugar Institute, Pune, Maharashtra (India) during November,13-16 2016.
91.		Annual Convention and Technical Expo of North Indian Sugarcane and sugar Technologist Association".IISR Lucknow, UP, India on 12-13 May, 2017.
92.	Dr Kuldeep Singh	4th International Agronomy Congress "Agronomy for Sustainable Management of Natural Resources, Environment, Energy and Livelihood Security to Achieve Zero Hunger Challenge" November 22-26, 2016 Indian Society of Agronomy at IARI, New Delhi.

93.	Dr Kuldeep Singh	'International Conference & Exhibition' on "Sugarcane Value Chain – Vision 2025 Sugar" November 13-16, 2016, Vasantdada Sugar Institute, Pune, India.
94.	Dr. Gulzar Singh Sanghera	Group meeting of All India Coordinated Research Project Sugarcane VSI, Pune, MH, 17-18 November, 2016.
95.	Dr. Gulzar Singh Sanghera	International Conference on Sugarcane Value Chain: Vision 2025 Sugar VSI, Pune (MH) 13-16, Nov., 2016.
96.	Dr. Gulzar Singh Sanghera	National Symposium on Challenges, Opportunities and Innovative Approaches in Sugarcane: Agriculture, Bio-energy and Climate Change held at UPCSR, Shahajahanpur (UP) on 21-23 Dec., 2016.
97.	Dr. Gulzar Singh Sanghera	National Conference on Recent Advances of *In-Silico* Analysis: Role in Plant Stress Biology , LKC Jalandhar (Pb) on 27-28, Oct., 2016.
98.	Dr. Gulzar Singh Sanghera	Plant Breeder's and Pathologist's Meet of North West, North Central & North Eastern Zones under AICRP on Sugarcane , ICAR-IISR, Lucknow, 23rd January, 2017
99.	Dr. Rupinder Pal Singh	National Symposium on Challenges, Opportunities and Innovative Approaches in Sugarcane: Agriculture, Bio-energy and Climate Change held at UPCSR, Shahajahanpur (UP) on 21-23 Dec., 2016.
100.	**Sh Onkar Singh**	International Conference on Sugarcane Value Chain: Vision 2025 VSI, Pune (Maharashtra) on 13-16, November, 2016.
101.	Sh Onkar Singh	Group meeting of All India Coordinated Research Project Sugarcane VSI, Pune, Maharashtra from 17-18 November, 2016.
102.	**Dr Anuradha**	National Symposium on Challenges, Opportunities and Innovative Approaches in Sugarcane: Agriculture, Bio-energy and Climate Change UPCSR, Shahjahanpur (UP) on 21-23 December, 2016
103.	Dr. Lenika Kashyap	10 days Orientation Course on "Effective Teaching, Research and Extension".P A U 27th September -7th October, 2016.
104.	Dr. Lenika Kashyap	National Symposium on "Challenges, Opportunities and Innovative Approaches in Sugarcane: Agriculture, Bio-energy and Climate Change". UPCSR, Shahjahanpur (UP) on 21-23 December, 2016.
105.	Dr Suneet Pandher	Annual Group meeting, All India Coordinated Cotton Improvement Project April 8 to 10, 2017 at TNAU Coimbatore
106.	Dr Harish Kumar	Annual Group meeting, All India Coordinated Cotton Improvement Project, 8-10 April, 2017 TNAU, Coimbatore.
107.	Dr Harish Kumar	Annual Group meeting, All India Coordinated Cotton Improvement Project, 8-10 April, 2017 TNAU, Coimbatore.
108.	Dr Vikrant Singh	International conference and exhibition on "sugarcane value chain – Vision 2025 Sugar" November 13-16, 2016 at Vasantdada Sugar Institute, Pune
109.	Dr Vikrant Singh	Annual Group Meeting of All India Coordinated Research Project on Sugarcane November 17-18, 2016 at Vasantdada Sugar Institute, Pune
110.	Dr Vikrant Singh	Annual Convention-2017 of North Indian Sugarcane and Sugar Technologists Association (NISSTA),May 12–13, 2017 at IISR, Lucknow
111.	Dr Vikrant Singh	Zonal Breeders Meet of North West, North Central, North East and East Coast Zones of AICRP on Sugarcane,23rd January, 2017 at Indian Institute of Sugarcane Research, Lucknow
2017-18		
112.	Dr. Gulzar Singh Sanghera	National Conference on 'Improving Income of Farmers through Agriculture and Aquaculture' ICAR-CIFA, Bhubaneshwar, Odisha from 5-7 Jan. 2018

113.	Dr Harish Kumar	3rd International Conference on "Plant Genetics & Genomics".July 20-21, 2017 at Chandigarh
114.	Dr Harish Kumar	International symposia on "Curbing whitefly-plant virus pandemics – the departure from pesticides to genomics solutions".5th& 6th Dec.2017 at PAU, Ludhiana
115.	Dr Harish Kumar	International Congress on "cotton and other fiber crops".20-23 Feb, 2018 at ICAR Research Complex for NEH Region, Umiam, Meghalaya
116.	Dr Harish Kumar	Annual Group meeting, All India Coordinated Cotton Improvement Project, 09-10 April, 2018 at HAU, Hisar
117.	Dr Harish Kumar	Workshop on "Digitalization of Field Books" 15th March, 2018 at PAU, Ludhiana
118.	Sh Gurpreet Singh	Workshop on "Digitalization of Field Books" 15th March, 2018 at PAU, Ludhiana
119.	Sh Gurpreet Singh	Indo-US symposium "Curbing whitefy-plant virus pandemics: departure from pesticides to genomics solution", December 4-5, 2017 PAU, Ludhiana
120.	Sh Gurpreet Singh	Annual Group Meeting, All India Coordinated Cotton Improvement Project, April 9-10, 2018 at HAU, Hisar
121.	Dr Harish Kumar	3rd International Conference on "Plant Genetics & Genomics". July 20-21, 2017 at Chandigarh
122.	Dr Harish Kumar	International symposia on "Curbing whitefly-plant virus pandemics – the departure from pesticides to genomics solutions". 5th& 6th Dec.2017 at PAU, Ludhiana
123.	Dr Harish Kumar	International Congress on "cotton and other fiber crops".20-23 Feb, 2018 at ICAR Research Complex for NEH Region, Umiam, Meghalaya
124.	Dr Harish Kumar	Annual Group meeting, All India Coordinated Cotton Improvement Project, 09-10 April, 2018 at HAU, Hisar
125.	Dr Harish Kumar	Workshop on "Digitalization of Field Books" 15th March, 2018 at PAU, Ludhiana
126.	Dr Harish Kumar	ICAR Short-course on "Phenomics, the next generation phenotyping (NGP), the trait dissection and crop improvement" 22-31 October, 2018, Department of plant physiology, ICAR-IARI, New Delhi
127.	Dr Sudhir K Mishra	Annual Review Meeting (ARM) of GKMS and FASAL project, 15-18 Nov. 2017 IGKV, Raipur
128.	Dr Sudhir K Mishra	CAFT training on 'Computational and Statistical Advances for Analysis of Biological Data in Agriculture 24 Mar - 13 Apr 2018 ICAR- IASRI, New Delhi
129.	Dr Suneet Pandher	Annual Group meeting, All India Coordinated Cotton Improvement Project April 9 to 10, 2018 at HAU Hisar
130.	Dr Suneet Pandher	7th Asian Cotton Research & Development Network Meeting at Nagpur ISCI, Mumbai, ICAC, Washington, USA, CICR, Nagpur ;15th-17th September 2017
131.	Sh Gurpreet Singh	CAFT training "Advanced Statistical Techniques in Biometrics" August 10-30, 2017 at ICAR-IASRI, New Delhi
132.	Sh Gurpreet Singh	Indo-US symposium "Curbing whitefy-plant virus pandemics: departure from pesticides to genomics solution" December 4-5, 2017 PAU, Ludhiana
133.	Sh Gurpreet Singh	Annual Group Meeting, All India Coordinated Cotton Improvement Project, April 9-10, 2018 at HAU, Hisar
134.	Dr Suneet Pandher	Indo-US symposium "Curbing Whitefly-Plant Virus Pandemics: Departure from Pesticides to Genomics Solutions" December 4-5, 2017 at PAU Ludhiana

135.	Dr. Lenika Kashyap	Annual Group meeting, All India Coordinated Cotton Improvement Project April 9 to 10, 2018 at HAU Hisar
136.	**Dr. Rajan Bhatt**	National seminar entitled "Water and Soil Management Approaches for Climate Smart Agriculture" Department of Soil Science and Agricultural Chemistry, Banaras Hindu University, Varanasi from 23-03-2018 to 24-02-2018 (2 days)
137.	**Dr. Rajan Bhatt**	CAFT training entitled, "Recent trends in sustainable management of soil health for doubling the farmer's income" Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pardesh, India from 18-09-18 to 08-10-18 (21 days)
138.	Dr Anuradha	Annual Convention and Technical Expo organized by North "Indian Sugarcane and sugar Technologist Association" in collaboration with ICAR-Indian Institute of Sugarcane Research, Lucknow and Punjab Agricultural University, Ludhiana 24-25 May, 2018.
139.	Dr. Paramjit Singh	International Symposium on Sugarcane Research since Co 205: 100 years. ICAR-Sugarcane Breeding Institute, Coimbatore, during 18-21, September 2017
140.	Dr. Paramjit Singh	Group meeting of All India Coordinated Research Project Sugarcane. Tamil Nadu Agricultural University, Coimbatore during 22-23, September, 2017.
141.	Dr. Gulzar Singh Sanghera	Annual Convention & Asian Conclave of Sugar Miller Vision-2022, organized by NISSTA, Lucknow NITTER, Chandigarh May 24-25, 2018.
142.	Dr. Gulzar Singh Sanghera	Group meeting of All India Coordinated Research Project Sugarcane TNAU, Coimbatore 22-23 Sept. 2017.
143.	Dr. Gulzar Singh Sanghera	International symposium on 'Sugarcane research since Co 205:100 years and beyond (Sucrosym 2017)' SBI, Coimbatore Sept. 18-21, 2017.
144.	Dr. Gulzar Singh Sanghera	Zonal Plant Breeder's Meet of North West, North Central & North Eastern Zones under AICRP on Sugarcane ICAR-IISR, Lucknow, 19 January, 2018
145.	Dr Rajinder Kumar	10 days ICAR sponsored training on "Modern Genomic Tools and Breeding Strategies for Biotic and Abiotic Stress Management in Sugarcane" ICAR-Indian Institute of Sugarcane Research, Lucknow from 25th October to 5th November 2017
146.	Dr Rajinder Kumar	5 days training on "Pesticide Application Techniques and Safety Measures".National Institute of Plant Health Management, Hyderabad 15-19th January, 2018
147.	Dr Rajinder Kumar	International Symposium on Sugarcane Research since Co 205: 100 years. ICAR-Sugarcane Breeding Institute, Coimbatore, during 18-21, September 2017
148.	Dr Rajinder Kumar	Group meeting of All India Coordinated Research Project Sugarcane. Tamil Nadu Agricultural University, Coimbatore during 22-23, September, 2017.
149.	Dr Rajinder Kumar	Annual Convention and Technical Expo organized by North "Indian Sugarcane and sugar Technologist Association" in collaboration with ICAR-Indian Institute of Sugarcane Research, Lucknow and Punjab Agricultural University, Ludhiana. Chandigarh, during 24-25 May, 2018.
150.	Sh Onkar Singh	Group meeting of All India Coordinated Research Project Sugarcane TNAU, Coimbatore from 22-23 September, 2017
151.	**Sh Onkar Singh**	International symposium on 'Sugarcane research since Co 205:100 years and beyond (Sucrosym 2017)' SBI, Coimbatore from Sept. 18-21, 2017

152.	Sh Onkar Singh	National Agronomy congress on "Redesigning agronomy for nature conservation and economic empowerment" G.B Pant University of Agriculture & Technology, Pant Nagar, Uttarakhand from 20-22 February, 2018.
153.	Dr Ashok Kumar	ICAR sponsored 21 days (CAFT) training course on " Adoption Technological Advances to minimize pre and post harvest losses in Agricultural and Horticultural crops to enhance Farmers' income 22.11.2017 to 02.12.2017, GBPUAT, Pant nagar, Uttrakhand
154.	Dr Ashok Kumar	Training on "Production protocol for bio control agents, quality analysis and quality management of microbial bio-pesticides and bio fertilizers" 07.06.18 to 27.06.2018, NIPHM, Hyderabad
155.	Dr Ashok Kumar	ISMPP International Conference on Plant health for human welfare.01.11.17 to 04.11.2017 University of Rajasthan, Jaipur
156.	Dr Ashok Kumar	Orientation workshop on Unnat Bharat Abhiyan, 24.04.2018 , AICTE, New Delhi
157.	Dr Vikrant Singh	International Symposium on Sugarcane Research since Co 205: 100 Years and Beyond (SucroSym-2017), September 18-21, 2017at Sugarcane Breeding Institute, Coimbatore
158.	Dr Vikrant Singh	Annual Workshop of All India Coordinated Research Project on Sugarcane , September 22-23, 2017at Tamil Nadu Agricultural University, Coimbatore
159.	Dr Vikrant Singh	"Orientation course on effective teaching, research and extension" November 07-17, 2017 at College of Home Science, PAU, Ludhiana
160.	Dr Vikrant Singh	Zonal Breeders Meet of North West, North Central, North East and East Coast Zones of AICRP on Sugarcane, 19th January, 2018at Indian Institute of Sugarcane Research, Lucknow
161.	Anil Khokhar	2nd*Himachal Pradesh Science Congress*, November 20-21, 2017., Shimla, H.P.
162.	K.K. Sharma	3rd National Convention: Agrivision 2018 under the theme 'Resource Conservation for Sustainable Agriculture and Food Security' 24th – 25th March, 2018 at National Agriculture Science Complex, ICAR, Pusa , New Delhi
163.	ParkashMahala	2nd National Agricultural Convention on Agricultural Skill Development for Doubling Farmers Income (ASDDFI-2017), Rajasthan University of Veterinary and Animal Sciences, Bikaner (Rajasthan) Rajasthan on 7th October 2017.
164.	ParkashMahala	2ndNational Agricultural Convention on ASDDFI-2017 at RAJUVAS, Bikaner, AIASA- Rajasthan
165.	BalkrishanSopanBhople	2nd Himachal Pradesh Science Congress, Shimla, Himachal Pradesh, on 20th-21st November 2017
166.	BalkrishanSopanBhople	21st Punjab Science Congress, PAU, Ludhiana (Punjab) on February 7th -9th February, 2018.
167.	AbrarYousuf	26th National Conference on Natural Resource Management for Climate Smart Sustainable Agriculture, Barapani, Meghalaya, 11-13 September 2017

Trainings Attended:

Sr. No.	Name of the participant	Title of the training	Date	Venue
1.	Satvinder Singh	5 day training on "Recharge cum Drainage Pits and NalaBunding"	10-14 Jan 2014	Yavatmal and Wardha, Maharshtra.
2.	Vijay Kumar	11 day "Orientation course on effective teaching, research and Extension"	20 – 30th August, 2013	Department of Home Science, extension & Communication Management, College of Home Science, Punjab Agricultural University, Ludhiana.
3.	Anil Khokhar	"Adaptation and mitigation strategies for climate resilient agriculture"	22-31 October, 2013,	CRIDA, Hyderabad.
4.	Vijay Kumar	"Breeding by Design"	7- 27th August, 2014	CAFT (Plant Breeding), Department of Plant Breeding & Genetics, Punjab Agricultural University, Ludhiana.
5.	Anil Khokhar	"Orientation course on effective teaching, research and Extension"	25th July – 5th August, 2014	Department of Home Science, extension & Communication Management, College of Home Science, Punjab Agricultural University, Ludhiana.
6.	Yogesh Khokhar	Hi-tech interventions on fruit production for enhancing productivity, nutritional quality and value addition	05-25, Nov., 2014	CIAH, Bikaner, Rajasthan
7.	Vivek Sharma	Effective Teaching, Research and Extension	26.08.2014 to 05.09.2014.	Department of Home Science Extension & Communication Management, College of Home Science, PAU, Ludhiana
8.	Vivek Sharma	21 days winter school on "Waste Recycling and Resource Management through Rapid Composting Techniques"	3-23rd December, 2014	ICAR-Indian Institute of Soil Science, Bhopal
9.	Vivek Sharma	21 days training programme on "Tillage and Nutrient Dynamics for Better Crop Production "	10.10.2015 to 30.10.2015	CAFT/ Department of Agronomy, College of agriculture, G.B. Pant University of Agric. & Tech., Pantnagar.
10.	Anil Khokhar	"Seed Production and quality Assurance"	15-16 January, 2015	PAU Ludhiana
11.	Yogesh Khokhar	Precision citriculture for sustainable production and post harvest management.	15 Oct. – 04 Nov., 2015.	CCRI, Nagpur

12.	Anil Khokhar	Tillage and nutrient dynamics for better crop producton	10.10.2015 to 30.10.2015	CAFT (Agronomy), GB Pant University of Agriculture and Technology, Pantnagar
13.	Vijay Kumar	Advances and accomplishments of innovative resistance breeding techniques in crop improvement	28-01-2016 to 17-02-2016	CAFT (Plant Breeding), Tamil Nadu Agricultural University, Coimbatore
14.	Saresh N.V.	Livelihood and climate change mitigation and adaptation through Agroforestry" organized by, from Livelihood & climate change mitigation &adaptation through agroforestry	21-days summer school 3rd-23rd Aug., 2016	ICAR, CAZRI Jodhpur
15.	Prakash Mahala	Advances in Production Techonology of Commercial Vegetable Crops	21 days training 8th- 28th Nov., 2016	Dr. Y S Parmar University of Horticulture & Forestry Nauni-Solan (HP)
16.	Manmohanjit Singh	Eliminating Hunger and Poverty through S&T Innovation.	3Days 13th -15th Dec., 2016	GLAST 2016
17.	Anil Kumar Khokhar	Ecological Agriculture for sustainability	21-days training 9th Feb.-1st March, 2017	G. B. Pant University of Agric. & Tech., Pantnagar
18.	B. S. Bhople	Ecological Agriculture for sustainability	21-days training 9th Feb.-1st March, 2017	G. B. Pant university of Agric. & Tech., Pantnagar
19.	K. K. Sharma	Adoption of suitable conventional and biotechnological approaches for biotic and abiotic stress management in crops	21-days training 13th Feb-5th March 2017	G. B. Pant university of Agric. & Tech., Pantnagar
20.	Rakesh Kumar	Skill development for sustainable livestick productivity in the genomic era	21-days training 6th- 26th March 2017	RCDR, NDRI, Karnal
21.	Parminder Singh Sandhu	Organic Production Management: Approaches and Practices	11.09.2017 to 01.10.2017	MPUAT, Udaipur (Rajasthan)
22.	Parminder Singh Sandhu	Tools on monitoring evaluation and impact assessment of rainfed agriculture technologies and development programme	01.11.2017 to 10.11.2017	CRIDA, Santhoshnagar, Saidabad (PO) Hyderabad
23.	K. K. Sharma	Adoption of suitable conventional and biotechnological approaches for biotic and abiotic stress management in crops	13/02/2017 to 05/03/2017	G.B. Pant University of Agric. & Tech., Pantnagar, Uttarakhand, India

24.	AbrarYousuf	Modeling and Advances in Micro-Irrigation for Enhancing Crop Water Use Efficiency	5-25 July 2017	SKUAST-Kashmir
25.	K. K. Sharma	"Bio-pesticides for Crop Protection and Improvement: Emerging Technology to Benefit Farmers"	Feb 02, 2018 to Feb 22, 2018	G.B. Pant University of Agriculture and Technology (GBPUAT), Pantnagar, Uttarakhand
26.	Prakash Mahala	Molecular breeding for higher productivity, quality, food colorants, nutraceutical and bioactive health"	February 13 March 5, 2018	Division of Vegetable Science, Indian Agricultural Research Institute, New Delhi
27.	BalkrishanSopanBhople	Protected Cultivation with Special Reference to Soilless Cultivation, Hydroponics and Aeroponics	9th -29th January, 2018	University of Agricultural Sciences, Dharwad (Karnataka), India



COBSH		
List of International Symposia/Conferences/Seminars attended		
Year 2013-2014		
S.No	**Name of the faculty**	
1.	Dr.Jagdish Kaur	English Haiku Canada Meet, 17-19 May, 2014, Canada
Year 2014-2015		
2.	Dr. S. K. Thind	XIII International Conference on Agricultural and Food Engineering, March 9-10, 2015, Miami, USA
3.	Dr Sarabjeet Singh	Bibi Bhani Camp, April 25 – 27, 2015, Victoria, Australia
Year 2016-2017		
4.	Dr. Neena Singla	5th International Symposium on Integrative Zoology, July 25-29, 2016 at Xilinhaote, Inner Mongolia, China
List of National Symposia/Conferences/Seminars attended		
Year 2013-2014		
5.	Dr.Sucheta Sharma & Dr.Manjeet Kaur Sangha	International Conference on "Role of Plant Biochemistry and Biotechnology in Food and Nutritional Security" Dec. 11-14, 2013, Shri Venkateswara University Triputi
6.	Dr (Mrs.) Manpreet Kaur	International Conference on Nanoscience and Technology (ICONSAT 2014), March 3-5, 2014. PU, Chandigarh
7.	Dr Raj Kumar	4th International Grains Conference, Feb 10-11, 2014 at New Delhi
8.	Dr. D K Grover	Bitter Gourd International Conference, Mar 20-21, 2014 ICRISAT, Hyderabad
9.	Dr. M S Sidhu Dr Sukhpal Singh Dr. M S Toor Dr.Sukhdev Singh	International Conference on Rejuvenation of Punjab Economy, Mar 21-23, 2014, Punjabi University, Patiala
10.	Dr G S Romana Dr Gurpreet Kaur Dr Sangeet	International Conference on Crop Productivity & Sustainability: Shaping the Future, Mar 20-21, 2014, Baba Farid College, Bathinda
11.	Dr P Katartia	Global Animal Nutrition Conference: GLANCE 2014, April 20-22, 2014, TajVivanta, Bangalore
12.	Dr PP Sahota	International Workshop on "Water for Health", 11.13 to 8.11.13 at Baba Farid University of Health Sciences, Faridkot
13.	Dr.Gagandeep Banga and Dr. Babita Kumar	National conference on Business Innovation and Management, 1st March, 2014 Ludhiana
14.	Dr. L.M. Kathuria and Dr.KhushdeepDharni	International conference on Research in Marketing (ICRM-2013), 21st-22nd December, 2013, Jamshedpur
15.	Dr.KhushdeepDharni	International conference on Changing Perspectives and Paradigms in Business and Behavioral Sciences, 28th -29th March, 2014, Patiala
16.	Dr D K Kocher	International Conference on Entomology, 21-23 Feb 2014, Punjabi University, Patiala
17.	Dr.Namarta Gupta	Crop Productivity and Sustainability (ICCPS-2014), Mar 20 -21, 2014 BFC, Bathinda
18.	Dr (Mrs.) K KChahal	6th National Seminar onNew Paradigm in Chemical Sciences, Feb. 13, 2014. Punjabi University, Patiala

19.	Dr. Ram Singh Dr. Parminder Kaur Dr. Narinder Pal Singh Dr. B K Sidana Dr.Sangeet	17th Punjab Science Congress, Feb. 14-16, 2014. PTU, Jalandhar
20.	Dr(Mrs.) DivyaUtreja	Professor Ram Chand Paul National Symposium, Feb. 15-16, 2014. PU, Chandigarh
21.	Dr. D.K. Grover	21st Annual Agri. Economics Research Association Conference, Sep 10-12, 2013, SKUAS&T of Kashmir, Srinagar (J&K)
22.	Dr P Kataria	Second National Conference of Indian Academy of Veterinary Nutrition and Animal Welfare, Sep 19-21, 2013, SKUAST, Jammu
23.	. M.S. Toor Dr. M.K. Sekho, Dr. Manjit Kaur Dr. G.S. Romana, Dr. Simran K. Sidhu, Dr. Shalini Sharma	National Seminar on Water and Food Security in India, Nov. 8-9, 2013, Khalsa College, Amritsar
24.	Dr. Parminder Kaur Dr. Arjinder Kaur Dr. B.K. Sidana Dr.Sukhpal Singh	55th Annual Conference of Indian Society of Labour Economics, Dec.16-18, 2013, JawaharLal Nehru University, New Delhi
25.	Dr.Sukhpal Singh	73rd Annual Conference of Indian Society of Agricultural Economics, Dec. 18-20, 2013, NAARM, Hyderabad
26.	Dr. D.K. Grover Dr. G.S. Romana, Dr. J.M. Singh Dr. Sanjay Kumar Dr.JatinderSachdeva	27th National Conference of Agri. Marketing, Dec. 18-20, 2013, Deptt. of Agri. Economics, University of Agri. Sciences, Dharwad
27.	Dr.Simran K Sidhu	XXXIX All India Sociological Conference, Dec 27-29, 2013, Karnataka State Open University, Mysore
28.	Dr Raj Kumar	Rabi workshop under the NAIP project "Establishing & Networking of Agricultural Market Intelligence Centres in India", Jan 02-04, 2014, TNAU, Coimbatore
29.	Dr (Mrs.) Anita Garg and Dr (Mrs.) Anjali Sidhu	17th Punjab Science Congress, Feb 14-16, 2014 , Punjab Technical University, Kapurthala
30.	Mini Goyal Dr P.Kataria Dr M. S. Toor Dr Raj Kumar Dr Jatinder Sachdeva Dr D K Grover Dr Harsimranjeet Kaur Dr G. S. Romana Dr Gurpreet Kaur Dr Parminder Kaur Dr Arjinder Kaur Dr Baljinder Kaur Dr J M Singh Dr Sangeet Ms. Amarpreet Kaur Dr Shruti Bhogal Ms Lovejeet Kaur	National Seminar on the Role of Punjab Mandi Board in Rural Development, Mar 3, 2014, PAU, Ludhiana



31.	Dr.SeemaGarcha	4th Biennial Conference of Gastrointestinal Infection Society of India (GISICON 2014), April 11-12, 2014, Chandigarh
32.	Dr (Mrs) ParveenBala	28th National Symposium on Plasma Science and Technology, Dec. 3-6, 2013,Bhubaneswar
33.	Dr (Mrs) ParveenBala	National Symposium on Emerging Trends in Physics for Ionizing Radiations Aerosols and Material Science (ETPRAM-13), Dec. 13-14, 2013, Patiala
34.	Dr Rajeev Kumar	Nanotechnology for Agricultural Research, July 8-9, 2013, Ludhiana
35.	Dr Rajeev Kumar	National Conference onEmerging Horizons in Science, Jan. 17-18, 2014, Faterhgarh Sahib
36.	Dr Rajeev Kumar	Contemporary trend in High Energy Physics and Instrumentation, March 10-11, 2014, Chandigarh
37.	Dr.Gagandeep Banga and Dr. Babita Kumar	National conference on Business Innovation and Management, March 1, 2014, Ludhiana
38.	Dr Rajeev Kumar	Unification and Cosmology after Higgs Discovery, May 13-15, 2014, Chandigarh
39.	Dr.Gagandeep Banga and Dr. Babita Kumar	National conference on Problems and Challenges of MSMEs, March 27-28, 2014, Patiala
40.	Dr. L.M. Kathuria	National Seminar on Problems and Challenges of Micro, Small and Medium Enterprises, Punjabi University, Patiala, March 21-22, 2014, Patiala
	Dr.Sukhmani	National seminar on Role of Mandi Board in Rural Development's -ApniMandi's: A Study of Ludhiana City, March 3, 2014
Year 2014-2015		
41.	Dr.Jagdish Kaur	World Punjabi Conference-2015, June 14, 2015
42.	Dr.Jagdish Kaur	2nd Canadian Punjabi Conference-2015, June21, 2015
43.	Dr HS Sodhi Dr S Kapoor	8th International Conference on Mushroom Biology and Mushroom Products, NASC, N. Delhi, Nov. 19-22, 2014
44.	Dr SeemaGarcha	International Conference on Emerging Trends in Biotechnology and XIth Convention of BRSI, Nov 06-09, 2014, Biotechnology Research Society of India BRSI and JNU, New Delhi
45.	Dr M Gangwar	International Sci. Congress, Dec. 08-09, 2014, Pacific Univ., Udaipur
46.	Dr.Jagdish Kaur Dr.SheetalThapar Sumedha Bhandari Dr Sarabjeet Singh Dr AshooToor	3rd All India Conference on Linguistics and Folklore (Theme: Emerging Trends in Linguistics and Folklore) in association with Punjabi Linguistics Punjabi Association, Patiala on May 28-29, 2015
47.	Dr SheetalThapar	National Seminar on 'Social Computing Phenomenon and its Implications', April 18, 2015, GGNIMT, Ludhiana
48.	Sumedha Bhandari	National Seminar on "Challenges before Indian Education System and Solutions and redraft of National Education Policy Commission", August 03, 2014, ShikshaSanskritiUthanNyas, Punjab.
49.	Sumedha Bhandari	11th International Business Conference, Nov. 07-08,2014, Multani Mal Modi College, Patiala.
50.	Dr Sarabjeet Singh	All India Media Educators Conference, April 2-4,2015, April 2-4,2015
51.	Dr AshooToor	International Seminar on Literature in the Emerging Contexts of Technology and Culture, March 25-27, 2015, Punjabi University, Patiala
52.	Dr AshooToor	National Seminar on Literature in the Emerging Contexts of Technology and Culture), February 25-26, 2015, Punjabi University, Patiala

53.	Dr.Jagmeet Kaur Dr.Nirmaljit Kaur Dr.NavitaGhai	Current Trends in Plant Sciences with special Reference to Phycology and Mycology, Oct 28-29, 2014, Oct 28-29, 2014
54.	Dr.SeemaBedi Dr.Nirmaljit Kaur	Crop Improvement for Inclusive Sustainable Development, Nov 7-9, 2014, PAU, Ludhiana
55.	Dr.Nirmaljit Kaur Dr.ShaliniJhanji	Sustainable solutions for access to safe water: promoting Innovation and Collaboration, Jan 22-23, 2015, PAU, Ludhiana
56.	Dr. S. K. Thind Dr.Nirmaljit Kaur	XII Agricultural Science Congress, Feb 3-6, 2015, ICAR-NDRI, Karnal
57.	Dr (Mrs) K KChahal Dr (Mrs) Anita Garg	18th Punjab Science Congress, February 7-9, 2015, DeshBhagat University, MandiGobindgarh
58.	Dr (Mrs) K KChahal	National symposium on Agrochemicals for food and environment safety, January 28-30, 2015 IARI, New Delhi
59.	Dr Tejdeep Kaur Dr Manoj Kumar Dr Rajwinder Singh Dr Navdeep Kaur	18th Punjab Science Congress, February 7-9, 2015, DeshBhagat University, MandiGobindgarh
60.	Dr (Mrs) Manpreet Kaur	National conference on Advanced materials and Radiation Physics, March 13-14, 2015, SLIET Longowal, Sangrur
61.	Dr Rajiv Kumar	XXI DAE BRNS High Energy Physics Symposium, Dec 8-12, 2014, DAE-IIT Guwahati
62.		29th National Annual Convention of IAPT 3rd Belle Analysis Workshop 2015, Oct 10-12, 2014, IAPT & GGS Khalsa College IIT Madras
63.	Dr PriyaKatyal	Afro-Asian Congress on Microbes for human and Environment health, Sept 29, 2014 to Oct 01, 2014, Amity University, Noida
64.	Dr GS Kocher	National conference on microbiology, Oct 02-04, 2014, RR College, Kolhapur, Maharashtra
65.	Dr PP Sahota Dr HS Sodhi Dr PriyaKatyal Dr SK Gosal Dr M Gangwar	National symposium on crop improvement for inclusive sustainable development, Nov. 07-09, 2014PAU, Ludhiana
66.	SeemaGarcha	Annual Convention of BRSI, Dec 4-7, 2014, JawaharLal Nehru University, New Delhi
67.	Dr PriyaKatyal Dr SeemaGarcha	5th Agriculture Science Congress, Feb 05-08, 2015, NDRI, Karnal
68.	Dr SK Gosal	18th Punjab Sci. Congress, Feb 07-09, 2015, DeshBhagat University, Gobindgarh
69.	Dr D.K.Kocher	7th National Conference on Recent Advances in Chemical, Biological and Environmental Sciences, Jan 30-31, 2015, M. M. Modi College, Patiala
70.	Dr Tejdeep Kaur Dr Manoj Kumar	Geospatial Technology in Natural Resource Management, March 17-18, 2015, Indian Society of Remote Sensing, Ludhiana
Year 2015-2016		
71.	Dr D.K.Kocher	4th Insect Science Congress, April 16-17, 2015, PAU, Ludhiana
72.	Dr SheetalThapar	International Conference on 'Communication for Social Change and Development: Imperatives and Constraints', Sept 18-19, 2015, H.P. University, Shimla
73.	Dr AshooToor	UGC sponsored International Seminar on Diaspora and Development: Emerging Multidisciplinary Dynamics of Indian/Punjabi Migration, Feb 25, 2016, Punjabi University, Patiala

74.	Dr AshooToor	CDC sponsored National Seminar (Sustainability and Development), Feb. 13, 2016, Swami PremanandMahavidyalaya, Mukerian, Hoshiarpur, SCD Government College, Ludhiana
75.	Dr SeemaBedi	Management development Programme on 'Strategies for enhancing the performance of research managers of PAU' organized by NAARM Hyderabad, Apr 26-30, 2016, PAU Ludhiana
76.	Dr (Mrs) K KChahal	International Conference 2016 on Natural Resource Management: Ecological Perspectives, Feb 18-20, 2016, Sher-e-Kashmir University of Agricultural Sciences and Technology, Jammu
77.	Dr.Sukhdev Singh	International conference on "systems of innovation for inclusive agriculture and rural development", July 28-29, 2015, Department of Economics & Sociology, PAU, Ludhiana
78.	Dr.Sukhdev Singh	Seminar on "Issues of Farmers Rural Sector", Nov 15, 2015, Institute of Sikh Studies, Chandigarh
79.	Dr.JatinderSachdeva Dr Baljinder Kaur Sidana	National workshop of Cost of Cultivation Scheme, October 14-16, 2015, OUAT, Bhubneshwar
80.	Dr.Sukhpal Singh Dr.VeenaGoel Dr.PoonamKataria Dr. D.K. Grover Dr.Sukhdev Singh Dr. V.K. Sharma Dr. Mini Goyal Dr Ram Singh Dr. G.S. Romana Dr. M.K. Sekhon Dr.ManjeetKaur Dr.Jitender Mohan Singh Dr.ParminderKaur Dr Sanjay Kumar Dr.ArjinderKaur Dr.Simran Kang Sidhu Dr.Shalini Sharma Dr.Jasdev Singh Dr. Raj Kumar Dr. H.S. Kingra Dr.JatinderSachdeva DrBaljinderKaurSidana Dr.Sangeet Dr.Narinderpal Singh Dr.GurpreetKaur	75th Annual Conference of the Indian Society of Agricultural Economics, November 19-21, 2015, Department of Economics & Sociology, PAU, Ludhiana
81.	Dr.Sukhpal Singh	National Seminar on Rural Credit and Financial Penetration in Punjab, March 21-22, 2016, Centre for Research in Rural & Industrial Development, Chandigarh
82.	DrPratibhaGoyal DrGagandeepBanga DrBabita Kumar	75th Annual Conference of the Indian Society of Agricultural Economics, Nov. 19-21, 2015, Indian Society of Agricultural Economics, Mumbai and Deptt of Economics & Sociology, PAU
83.	Dr ParveenBala	30th National Symposium on Plasma Science & Technology (PLASMA-2015), Dec. 1-4, 2015, Plasma Science Society of India, Saha Institute of Nuclear Physics, Kolkata
84.	Dr PratibhaGoyal	UGC sponsored National Seminar on entrepreneurship: The Road Ahead, March 8-9, 2016, Punjabi University, Patiala

85.	Dr. (Mrs.) Param Pal Sahota, Dr SK Gosal Dr M. Gangawar	Research and Extension specialist workshop for Rabi crops, August 27-28, 2015, PAU, Ludhiana
86.	Dr.SeemaGarcha and Dr.PriyaKatyal	56th Annual Convention of Association of Microbiologists of India, Dec 7-10, 2015, AMI at JNU, New Delhi
87.	Dr. S K Gosal and Dr.GSKocher	19th Punjab Science Congress, Feb 7-9, 2016, SUS, college Tangori
88.	Dr. D. K. Kocher	National Conference on Entomology, Oct. 29-30, 2015, Punjabi University, Patiala
89.	Dr. Manoj Kumar Dr.NishaVashishat	3rd International conference on Sustainable development through green initiative, Mar. 1-2, 2016, Sri Guru Granth Sahib World University, Fatehgarh Sahib
Year 2016-2017		
90.	Dr.Sukhpal Singh	Seminar on Farmers' Distress, May 27, 2016, Punjabi University, Patiala
91.	Sukhpal Singh Dr.VeenaGoel Dr.PoonamKataria Dr. D.K. Grover Dr.Sukhdev Singh Dr. V.K. Sharma Dr. Mini Goyal Dr. M.K. Sekhon Dr.ManjeetKaur Dr.Jitender Mohan Singh Dr.ParminderKaur Dr Sanjay Kumar Dr.ArjinderKaur Dr.Simran Kang Sidhu Dr.Shalini Sharma Dr.Jasdev Singh Dr. Raj Kumar Dr. H.S. Kingra Dr.JatinderSachdeva DrBaljinderKaurSidana Dr.Sangeet Dr.GurpreetKaur	3rd National Seminar on Market Imperfections, Farmers' Distress and Agrarian Crisis in India, April 7, 2016
92.	Dr. S.S. Hundal, Dr. K S Khera Dr G K Sehgal Dr.Tejdeep Kaur Dr.NeenaSingla Dr. D. K. Kocher Dr. B K Babbar Dr. Manoj Kumar Dr.NishaVashishat	One Day Dr S SGuraya Memorial Seminar on Recent Advances in Reproduction, Oct 12, 2016 Department of Zoology PAU, Ludhiana
93.	Dr. S. K. Upppal Dr Manpreet Kaur	National Conference on Nascent Innovations in Chemical Sciences (NICS-16), Oct 21-22, 2016, Sangrur
94.	Dr SeemaBedi Dr Nirmaljit Kaur Dr Rajni Sharma Dr NavitaGhai	National Conference on 'Basic & Applied Researchers in Plants & Microbes, Nov 3-5, 2016, Punjabi University, Patiala, Punjab



95.	Dr. (Mrs.) S.K Gosal	International Conference on the theme "He foe She: A Solidatry Movement for Gender Equality", Nov 16 -17, 2016, Punjabi University, Patiala
96.	Dr.Jitender Mohan Singh	Agro-tech, 2016, Nov 22,2016, Chandigarh
97.	Dr. Rajeev Kumar Sharma	National Conference on Research Trends in Physics and Electronics, Nov 25-26, 2016 SGGS Khalsa College, Mahilpur
98.	Dr D K Kocher	International Conference on Entomology, Dec 3-5, 2016, Punjabi University, Patiala
99.	Dr. Rajeev Kumar Sharma	XXII DAE-BRSN High Energy Physics Symposium, Dec 12-17, 2016, University of Delhi, New Delhi
100.	Dr. B Baljinder Kaur Sidana	24th Annual AERA conference, Dec 15-17, 2016, AERA, ICAR- Indian Veterinary Research Institute, Izatnagar, U.P.
101.	Dr.Sukhpal Singh	Punjab Vikas Conference, Jan 18, 2017, Punjabi University, Patiala
102.	Dr.Jitender Mohan Singh	National Seminar on crop insurance on the theme 'Derisking Indian Agriculture: Crop Insurance Way' Feb 1, 2017, Kurukshetra University, Kurukshetra
103.	Dr S Kapoor	"20th Punjab Science Congress, Feb 7-9, 2017, IET, Bhadal
104.	Dr.NeenaSingla	National Symposium on "Drug Development through Natural Products", Feb 11, 2017 Maharaja Agrasen University, Baddi, Solan, HP
105.	Dr PriyaKatyal	International Conference on Emerging Areas in Environmental Science and Engineering, Feb 16-18, 2017, Guru Jambeshwar University, Hisar
106.	Dr.Manjeet Kaur	National Seminar on Agricultural and Rural Diversification in Punjab, Feb 17-18, 2017, Punjab School of Economics, Guru Nanak Dev University, Amritsar
107.	Dr S Kapoor	National Conference on Recent Advances in Microbial Biotechnology: Application in Industry and Society", Feb 24, 2017, Lyallpur Khalsa College, Jalandhar
108.	Dr P P Sahota	Bacteriological Food Testing Kit: A combined biochemical approach to assess the microbiological quality of food" at "National Conference on Recent Advances in Microbial Biotechnology: Application in Industry and Society"., Feb 24, 2017, Lyallpur Khalsa College, Jalandhar
109.	Dr. Anjali	Prof. Ram Chand Paul National Symposium on Current Advances in Chemical Sciences, Feb 24-25, 2017, Punjab University Chandigarh
110.	Dr. S.S. Sidhu Dr. I.S. Grewal Dr. G.S. Walia	19th Annual Conference of Society of Statistics, Computer & Applications on Statistics and Informatics in Agricultural and Allied Sciences, March 6-8, 2017, SKUAST, Jammu
111.	Dr AshooToor	National Seminar on "Travel Writing as Literature and History". Title of Paper presented: "*Reading Gita Mehta's A Travel Sutra as a Travel Narrative*"., March 23-24, 2017, Department of English, Punjabi University, Patiala

Year 2017-2018		
112.	Sukhpal Singh Dr.PoonamKatariaDr. D.K. Grover Dr.Sukhdev Singh Dr. V.K. Sharma Dr. Mini Goyal Dr. G.S. Romana Dr. M.K. Sekhon Dr.Manjeet Kaur Dr.Parminder Kaur Dr. Sanjay Kumar Dr.Arjinder Kaur Dr.Simran Kang Sidhu Dr.Shalini Sharma Dr. Raj Kumar Dr. H.S. Kingra Dr.JatindererSachdeva Dr.Baljinder Kaur Sidana Dr.SangeetRanguwal	4th National Seminar on Doubling Indian Farmers' Income by 2020: Opportunities and Challenges, April 7, 2017, Society of Economics and Development
113.	Dr.Baljinder Kaur Sidana	National Conference on Sustainable Development Goals: Indiania's preparedness and role of agriculture, May11-12, 2017, TAAS-IFPRI-ICAR
114.	DrPoonamKataria	Ninth Asian Buffalo Congress on the Theme, "Climate resilient buffalo production for sustainable livelihood." 1st to 4th February, 2018, Central Institute for Research on Buffalo, Hisar
115.	Dr Sukhdev Singh	Arthita, Kisani ate Khudkushian at 6th Punjabi Conference, March 10-11, 2018, World Punjabi Conference, Chandigarh
116.	DrArjinder Kaur	National Conference on Agro-Economic Research, 30-31st January, 2018, Agro-Economic Research Centre/Units and Ministry of Agriculture and Farmers' Welfare at institute of Economic Growth (IEG), Delhi
117.	DrJitender Mohan Singh	National Conference on Agro-Economic Research, 30-31st January, 2018, Agro-Economic Research Centre/Units and Ministry of Agriculture and Farmers' Welfare at institute of Economic Growth (IEG), Delhi
118.	DrShalini Sharma	National Seminar on ' policy & Technological options for doubling of Farmers' Income at CRRID, Chandigarh, March 22-23, 2018
119.	DrJasdev Singh	National Seminar on 'planning workshop of Network Projects of NIAP', August 30-31, 2017, ICAR-National Institute of Agricultural Economics and Policy Research, New Delhi
120.	DrSangeetRanguwal	Golden Jubilee National Seminar on Promotion of skills and technologies for sustainable development in India, August 31-September 1, 2017, NITTR, Chandigarh
121.	DrSangeetRanguwal	National Seminar on Agribusiness potential of Punjab State, September 14-15, 2017, Centre of Research in Rural and Industrial Development (CRRID), Chandigarh and Indian Society of Agricultural Marketing (ISAM), Hyderabad
122.	DrSheetalThapar DrAshooToor MrsSumedha Bhandari	International Conference on "Immigrant Literature" January 16-17 2018. GGN Khalsa College, Ludhiana
123.	DrSheetalThapar	6th World Punjabi Conference on "Punjabiyat: Vartmaan ate Bhavikh", March 10-11 2018 Panjab University, Chandigarh
124.	DrAshooToor	International Multistream Conference on "Research and Society" October 29 2017, GGN Institute of Management and Technology

125.	Dr AshooToor	National Seminar on "Gender Equality and Women Empowerment", January 13 2018, Gobindgarh Public College, Alour, Khanna
126.	DrAshooToor	National Seminar on "Towards Inclusive Growth Through Women Empowerment- An Economic and Psycho-Social Perspective", January 25, 2018, Khalsa College for Women, Ludhiana
127.	Dr AshooToor	International Conference on "Contemporary Issues in Social Sciences" February 02, 2018, Hans Raj Mahavidyala, Jalandhar
128.	Dr AshooToor	National Seminar on "Feminist Approach in Indian Society" February 03, 2018, Mata Ganga Khalsa College, Kotan
129.	Dr AshooToor	National Seminar on "The Treatment of Gender, Race & Class in English Literature" April 08, 2018, Hans Raj Mahavidyala, Jalandhar
130.	DrPriyaKatyal	58th AMI, LucknowNovember 16-19, 2017, Baba SahebBhimraoAmbedkar University. Lucknow, UP
131.	Dr PriyaKatyal	National Conference on promoting entrepreneurial growth through innovative approaches in food processing sector, March 16-17, 2018, CIPHET, Ludhiana
132.	Dr. S SHundal, Dr. K S Khera Dr G K Sehgal Dr.Tejdeep Kaur Dr.NeenaSingla Dr. D. K. Kocher Dr J K Kondal Dr. B K Babbar Dr. Manoj Kumar Dr.NishaVashishat DrRajwinder Singh DrNavdeep Kaur	2 day National Seminar on Reproductive Health Advances for Adolescents in September 7-8, 2017
133.	Dr.Paramjit Singh	National Symposium on Innovations in Horticulture: Production to Consumption. Held at G.B.Pant University of Agriculture and Technology, Pantnagar, Sep14-15, 2017.
134.	Mr.Harmandeep Singh	International Conference on Science and Technology: Trends and Challenges, Apr 16-17, 2018, Gujranwala Guru Nanak Khalsa College, Ludhiana
135.	Dr KhushdeepDharni	National Conference on "Promoting Entrepreneurial Growth through innovative Approaches in Food Processing Secto, March 16-17, 2018, Ludhiana
136.	Dr. D.K. Grover Dr V. K. Sharama Dr. Mini Goyal Dr. G.S. Romana DrManjeet Kaur Dr.Jitender Mohan Singh DrParminder Kaur Dr Sanjay Kumar DrArjinder Kaur DrSimarn Kang DrShalini Sharma DrJasdev Singh Dr Raj Kumar Dr H.S. Kingra DrJatinderSachdeva Dr.Baljinder Kaur	National Seminar on "Towards Sustainable Agriculture: Role at Technology, Policy Planning and implementation",5th April, 2018 at PAMETI, PAU, Ludhiana

137.	Dr PoonamKataria	Workshop on 'Crop Insurance Experience of Haryana and relevance to Punjab, '16th May, 2018, Punjab State Farmers' Commission, Mohali
138.	Dr.Param Pal Sahota	Energy recovery from Municipal Solid Waste: Challenges in Developing Countries" (In: Regional Conference Environment Law Auditorium, Panjab University, Chandigarh), April 22, 2018, Law Auditorium, Panjab University, Chandigarh
139.	Dr HS Sodhi Dr S Kapoor DrPriyaKatyal DrSeemaGarcha DrKeshani DrShivani Sharma	Food convention-Conference on trends, challenges and opportunities in Agro and food processing industry in Punjab, May 16, 2018, PAU, Ludhiana
140.	Dr.Babita Kumar	5th National Seminar on "Towards Sustainable Agriculture : Role of Technology, Policy, Planning and Implementation, April 5, 2018, PAU, Ludhiana
List of National Workshops/meetings attended		
Year 2013-2014		
141.	Dr M. S. Sidhu Dr Sukhpal Singh Dr PoonamKataria Dr Manjeet Kaur Dr S. K. Saran Dr Bhupinder Singh Dr G. S. Romana Dr Gurpreet Kaur Dr Parminder Kaur Dr Arjinder Kaur Dr M. S. Toor Dr M. K. Sekhon Dr A. S. Bhullar Dr Kamal Vatta	Workshop on "Capacity Building in National Planning for Food Security", Jul 4, 2013, Punjab Agricultural University, Ludhiana.
142.	Dr PP Sahota	International Workshop on "Water for Health", Nov. 7-8, 2013, BFUHS, Faridkot
143.	Dr SK Gosal	17th Punjab Science Congress, Feb. 14-16, 2014, PTU, Kapurthala
144.	Dr PP Sahota	Punjab Agricultural Summit, 2014, 17.2.14 to 19.2.14 at Chaparchiri, Mohali
145.	Dr Raj Kumar	Workshop on "Valuation and pricing of agricultural technologies", Dec 26,2013 NASC Complex, New Delhi
146.	Dr HS Sodhi Dr S Kapoor	XVI Workshop on AICRP on Mushrooms , Mar. 20-21, 2014, PUSA, Samastipur
147.	Dr PP Sahota	Workshop cum Demonstration & Brain storming session on Bioremediation and Bio-Control Technologies for weed management, Mar. 27, 2014 Chandigarh
148.	Dr. G.S. Kocher	Sensitization workshop on Nanotechnology in Agri. Research for PAU Faculty, July 8-9, 2013, PAU, Ludhiana
149.	Dr (Mrs) ParveenBala	83rd National Workshop on Radiochemistry and Applications of Radioisotope, Sept. 21-28, 2013, Amritsar
Year 2014-2015		
150.	Dr PriyaKatyal	Workshop on "Anaerobic bioprocesses for energy and environment", 16 -26 December, 2014, GNDU, Amritsar
151.	Dr HS Sodhi	XVIIth Annual Workshop of AICRP mushrooms at DMR, Solan, 29-30 June, 2015



Year 2015-2016		
152.	Dr NavitaGhai	Brain Storming meeting on Promotion of Pulses in the Indo-Gangetic Plains of India, Aug 31, 2015, PAU Ludhiana
153.	Dr Rajni Sharma	Workshop on Revision of Forest policy, Dec 1-2, 2015, IIFM Bhopal, Chandigarh
154.	Dr. (Mrs.) Param Pal Sahota, Dr HS Sodhi and Dr S. Kapoor	Research and Extension Specialists Workshop, Jan. 20-21, 2016, PAU, Ludhiana
155.	Dr. (Mrs.) Param Pal Sahota, Dr SK Gosal, Dr M Gangwar	Research and Extension specialist workshop for Kharif crops, Feb. 23-24, 2016, PAU, Ludhiana
156.	Dr (Mrs.) Param Pal Sahota, Dr HS Sodhi and Dr S. Kapoor	Research and Extension Specialists Workshop, May 30-31, 2016, PAU, Ludhiana
157.	Dr HS Sodhi and Dr S, Kapoor	XVIIIth Annual Workshop on AICRP on Mushrooms, June 9-10, 2016, DMR (ICAR), Solan
Year 2016-2017		
158.	Dr.Jitender Mohan Singh	Workshop on 'Farmers Suicides in India: Causes and Suggestions', Oct 20, 2016, ISEC, Bangalore
159.	Dr.Jitender Mohan Singh	Workshop on 'Impact of Neem Coated Urea on Production, Productivity and Soil Health in India', Oct 21, 2016 ISEC, Bangalore
160.	Dr.JatinderSachdeva	Workshop under the ICAR Social Science Network Project on Regional crop planning for improving resource use efficiency and sustainability, Nov 10, 2016, PAU, Ludhiana
161.	Dr.Jasdev Singh	Regional workshop regarding formulation of price policy for kharif crops for 2017- 18, Dec 16, 2016, KisanBhavan, Panchkula
162.	Dr.JatinderSachdeva	Policy Advocacy Dissemination Workshop under the ICAR Social Science Network Project on Regional crop planning for improving resource use efficiency and sustainability, Dec 19, 2016, MPUAT, Udaipur
163.	Dr.Baljinder Kaur Sidana	National Workshop under the Cost of Cultivation Scheme, Jan 17-20, 2017, Ministry of Agriculture and Cooperation, Government of India
164.	Dr.Jasdev Singh	National Workshop on Cost of Cultivation Scheme, Jan 18-20, 2017, Tamil Nadu Agricultural University, Coimbatore
165.	Dr.JatinderSachdeva	National Workshop on Cost of Cultivation Scheme, Jan 18-20, 2017., Tamil Nadu Agricultural University, Coimbatore
Year 2017-2018		
166.	Dr Sukhdev Singh	Workshop on 'Public Policy to Prevent Rural Suicides', November 15, 2017, Department of Economics, Punjabi University, Patiala
167.	Dr Sukhdev Singh	International workshop on "Sustainable Pathways to Revitalize Punjab Agriculture: Challenges and Opportunities , January 30th , 2018, CIPT, FAO, Zirakpur
168.	DrJasdev Singh	National Workshop on the Cost of Cultivation Scheme, August 17-19, 2017, MPUAT, Udaipur
169.	DrJitender Mohan Singh	Review Workshop on ICAR Social Science Network Project on 'Resource use Planning for Sustainable Agriculture', 17th February, 2018, ICAR-National Centre for Agricultural Economics & Policy Research (ICAR-NIAP), New Delhi
170.	DrJasdev Singh	Policy Dialogue on Agricultural Economy of Punjab, November 21, 2017, Punjab State Farmers' Commission

171.	DrJasdev Singh	National Workshop of project on "Resource use Planning for sustainable Agriculture", February 16-17, 2018, ICAR-NIAP, New Delhi
172.	DrJasdev Singh	National Workshop on the Cost of Cultivation Scheme, August 17-19, 2017, MPUAT, Udaipur
173.	Dr JatinderSachdeva	Review meeting-cum-workshop of network project on Resource use planning for sustainable agriculture, February 16-17, 2018 at NIAP, New Delhi
174.	DrBaljinder Kaur	National Workshop under the Cost of Cultivation Scheme, August 17-19, 2017 at Rajasthan College of Agriculture, MaharanaPratap University of Agriculture & Technology, Udaipur
175.	DrBaljinder Kaur	Workshop for Kharif Crops, 21-22 Feb. 2018 at PAU, Ludhiana
176.	DrBaljinder Kaur	One day workshop on "Sustainable pathways to revitalize Punjab Agriculture: Challenges & opportunities, Zirakpur, Chandigarh on 30-31st January, 2018
177.	DrSangeetRanguwal	Training cum workshop on formation of Farmers Producers Organizations (FPOs) and their benefits for DES/KVK scientists, 20th November, 2017, PAU, Ludhiana
178.	Dr. Rajeev Kumar	7th Belle Analysis Workshop, Nov 29 – Dec3, 2017, NIT Jaipur
179.	Dr HS Sodhi	Workshop on secondary agriculture/food processing entrepreneurial start up project-an interactive meet organized by PSCST and PAU, May 24, 2018, PAU, Ludhiana
180.	Dr.JatinderSachdeva	Annual Review Meeting cum Concluding Workshop under the ICAR Social Science Network Project on Regional crop planning for improving resource use efficiency and sustainability, March 24-25, 2017, NIAP, New Delhi
181.	Dr PoonamKataria	Agriculture Summit 2017, 24th October, 2017, NASC Complex, New Delhi

Participation in Seminar/Conference/Workshop/Symposia (State/National/Int. level)

S. No.	Name of Scientists	Programme and Title	Organizing/ sponsoring agency	Date & Venue
2013-14				
1.	Dr. Satwinderjit Kaur	Training programme on "Emerging Paradigms of Competencies for Extension Professional in Context of Changing Agricultural Scenario"	IARI, New Delhi	3.1.2013 to 23.1.2013 at IARI, New Delhi
2.	Dr. Amritpal Singh Brar Dr. Kulvir Kaur	Refresher Course on "Educational Technologies"	CSS HAU, Hisar	13.2.2013 to 5.3.2013 at CSS HAU, Hisar
3.	Mrs. Gurpreet Kaur	Training programme on "Resource Conservation for Shaping Future Agriculture"	GBPUA &T, Pantnagar	15.2.2013 to 7.3.2013 at GBPUA &T, Pantnagar
4.	Dr. Gurupdesh Kaur	Training programme on "Managerial Effectiveness Enhancement Programme"	IMTR, Goa	4.3.2013 to 8.3.2013 at IMTR, Goa
5.	Dr. Gurjant Singh Aulakh Mrs. Renuka Aggarwal Dr. Navjot Kaur	16th Punjab Science Congress	BFUHS, Faridkot	7.2.2013 to 9.2.2013 at BFUHS, Faridkot
6.	Dr. Satwinderjit Kaur	Summer School on "Innovative Technologies for Shaping Future Agriculture in Salt Effected Area"	CSSRI. Karnal	8.5.2013 to 28.5.2013 at CSSRI. Karnal
7.	Dr. Devinder Tiwari	Refresher Course on "Communication Skills & Technical Writing"	CCSHAU, Hisar	8.5.2013 to 28.5.2013 at CCSHAU, Hisar
8.	Dr. Parvinder Singh Dr. Bikaramjit Singh Dr. Mohinder Kaur	Summer School on "Advances in Quality Potato Production & Post Harvest Management"	CFTRI, Shimla	16.7.2013 to 5.8.2013 at Shimla
9.	Mrs. Rubaljot Kooner	Workshop on Borlaug Global Rust Initiative (BGRI), 2013	BISA, New DElhi	19.8.2013 to 22.8.2013 at New Delhi
10.	Dr. Balbir Kaur	Training Course on "Recent Approaches for Breeding & Production of Vegetable Crops"	Dr Y.S.Parmar Uni. of Agri. & Forestry, Nauni, Solan	20.8.2013 to 9.9.2013 at Dr Y.S.Parmar Uni. of Agri. & Forestry, Nauni, Solan
11.	Dr. Ashok Kumar	Training Course on "Maize Production System for Imposing Resource Use Efficiency & Livelihood Security"	IARI, New Delhi	2.9.2013 to 9.9.2013 at IARI, New Delhi
12.	Dr. Ravinder Kumar	Winter School on "Securing Stored Grains from Pests & Diseases"	TNAU, Tamilnadu	11.9.2013 to 1.10.2013 at TNAU, Tamilnadu
13.	Dr. Ravinder Singh Chhina	Training Programme on "Machinery for Natural Resource Management & Technologies"	Deptt. of FMPE, PAU	29.8.2013 to 18.9.2013 in Deptt. of FMPE, PAU

14.	Dr. Gurmeet Singh Dhillon	Training Course on "Advances in Methodological Paradism & Tools in Extn. Res."	IARI, New Delhi	17.9.2013 to 7.10.2013 at IARI, New Delhi
15.	Dr. Gagandeep Kaur Dr. Monika Gupta	National Training Programme on "Exploitation of UnderUtilized Fruits"	Mahatama Phule Krishi Vidya Peeth, Rahauri(Maharashtra)	17.9.2013 to 7.10.2013 at Mahatama Phule Krishi Vidya Peeth, Rahauri(Maharashtra)
16.	Dr. H.S.Bajwa	Workshop	Egerton Uni. Kenya	20.9.2013 to 29.9.2013 at Egerton Uni. Kenya
17.	Sh. Amandeep Singh Sidhu	Workshop on "Priniciples & Practices of Directed Seeded Rice"	CCS HAU Hisar	23.9.2013 to 2.10.2013 at CCS HAU Hisar
18.	Dr. Parminder Singh Dr. Madhu Shelly	Training Programme on "Advances in Statistical Methods for Animal Experiments"	IASRI, Pusa, New Delhi	1.10.2013 to 21.10.2013 at IASRI, Pusa, New Delhi
19.	Mrs. Gaganjot Kaur	Training Couses on "Advances in Production Functional Rheological & Quality Aspects of Traditional Indian Dairy Products"	NDRI, Karnal	8.10.2013 to 28.10.2013 at NDRI, Karnal
20.	Sh. Pardeep Goyal	Training Course on "Decision Exploring Rhizophere for Increasing Input Efficiency"	GB Pant Uni. of Agri. & Tech. Pantnagar	11.10.2013 to 31.10.2013 at GB Pant Uni. of Agri. & Tech. Pantnagar
21.	Dr. Satpal Saini	National Seminar on "Developments soil science-2013"	NASC, Pusa New Delhi	23.10.2013 to 26.10.2013 at NASC, Pusa New Delhi
22.	Dr. Anju Bala	National Symposium on "Changing Diseases Scenario & Managerial Approaches for Sustainable Agriculture"	SKUAST-K	26.10.2013 to 27.10.2013 at SKUAST-K at Srinagar
23.	Dr. Karamjit Sharma Dr. Kanchan Sandhu Dr. T.S.Riar	3rd International Conference on "Extension Educational Strategies for Sustainable Agril. Development-A Global Perspective"	INSEE, UAS, Bangalore	5.12.2013 to 8.12.2013 at INSEE, UAS, Bangalore
24.	Dr. Rachana Arora Dr. Rajani Goyal Dr. Harsimrat Kaur Bons	Winter School on "Recent Advances in the Valorization of the Horticultural Produce"	IARI, Pusa, New Delhi	6.12.2013 to 26.12.2013 at IARI, Pusa, New Delhi
25.	Mrs. Amina Raheja	Training Programme on "Machinery for Natural Resource Managemnet & Technologies"	Deptt. of FMPE, PAU	29.8.2013 to 18.9.2013 in the Deptt. of FMPE, PAU

26.	Mrs. Neerja Rani Sh. Amandeep Singh Sidhu	Training Course on "Management Technologies & Improving Soil Quality & Crop Productivity"	Deptt. of Soil Science, PAU	9.10.2013 to 29.10.2013 in the Deptt. of Soil Science, PAU
27.	Dr. Kanchan Sandhu	Workshop on 46th National Conference of Indian Dietetics Association	-	12.12.2013 to 14.12.2013 at Pune
28.	Sh. Balkaran Singh	Model Training Course Integrated Family System for Enhancing Resource Use of Efficiency & Livelihood Security of Small & Marginal Farmers	IARI, New Delhi	20.12.2013 to 27.12.2013 at IARI, New Delhi
29.	Dr. Yuvraj Singh Pandha	Training Programme Regarding "Fundamentals of Plant Health Management for Plant Health 'Doctors'"	National Institute of Plant Health Agri-Coop. Rajendra nagar, Hyderabad	17.1.2014 to 6.2.2014 at National Institute of Plant Health Agri-Coop. Rajendra nagar, Hyderabad
30.	Dr. Gurdeep Singh	Evolution of Vocational Training Courses –KVKs experience with Bee-Keepers	University of Science, GKVK, Bangalore	5.12.2013 to 8.12.2013 at University of Science, GKVK, Bangalore
31.	Mrs. Gaganjot Kaur Mrs. Jagbir Rehal	Rashtriya Sangosthi	CIPHET Ludhiana	28.1. 2014 to 29.1.2014, CIPHET Ldh
32.	Dr. Harinder Singh Sh. Ashok Kumar	Training Programme on Agricultural Extension Management for Programme	National Institute of Agril. Extn. Management Rajendra nagar	16.1.2014 to 25.1.2014 at Dr. Senthil Vinaygam Director(Agril. Extn.) National Institute of Agril. Extn. Management Rajendra nagar, Hyderabad-500030(AP)
33.	Dr. Mrs.Manpreet Kaur Saini	International Course entitled Pest Management & Food Safety & also Nuffic fellowship(NFP)	Wagenirgen, the Netherlands	9.6.2014 to 27.6.2014 at Wagenirgen the Netherland
34.	Dr. Yuvraj Singh Pandha	21 Days Training on Production Protocol for Bio-control agents & Quality Analysis & Quality Management of Microbial Bio-pesticides	NIPHM, Hyderabad	8.4.2014 to 28.4.2014 at NIPHM, Hyderabad
35.	Dr. Mrs. Gurupdesh Kaur	"Training Management"	Ministry of Agriculture Extension Education Institute, NeloKheri	10.11.2014 to 14.11.2014 at Dr. R.S Hudda, Reg. Director Govt. of India , Ministry of Agriculture Extension Education Institute, NeloKheri-132117(Hayana)

36.	Dr. Mrs.Mandeep Kaur Saini	Advanced Faculty Training on Forecast Modeling Analytics in Crops	IASRI, New Delhi	30.5.2014 to 19.6.2014 at Dr. V.C.Sud Director(A),IASRI, Library Avenue, New Delhi
37.	Dr. Mrs. Arvindpreet Kaur	Summer school on "Recent advances in Temperate fruit production	Dr. Y.S.Parmar, Univ. of Horticulture & Foresty, Nauni Solan	10.6.2014 to 30.6.2014 at Dr.P.S.Chauhan, Prof & Head Deptt. of Fruit Science, Dr. Y.S.Parmar , Univ. of Hoticulture & Foresty, Nauni Solan(H.P.)-173203
38.	Dr. Vicky Singh	World Congress on Conservation Agriculture	-	June 22-25, 2014 held at Winnipeg, Canada
39.	Dr Kiran Grover	International Conference on Nutritional Therapies against lifestyle related disorders	Univ of Agriculture, Faislabad, Pakistan	May 29-30, 2014 at Univ of Agriculture, Faislabad, Pakistan
40.	Dr Shivani Sharma Dr Manpreet Singh	Summer School on "Modern Techniques and approaches in storage of harvested and processed plant & animal food products	CIPHET, Ludhiana	11.06.2014 to 01.07.2014 at CIPHET, Ludhiana
41.	Dr. Deedar Singh Bhatti	Seminar on Challenges to growth agriculture and 59th Alumni Meet	University of Agriculture, Faislabad, Pakistan	25-26.4.2015 University of Agriculture, Faislabad, Pakistan
42.	Dr. (Mrs) Kiran Grover	Global Forum for Innovations in Agriculture, GFIA, 2015 (Fight against World Hunger)	GFIA, Abhu Dhabi UAE	9-11.3.2015 Abhu Dhabi, UAE
43.	Dr. (Mrs) Kiran Grover	International Conference on 'Nutritional Therapies against life style related disorders	University of Agriculture, Faislabad, Pakistan	29-30.5.2014 University of Agriculture, Faislabad, Pakistan
44.	Dr. Rakesh Sharda	Series of meetings and field visits of protected cultivation of Vegetables with AVRDC Project staff and Partners	AVRDC - The World Vegetable Centre	2-9.3.2015 Lahore, Faislabad and Islamabad, Pakistan
45.	Dr. T.S. Riar	7th National Extension Education Congress on 'Translational Research-Extension for Sustainable Small Farm Development'	Society of Extension Education, Agra	8-11.11.2014 ICAR Research Complex, NEH Region, Umiam (Meghalaya)

46.	Dr T.S. Riar	7th National Seminar of Mobilization on Sustainable Rural Livelihood Technology & Institutional Perspective	FOA, SKUAST, Jammu	8-10.1.2015 Jammu, Chatha
47.	Dr. Narinder Pal Singh Dr. Parminder Kaur Sh. Ajay Kumar	Outreach Programme on Food Processing	National Institute of Food Technology Entrepreneurship and Management, National Institute for Micro, Small and Medium Enterprises	28.7.2014, Virsa Vihar, Amritsar
48.	Sh. Ajay Kumar	Seminar on Vegetable Crops	NHRDF, Bathinda	29.8.2014, Mallia, Jalandhar
49.	Dr. Paramjit Singh Dr.Narinder Pal Singh Dr. Parminder Kaur Sh. Ajay Kumar	65 World Sikh Educational Conference	Sri Guru Harkrishan Public School	14-16.11.2014, Tarn Taran
50.	Dr. Narinder Pal Singh	National Seminar on Sustainable on Agricultural Development	Society of Economic and Development, PAU	3.3.2015, PAU, Ludhiana
51.	Dr. Paramjit Singh	4th Insect Congress	Deptt. of Entomology	16-17.4.2015. PAU, Ludhiana
52.	Dr. Savreet Khehra Dr. Kirandeep Kaur	65 World Sikh Educational Conference	Sri Guru Harkrishan Public School	14-16.11.2014, Tarn Taran
53.	Dr. Savreet Khehra	16th Punjab Science Congress on Innovative Trends of Science & Technology in Current Scenario	Punjab Academy of Sciences	7- 9.2.2015 Mandi Gobindgarh
54.	Dr. Bindu	Annual Convention of ISAE & Symposium on Engineering Solution on Sustainable Agriculture & Food Processing	Deptt. of Processing & Food Engg.	23-25.2.2015 PAU, Ludhiana
55.	Dr. Baljit Singh	4th Congress on Insect Science	Indian Society for the Advancement of Insect Science	16-17.4.2015
56.	Dr. Suman Kumari	4th Congress on Insect Science	PAU	16-17.4.2015 Ludhiana
57.	Dr. Mandeep Sharma	National Seminar on Extension Innovations and Methodologies for Market Agricultural Growth & Development	ISEE & deptt. of Extension Education, RVSKVV	26-28.2.2015 Gwalior (MP)
58.	Dr. Maninder Singh Bons	International Conference on Changing Scenario of Pest Problems in Agri-Horti Eco system and their management	MPUAT Udaipur (Raj)	27-29 .11.2014 Udaipur (Raj)
59.	Dr. Maninder Singh Bons	National seminar on Plant Protection in Citrus Crop	Deptt. of Horticulture, Punjab & Embassy of Israel	26-27.2.2015 Khanoura, Hoshiarpur

60.	Dr. Harjit Singh Brar	National Symposium on Agricultural Diversification for sustainable livelihood and environmental security	Indian Society of Agronomy	18-20.11.2014 PAU, Ludhiana
61.	Dr.Vicky Singh	6th World Congress on 'Conservation Agriculture'	DST & CICS	22-25.6.2014 Winnipeg, Canada
62.	Mrs Rajdeep Kaur	National Seminar on Enterpreneurship Development in India: Challenges and Opportunities	SGGSC, Chandigarh	4.12.2014 Chandigarh
63.	Dr Pardeep Kumar	National Level Symposium on Modern Agro-Technologies on Nutritional Security & Health	YS Parmar University, Solan	21-23.4.2015, Solan
64.	Mrs Rajdeep Kaur	2nd National Seminar on Sustainable Agriculture Development	HOD, Apperal & Textiles, COHSC	Feb.2015 PAU, Ludhiana
65.	Dr. A.P.S. Brar	ICAR Foundation Day Function Smart -Farmers Certificate for Distribution Organized	ZPD, Zone-I	16.7.2014 PAU, Ludhiana
66.	Dr. A.P.S. Brar Dr. Rakesh Kumar Sh. Sukhwinder Singh Dr. Shivani Sharma Dr. Munish Kumar	Interaction Meet Collaborative between KVKs on Border	KVK, Sirsa	19.9.2014 KVK, Sirsa
67.	Dr. Shivani Sharma	6th Annual Conference on Promoting Excellence in Women Development : The Way Forward for Progress	Punjabi University, Patiala	30-31.10.2014 Patiala
68.	Dr. Rakesh Kumar Sh. Sukhwinder Singh	Technology Demonstrations for Climatic Changes and Value Added Agro Advisory	CRIDA, Hyderabad	19-20.1.2015 Hyderabad
69.	Dr. Rakesh Kumar	One Day Awareness Programme on Commodity Future Market for PACs Officials/ Bankers	NABARD	18.2.2015 NABARD at RESTI, Faridkot
70.	Dr. Sukhwinder Singh	Field Crop Experimentation Design	PAU	5-6.5.2015 PAU, Ludhiana
71.	Er. Amina Raheja	National Level 49th Annual Conversation of ISAE	COAE&T	23-25.2.2015 PAU, Ludhiana
72.	Dr.Satwinderjit Kaur	National Symposium on Natural Resource Management and Sustainable hill farming system for livelihood security	Soil Conservation Society of India, Jammu	23-24.7.2014 SKUAST, Jammu
73.	Dr. Mandeep Kaur Saini Dr. Satwinderjit Kaur	National Symposium on Agricultural Diversification for sustainable livelihood and environmental security	Indian Society of Agronomy	18-20.11.2014 PAU, Ludhiana
74.	Dr. Satwinderjit Kaur Dr. Mandeep Kaur Saini	7th National seminar on sustainable rural livelihood Technological and Institutional perspective	SKUAST, Jammu	8-10.1.2015 SKUAST, Jammu

75.	Dr. R.K. Dular	Interface meeting of Veterinary Officers, Dairy Development Officers and SMSs of KVKs of Punjab	GADVASU	25.3.2015 Ludhiana
76.	Dr. S.S. Aulakh	4th Congress on Insect Science	PAU	16-17.4.2015 Ludhiana
77.	Dr. Manisha Bhatia	46th Annual Conference of Nutrition Society of India	Nutrition Society of India and DMC, Ludhiana	6-8.11.2014 Ludhiana
78.	Dr. Anju Bala	National Symposium on Agriculture Diversification for sustainable livelihood and environmental security	PAU	18-20.11.2014 PAU, Ludhiana
79.	Dr. Manpreet Singh	49th Annual Convention of ISAE AND Symposium on Engineering Solutions for sustainable agriculture and food processing	PAU	23-25.2.2015 Ludhiana
80.	Dr.Rachna Arora	National Symposium on modern agro technology for nutritional security and health	YSP University	21-23.4.2015 Solan (HP)
81.	Dr. Gurdeep Singh	7th National Extension Education Congress 2014	Society of Extension Education, Agra	8-11.11.2014 ICAR Research Complex, NEH Region, Umiam (Meghalaya)
82.	Er. Ankit Sharma	49th Annual Convention of Indian Society of Agricultural Engineers Symposium on Engineering Solutions for Sustainable Agriculture & Food Processing	ISAE	23-25.2.2015 PAU, Ludhiana
83.	Dr. Harinder Singh	National Symposium on Agriculture Diversification for sustainable livelihood and environmental security	PAU	18-20.11.2014 PAU, Ludhiana
84.	Mrs Purva Jaggi	Global Social Science Conferrence 2015 on Management of Sustainable Livelihood System	University of Agriculture & Technology,	14-17.2.2015 Orissa , Bhubneshwar
85.	Dr Sanjeev Ahuja	International Conferrence on Agriculture &Climate change:Adopting Crops to Increase Uncertainty	NICRA	15-17.2.2015 Amsterdam, Neitherland
86.	Dr. Manoj Sharma	7th National Extension Education Conference at ICAR Regional Complex for NEH Region	Society of Extension Education, Agra	8-11.11.2014 ICAR Research Complex, NEH Region, Umiam (Meghalaya)
87.	Dr. Sandeep Sandhu	National Symposium on Agriculture Diversification for sustainable livelihood and environmental security	PAU	18-20.11.2014 PAU, Ludhiana
88.	Dr. Kanchan Sandhu	7th National Conference of Society of Extension Education at ICAR Regional Complex for NEH Region	Society of Extension Education, Agra	8-11.11.2014 ICAR Research Complex, NEH Region, Umiam (Meghalaya)

89.	Dr. Kanchan Sandhu	1st International Digital Literacy for on the theme "Redifining literacy in the emerging digital society"	PU, Chandigarh in collaboration with confederation College, Ontario, Canada and World Punjabi Council, Toranto, Canada	5-6.2.2015 Bhutta College of Education
90.	Dr. Kanchan Sandhu	National Conference on Community Health and Nutrition	IAPEN, New Delhi	8.3.2015 Pushpa Gujral Science City, Kapurthala
91.	Dr. Balbir Kaur	National Symposium on modern agro technology for nutritional security and health	YSP University	21-23.4.2015 Solan (HP)
92.	Mrs Ritu Babuta	National Symposium on Weather & Climate Extremes	IMD, MC, Chandigarh	15-18.2.2015 Chandigarh
93.	Er. Gaganjot Kaur	International Conference on Mushroom Biology and Mushroom products	Mushroom Society of India	19-22.11.2014 NASC, New Delhi
94.	Ms. Amanpreet	National symposium on crop improvement for inclusive sustainable improvement	Indian Society of Genetics & Plant Breeding	7-9.11.2014 PAU, Ludhiana
95.	Dr. Harsmiranjit Kaur Mavi	National Symposium on Agricultural Diversification for sustainable livelihood and environmental security	Indian Society of Agronomy	18-20.11.2014 PAU, Ludhiana
96.	Dr. Parminder Kaur	National Conference on Community Health and Nutrition	Society for Clinical Nutrition and Metabolism, Jalandhar	8.3.2015 Dr. Bhim Rao Ambedkar Cultural & Educational Activity Centre, Jalandhar
97.	Dr. Arshdeep Kaur	4th Insect Congress	Deptt. of Entomology	16-17.4.2015 PAU, Ludhiana
98.	Dr. Karamjit Sharma	7th National Seminar on sustainable rural livelihood technology & institutional perspectives	Society of Community Mobilization for Sustainable Development	8-10.1.2015 SKUAST, Jammu
99.	Dr. Jasvinder Singh Dr. Gurupdesh Kaur Dr. Rajni Goyal	Seminar on sustainable agricultural practices	PCRA & PHD Chamber of Commerce and Industries	30.8.2014 Thapar University Patiala
100.	Dr. Racha Dr. Gurupdesh Kaur Dr. Rajni Goyal	Seminar on Augmenting shelf life of fresh fruits & vegetables	Ministry of Food Processing & NPC	26.9.2014 PAU, Ludhiana
101.	Dr. Gurupdesh Kaur Dr. Rajni Goyal Dr. Racha	International symposium on 'Innovation in Horticulture for National Security Concerning Biodiversity & Poverty Alleviation	Deptt. of Applied Plant Sciences, BBAU	16-18.10.2014 BBAU, Lucknow
102.	Dr. Gurupdesh Kaur Dr. Rajni Goyal Dr. Racha	6th Annual Conference on Promoting Excellence in Women Development : The Way Forward for Progress	Punjabi University, Patiala	30-31.10.2014 Patiala

103.	Dr. Gurupdesh Kaur	46th Annual Conference of Nutrition Society of India	Nutrition Society of India and DMC, Ludhiana	6-8.11.2014 Ludhiana
104.	Dr. Jasvinder Singh Dr. Rajni Goyal Sh. Ashok Kumar	National Symposium on Agricultural Diversification for sustainable livelihood and environmental security	Indian Society of Agronomy	18-20.11.2014 PAU, Ludhiana
105.	Dr. Parminder Singh	Seminar on Dairy Farming by Deptt. of Dairy Development	Deptt. of Dairy Development, Punjab	22.11.2014 Panchayat Bhawan, Patiala
106.	Dr. Rajni Goyal Dr. Racha	Seminar on present status and future strategies for processing and value addition of agril. commodities	CIPHET Ludhiana	19-20.12.2014 Ludhiana
107.	Dr. Jasvinder Singh Dr. Gurupdesh Kaur	Seminar on water management for sustainable development	Ministry of Water Resources, River Development, Ganga Rejuvenation	17.1.2015 Mini Secretariat, Patiala
108.	Dr. Parminder Singh	Agricultural Science Congress	NDRI, Karnal	3-6.2.2015 NDRI, Karnal
109.	Dr. Gurupdesh Kaur	National Conference on Community Health and Nutrition	IAPEN, New Delhi	8.3.2015 Pushpa Gujral Science City, Kapurthala
110.	Dr. Mandeep Singh	National Seminar on Agrarian Crisis in India : Issues and Interventions	Akal Degree College for Women	20.1.2015 Sangrur (Pb)
111.	Er. Apoorav Prakash	49th Annual Convention of Indian Society of Agricultural Engineers and Symposium on Engineering Solutions for Sustainable Agriculture & Food Processing	PAU	23-25.2.2015 Ludhiana (Pb)
112.	Dr. Ravinder Kaur	National Symposium on Modern Agro-technologies for Nutritional Security and Health	Dr. Y.S. Parmar Uni. of Hort. & Forestry	21-23.4.2015 Solan (HP)
2015-16				
113.	Dr. Mandeep Singh	9th National Conference of KVKs and 87th Annual Foundation Day of ICAR	ICAR, New Delhi	25-26.07.2015, Patna (Bihar)
114.	Dr. Mandeep Singh Dr. Gurbir Kaur Sh. Ashok Kumar Er. Apoorv Prakash	Research and Extension Specialists' workshop for *rabi* crops	PAU, Ludhiana	27-28.08.15 PAU, Ludhiana
115.	Dr. Satbir Singh	National Conference on "Push to the Livestock Farming Through Knowledge Empowerment of the Farmers"	GADVASU, Ludhiana	18-20.11.15 GADVASU, Ludhiana
116.	Dr. Mandeep Singh	Platinum Jubilee Conference of Indian Society of Agricultural Economics	PAU, Ludhiana	19-21.11.15 PAU, Ludhiana
117.	Dr. Mandeep Singh	Workshop on Agriculture Clinics and Agri Business Centres and other Govt. Sponsored schemes of Govt of India organized by NABARD	NABARD	27.11.15 Sangrur

118.	Dr. Mandeep Singh Sh. Ashok Kumar Er. Apoorv Prakash	Awareness seminar on management of paddy straw and wheat stubbles	Deptt. of Agriculture, Sangrur	10.12.15 17.12.15 31.12.15 DC, Office, Sangrur
119.	Dr. Ravinder Kaur	Research & Extension Specialists Workshop for Fruits, Mushroom, Agro-forestry, along with Post Harvest Management, Farm Power & Machinery, Food Technology & Agri-Economics	PAU, Ludhiana	20-21.01.2016 PAU, Ludhiana
120.	Dr. Monika Choudhary	Seminar on publicity and awareness building of equity grant and credit guarantee fund organised by Small farmer's Agribusiness Consortium (SFAC) through project Management Agency, AFC India Ltd.	NABARD, Sangrur	16.02.16 Sangrur
121.	Dr. Mandeep Singh Sh. Ashok Kumar	District level Cooperative Conference organized by KVK, Sangrur & IFFCO, Area Office, Patiala	IFFCO	17.02.16 KVK, Sangrur
122.	Dr. Mandeep Singh Sh. Ashok Kumar Er. Apoorv Prakash	Research and Extension Specialists' Workshop for *Kharif* Crops	PAU, Ludhiana	23-24.02.2016 PAU, Ludhiana
123.	Dr. Mandeep Singh	State Level Workshop on Training Planning for the year of 2016-17 and presented the proposed Annual Training Programme of KVK, Sangrur for 2016-17	PAU, Ludhiana	01.03.16 PAU, Ludhiana
124.	Dr. Mandeep Singh Dr. Ravinder Kaur Er. Apoorv Prakash	Research and extension specialists' workshop for vegetables, floriculture and sericulture alongwith post harvest management, farm power and machinery, food technology and agricultural economics	PAU, Ludhiana	30-31.05.16 PAU, Ludhiana
125.	Dr.Kuldeep Singh and Dr. Balvir Kaur	Research and Extension Specialist workshop for fruits, Mushroom, Agro forestry along with post harvest management farm power machinery food technology and Agri economics	PAU, Ldh	20.1.16 PAU, Ldh
126.	Dr Kuldeep singh	International Conference of Natural Resource Management Ecological perspective	Sher -e Kashmir University of Agricultural Sciences and Technology of Jammu	18-20.2.16 (3 days) Sher -e Kashmir University of Agricultural Sciences and Technology of Jammu
127.	Dr. Jugraj Singh Deputy Director (Trg.)	National conference of KVKs	ICAR	25-26.7.2015 at Patna

128.	Dr. (Mrs.) Anju Sharma Assistant Professor (Plant Protection)	Orientation course on IPM in important crops with special reference to Punjab, Haryana, Delhi, Himachal Pradesh and jammu & Kashmir	PAU, Ludhiana	20-22.8.2015 at PAU, Ludhiana
129.	APS Brar	National conference of KVK's	ICAR	25-28 July, 2015 Patna
130.	Gaganjyot Kaur	Workshop in Trans-Ganga Plains Zone (Haryana, Punjab, Delhi and Ganganagar district of Rajasthan)	ICAR	5th October, 2015 ICAR-CSSRI, Karnal
131.	Amanpreet	25th Asian pacific conference on Weed Science for sustainable Agriculture, Environment and Biodiversity	Weed Science Society	13-16 October, 2015, NIPHM, Hyderabad
132.	H K Mavi Parminder Kaur	Two-day Seminar on "Up Scaling Energy Efficiency and Sustainable Practices in Agriculture Sector" on.	Petroleum Conservation Research Association (PCRA)	3rd & 4th November, 2015
133.	Parminder Kaur Amanpreet	Workshop cum training programme on pulses	ICAR	1-2 December 2015 CCSHAU, Hisar
134.	Parminder Kaur, H.K. Mavi	7th International Conference on Empowering Women, Empowering Humanity	Women's Studies Circle, Punjabi University, Patiala	11-12 December 2015,Punjabi University, Patiala
135.	Amanpreet	International conference on Natural Resource management : Ecological prospective	Indian Ecological Society	18-20 Feb, 2016 Sher-e-Kashmir University, Jammu
136.	H.K.Mavi	3rd National seminar on Market imperfections, Farmers' distress and agrarian crisis in India	Society of Economics and Development	7th April 2016, PAMETI, PAU, Ludhiana
137.	N.S. Gill H.K.Mavi	Workshop on vegetable crops, FPM, PHPTC, Agri. Economics	PAU	30-31 May, 2016, PAU, Ludhiana
138.	Dr. Raminder Kaur	Conference on Weed science for sustainable Agriculture, environment and biodiversity.	AG Ranga Rao, Agriculture University, Hyderabad	12-16.10.2015
139.	Dr. Sukhjinderjit Singh	XVI Biennial Animal nutrition conference	NDRI, Karnal	06-08.02.2016
140.	Dr. Raminder	International conference on Natural Resource management. Ecological perspective	SKAUST, Jammu	18-20.02.2016
141.	Dr. Harinder Singh	National workshop on Natural resource management for climate resilent Agricuture in Lower Himalayas	Regional Research Station, Ballowal Saunkhri	23.12.2015 RRS, Ballowal Saunkhri
142.	Dr. Harinder Singh	International Conference on Natural resource Mangement: Ecological perspectives	Sher-e-kashmir, University of Agricultural sciences and technology of Jammu, India	18-20.2.2016. SKUAST, Jammu, India
143.	Dr. S.C Sharma	Review workshop of NICRA project by PC, CRIDA Hyderabad, Director , ATARI	NDRI, Karnal	NDRI, Karnal

144.	Dr Dimpy Raina, AP (Horticulture)	Seminar on temperate fruit nuts at CITH, rangreth, Kashmir. dated 6 to 10 November, 2015	CITH Srinagar	6 to 10 November, 2015
145.	Dr. G.S. Aulakh , Associate Director(Trg.)	Cluster workshop cum training programme on frontline demonstration pulses and oilseeds dated 1.12.15- 2.12.15	ICAR	1.12.15- 2.12.15 HAU, Hissar
146.	Mr Vicky Singh, AP(Soil Science)	National seminar "Issues, Challenges and strategies to sustain Soil Health" at Peechi, Kerala dated 10.12.15- 11.12.15	KFRI, Peechi, Kerala	10.12.15- 11.12.15 KFRI, Peechi, Kerala
147.	Dr. Pardeep Kumar , AP(Agronomy)	National conference on Statistics and Computer applications in agriculture. dated 18.2.16	University of Jammu	18.2.16 University of Jammu
148.	Dr. Pardeep Kumar , AP(Agronmy	International Conference on Natural Resource Management. dated 19- 20.2.16	University of Jammu	19- 20.2.16 University of Jammu
149.	Gurpreet kaur	International conference on systems of innovation for inclusive agriculture and rural development.	CDEIS, Punajbi University, Patiala and CDS, Thiruvananthapuram	28-29th July, 2015
150.	Amandeep Kaur	19th Punjab Science Congress	Punjab Academy of Science, Punjabi University, Patiala	7-9th February, 2016
151.	Dr sumesh chopra	25th Asian Pacific weed science society conference on "Weed science for sustainable agriculture, environment and biodiversity" – International level	Indian Society of Weed Science, Jabalpur (M.P.)	October 13-16, 2015 at PJT State Agricultural University, Hyderabad, India
152.	Dr Sumesh chopra	Indian Ecological Society: International Conference (IESIC) 2016 on " Natural Resource Management: Ecological Perspectives" – International level	SKAUST , Jammu	February 18 – 20, 2016 at SKUAST, Jammu, India
2016-17				
153.	J K Brar Dr. Manisha Bhatia	Attended ToT for job roles of self employed tailor and hand embroider in association with Apparel, made ups and furnishing council of India	-	23-24 .02. 2017 PAU ludhiana
154.	Dr. J S Brar Dr. V.K. Rampal Mrs. Maninder Kaur Dr. Arvind Preet Kaur	Video conference regarding KVK's to interact by Hon'abe Minister of Agriculture	-	19.10. 2016 2.11.2016
155.	Dr. Amardeep kaur	National seminar on recent trends in food processing	Central University of Punajb	9 .12. 2016
156.	Dr. Amardeep kaur	Guava show	Bahadur Garh, Patiala	29 11. 2016

157.	All Deputy/ Associate Director (Trg.), KVKs of Punjab	Zonal workshop KVKs Zone-1	CSKHPAU, Palampur	12-14.12.2016
158.	Dr. J S Brar	Workshop on skill development Programme	NASC, New Delhi	16-19.01.2017
159.	Dr. V.K Rampal Mrs. Reet Verma	District pest surveillance meeting	CAO, Dept. of Agriculture	29.8.2016
160.	Dr. Arvind Preet Kaur	Prdhanmantri Krishi Sinchayi Yojna meeting	Deputy commissioner, Fatehgarh Sahib	8.9.2016
161.	Dr. V.K. Rampal Mrs. Reet Verma Mrs. Maninder Kaur	Sseminar on agrochemical formulations and spray technology	PAU, Ludhiana	22.11.16
162.	Dr. Manisha Bhattia	21 days refresher course on research methodology and data analysis	UGC-Human resource development centre, PU, Chd.	24 Nov-14 Dec., 2016
163.	Dr. V.K Rampal	Placing of trainees of 5th MDP for Newly Recruited PCs of KVKs	ICAR-NAARM	15.12.2016-17.1.2017
164.	Dr. V.K Rampal	5 th MDP for Newly Recruited PCs of KVKs	ICAR- NAARM	15.12.2017-17.1.2017
165.	Dr. V.K Rampal Dr. Arvind Preet Kaur Dr. Harinder Singh Dr. Ashok Kumar	Workshop on oilseed and pulses	DEE, PAU, Ludhiana	23-24.1.2017
166.	Dr. Ajay Siingh	Workshop cum training on precision livestock management for sustainable animal production	GADVASU, Ludhiana	8.2.2017
167.	Dr. Navjot Kaur Dhillon	21 days training on Recent analytical technique in genetics and genomics	IASRI, Pusa campus, New Delhi	16.1.2017-6.2.2017
168.	Mrs. Reet Verma	State level Pest surveillance meeting	Kheti Bhawan, Mohali	5.6.2017
169.	Dr. Ajay Singh	Workshop-cum-training programme on Precision livestock management for sustainable animal production	GADVASU, Ludhiana	08-02-2017 GADVASU, Ludhiana
170.	Dr. G.S. Aulakh, Dr. Pardeep Kumar Dr. Y.S. Pandha, Mrs. Rajdeep Kaur, Mr Vicky Singh,	Farmers seminar attended by KVK faculty along with progressive farmers during the visit of Union Minister of Agriculture at PAU, Ludhiana	PAU	27.05.16 PAU, Ludhiana
171.	Mrs Rajdeep Kaur AP (Home Science)	Summer school on "Approaches to Identification, Quantification and Reduction of Post Harvest Losses in India"	CIPHET	17.8.16 – 6.9.16 CIPHET, Ludhiana
172.	Dr. G S Aulakh, Dr. Y S Pandha Mrs Rajdeep Kaur Mr. Vicky Singh	Attended and Participated in Kisan Sammelan organized by ATARI-Zone-I	ATARI	25.09.2016 KVK, Samrala

173.	Dr. G. S. Aulakh, Dr YS Pandha	Brainstorming on Agrochemicals and Spray Technology	PAU	22.11.16 FSC, PAU, Ludhiana
174.	Dr. G. S. Aulakh, Assoc. Dir (Trg) Dr YS Pandha AP (PP)	FLDs on Oilseeds	PAU	23.01.17 FSC, PAU, Ludhiana
175.	Dr. Bharti Dr. Munish Kumar	Workshop on "precision livestock management for sustainable animal production"	PAU	8.02.17 PAU, Ludhiana
176.	Mr Vicky Singh,	Double farmers income in 2022: Biennial conference		1-3.03.17 Udaipur, Rajasthan
177.	Dr. Rakesh Kumar,	Sensitization workshop-cum-training for Extension Functionaries of KVKs & State Government	CIAE, Bhopal	CIAE, Bhopal 2-7.8.16
178.	Dr. Jagdish Grover Sukhwinder Singh	Workshop on Sharing learning, experiences on innovative cotton production technology	CICR, Sirsa	5.11.16 CICR, Sirsa
179.	Dr. Jagdish Grover, Dr. Rakesh Kumar, Gurdarshan Singh	Training cum workshop on 'Effective communication skills for transfer of technology'	PAU Ludhiana	12.7.16 PAU Ludhiana
180.	Dr. Munish Kumar, Astt. Prof. (Ani. Sci.)	Workshop cum training on 'Enabling Extension Functionaries to address field level problems in Animal Husbandry'	NDRI, Karnal	NDRI, Karnal, 22-25.8.16
181.	Dr. P.K. Ghuman, Dr. S.S. Aulakh, Dr. R.S. Chhina	Kisan Sammelan on the occasion of birth centenary of celebration of Pandit Deen Dayal Upadhyay Antyodaya Krishi Purushkar 2016	ICAR-ATARI, Zone-I, Ludhiana	25.9.2016 KVK, Samrala
182.	Dr Pawan Kumar Dr. Jasvinder Singh Dr. Rachna Singla Dr Maninder Singh Bons & Er. Ajaib Singh Dr. (Mrs.) P.K. Ghuman Dr. Mandeep Kaur Saini Dr. Mandeep Singh Dr. Sunil Kashyap	Cluster Frontline Demonstrations on Oilseeds of KVKs of ICAR-ATARI, Zone-I	ICAR-ATARI, Zone-I, Ludhiana	23.01.2017 PAU, Ludhiana
183.	Dr. (Mrs) P.K.Ghuman Dr. R.S. Chhina Dr. Satwinderjit Kaur Dr. Mandeep Kaur Saini Dr. R.K. Dular	Seminar on Horticultural crops	PAU, Ludhiana	25.02.2017 MS Randhawa Fruit Research Station, Gangian, Hoshiarpur

184.	Dr. Manoj Sharma Dr. Gurmeet Singh Smt. Ramandeep Kaur Dr. Mandeep Singh Dr. Ravinder Kaur Dr. Sunil Sh. Gurjant Singh	Orientation workshop on skill Development in Agriculture	Agri. Skill Council of India	26/10/16 to 28/10/16 PAU, Ludhiana
185.	Er Ankit Sharma	Brain storming workshop on converging liquid fertilizer/ fertigation and conservation Agriculture: A game Changing Paradigm for smallholder system of South Asia	BISA, Ladowal / PAMETI Ludhiana	19.11.16
186.	Ankit Gupta	Workshop on KVK Portal	ICAR-IASRI, New Delhi	09.03.2017
187.	Dr Gurmail Singh	Workshop on Sharing learning experience on innovative cotton production	ICAR ATARI, Ludhiana	5/11/2016
188.	Dr. Harinder Singh	District Level Workshop on Government Sponsored Schemes with Special emphasis on Solar Pumping, Solar Lighting, DEDS and ACABC Schemes"	Hotel Sahil Palace Rupnagar	20.7.2016
189.	Dr. Sanjeev Ahuja Dr. Harinder Singh Dr. Jugraj Singh Marok, Dr. Navjot Singh Dr. M.S.Bons & Er. Ajaib Singh	Seminar on 'Organic farming in kandi region of Punjab: Opportunities & limitations.	Regional Research Station, Ballowal Saunkhri	27.7.2016
190.	Dr. Harinder Singh	4th International Agronomy Congress	ICAR-IARI, New Delhi	22-26.11.2016
191.	Dr. Sanjeev Ahuja	Seminar on Horticulture crops	PAU Sub- station, Gangian (Hoshiarpur)	One day/ 25.2.2017
192.	Dr. Ashok Kumar	2nd capacity building participatory planning workshop for Nodal officers of Unnat Bharat Abhiyan.	NIRDPR, Hyderabad	31.3.2017-3.4.2017
193.	Dr. Satbir Singh	Workshop-cum-training on "Enabling Extension Functionaries to address Field level problems in Animal Husbandry	NDRI, Karnal	22-25.08.16 NDRI, Karnal
194.	Dr. Monika Choudhary	Nutrition risk management and communication	Nutrition Society of India	04-05.11.16 St. John's Research Institute, Bangaluru

195.	Dr. Sunil	Converging Liquid Fertilizers/ Fertigation and Conservation Agriculture: A Game Changing Paradigm for Smallholder Systems of South Asia"	ICAR	19.11.16 ICAR, ATARI Ludhiana
196.	Dr Sunil Kashyap	National Workshop on Skill Development	ICAR	05.01.17 NASC, Complex New Delhi
197.	Dr. Satbir Singh	Workshop-cum-training course on "Precision Livestock Management for Sustainable Animal Production"	GADVASU, Ludhiana	08.02.17 GADVASU, Ludhiana
198.	Dr. Monika Choudhary	Sustainable Development Goals: Preparedness and Role of Indian Agriculture	International Food Policy Research Institute (IFPRI) and the Trust for Advancement of Agricultural Sciences (TAAS)	11-12.5.17 NASC Complex, New Delhi
199.	Dr. Monika Choudhary	National Seminar on "Nutrition Sensitive Agriculture" organised by Deendayal Research Institute, New Delhi in collaboration with Ministry of Agriculture and Farmers Welfare, Government of India and Women and Child Development Department (Madhya Pradesh).	ICAR	23-24.06.17 ICAR Comlex, Barapani, Shillong
200.	Dr Rohit Gupta	Poultry Seminar	Animal Husbandry department, Jalandhar	Poultry seminar at Multidisciplinary training center, Animal Husbandry department, Jalandhar on 6.6.17,
201.	Dr.Kuldeep Singh	Conference on " Climate change adaptation and biodiversity : Ecological sustainability & Resource management for livelihood security."	ICAR CIARI , Port blair	ICAR CIARI , Port blair,8-10.12.16
202.	Dr Kanchan Sandhu	International conference on Alegal Technologies by IAPEN and Rahul Budha Vihar Prabhandak Commitee	IAPEN and Rahul Budha Vihar Prabhandak Commitee	Jallandhar ,14-16th July,2016
203.	Dr. Jasvinder Singh Dr. Rachna Singla Mrs. Suman Sethi Sh. Pankaj Sharma	Farmers seminar on improved crop varieties, storage and management of potatoes by CII, Chandigarh (15.5.2017)	Silver Oak, Patiala	(15.5.2017) Silver Oak, Patiala

204.	Dr. Gurupdesh Kaur	Seminar on nutrition sensitive agriculture in collaboration with Deen Dayal Research Institute, New Delhi and Ministry of Agriculture & Farmer's Welfare, Govt. of India (23-25 June, 2017) and presented poster	ICAR Research Complex for NEH at Shillong (Barapani)	(23-25 June, 2017) ICAR Research Complex for NEH at Shillong (Barapani)
205.	Dr. (Mrs.) Suman Kumari,	To attend International Conference on Entomology	Punjabi University, Patiala Punjab	3-5.12.2016 and Punjabi University, Patiala Punjab
206.	Er. Ajaib Singh	Sensitization Workshop cum Training on Recent Agricultural Engineering Technologies	CIAE, Bhopal	2-8-16 to 6-8-16 CIAE, Bhopal
207.	Dr. Mandeep Sharma	National Seminar on information and communication management concerning climate smart agriculture for sustainable development and poverty alleviation	RVSKVV, Gwalior, MP	28 to 30-11-16 RVSKVV, Gwalior, MP
208.	Dr Maninder Singh Bons Dr. Satwinderjit Kaur Dr. Mandeep Kaur Saini	National review workshop for cluster frontline demonstrations on oilseeds	IGKV, Raipur, Chhattisgarh	17 & 18-2-17 IGKV, Raipur, Chhattisgarh
2017-18				
209.	Dr. Shivani Rana	To attend training on Advanced strategic processing techniques for oilseeds to combat protein energy malnutrition and augment farmer's income	CIPHET, Ludhiana	1-21 .8. 2017
210.	Sh. Vicky Singh, AP (Soil Sc.), KVK, Ferozepur	21 days training on "West to wealth : Biocompost production in organic agriculture"	Division of Agronomy, ICAR, New Delhi	10- 30.8.2017
211.	Dr. Harinder Singh DD(T), KVK, Ropar	Workshop on "Revitalization of rural communities through productivity management initiatives"	at Indonesia	21- 25.8.2017
212.	Dr. Devinder Tiwari Dr. Jugraj Singh DDT, KVK, Langroya	To attend training on Remote Sensing (RS) Geographical Information System (GIS) and its applications for University Faculty/ Line Department Officials	Department of Remote Sensing, PAU Campus	28 – 15.9. 2017
213.	Sh. Vicky Singh, AP (Soil Sc.), KVK, Ferozepur	21 days CAFT training on "Extension strategies for nutrition sensitive agriculture to address sustainable development goals"	Division of Agril. Extn. ICAR, New Delhi	2- 22.9.2017
214.	Sh. Tejiner Singh, AP (Ani. Sc.) KVK, Langroya	CAFT training on "Advances in animal nutrition to improve livestock productivity"	ICAR-IVRI, Izatnagar	6-26 9.2017

215.	Dr. Gurdeep Singh AP (Ext. Edu), KVK, Mansa	21 days CAFT training on "Advances in international tech. for enhancing teaching learning and training competencies"		19.8.2017 to 6.9.2017
216.	Er. Ajaib Singh AP (Agril. Engg.) KVK, Bahowal	21 days training on "Machinery for conservation agriculture for mitigation and adaption of climate change"		5-25.9.2017
217.	Dr. Maninder Kaur DES (Agron) FASC, Sangrur	26th Asian pacific weed science society conference	Kyota, Japal	19- 22.9.2017
218.	Dr. Dimpy Raina AP (Hort) KVK, Fzr.	National conference on "Impact of agricultural technologies in enhancing growth and income"	Division of agril. economics & ABM SKUAST, Jammu	23- 24.10.2017
219.	Dr. Balvir Kaur AP (Hort) KVK, Nurmahal	International conference on "Advances in agricultural biodiversities conservation for sustainable development"	at CCS University, Meerut (UP)	27-28.10.2017
220.	Dr. Tejbeer Singh AP (An. Sci.) KVK, Langroya	CAFT training on "Selection of superior sires, pre breeding evaluation, quality semen production and fertility optimization in dairy animals, an update"	GADVASU, Ldh.	24.10.2017 to 13.11.2017
221.	Dr. BK Babbar, Department of Zoology	To learn about nano technological approaches in pest and disease management	National Bureau of Agricultural Insect Resources, Banglore	15-24.11.2017
222.	Sh. Ashok Kumar AP (PP) KVK, Ropar	International conference on "Plant health for human welfare"	University of Rajasthan, Jaipur	1- 4.11.2017
223.	Dr. Subash Singh Asstt. Entomologist o/o DEE Dr. Jasjinder Kaur AP (Pl. Prot.) KVK, Mansa Dr. Gurmail Singh AP (Pl. Prot.) KVK, Muktsar	21 days CAFT training on "Innovation strategies of plant protection for insect pest mgt. in changing agricultural scenario"	HAU, Hisar	8- 28.11.2017
224.	Sh. Ashok Kumar AP (Pl. Path) KVK, Ropar	CAFT training	GB Pant Uni. of Agri. & Tech. (Uttranchal)	22- 12.12.2017
225.	Dr. Arshdeep Kaur AP (Pl. Path.) KVK, Moga	CAFT training on "Innovative approaches and advances in insect biodiversity cen….."	TNAU, Coimbatore	30.11.2017 to 20.12.2017

226.	Sh. Gurmail Singh AP (Pl. Prot.) KVK, Muktsar	14 days training on "Identification of insect pest vector/their damaging symptoms and management"	at Pusa Campus, ICAR, New Delhi	21.11.2017 to 4.12.2017
227.	Dr. Sanjeev Ahuja AP (Hort) KVK, Ropar	6th national conference on "New frontier of Engg. Science management and humanities, ICNFESMH 2017"	Institute of Electronics & Tele Communication, Chandigarh	9.12.2017
228.	Dr. GPS Sodhi ADT, KVK, Mansa Dr. Karamjit Sharma Prtof. Extn. Edn. KVK, Muktsar Dr. Gurmail Singh AP (PP) KVK, Muktsar Dr. T.S. Riar Prof. of Extn. Edn. KKG, Ldh. Dr. Raminder Kaur Hundal AP (Agron) KVK, Amritsar Dr. Gurdip Singh AP (Extn.Edn.) KVK, Mansa Sh. Vicky Singh AP (SS) KVK, Fzr.	National conference on "Improving income of farmers through agriculture & allied sectors through development interventions"	ICAR, Central Institute of Fresh Water Agriculture	5- 7.1.2018
229.	Dr. Rajwinder Singh, , Department of Zoology	To learn about pesticide application techniques and safety measures	National Institute of Plant Health Management (NIPHM), Hyderabad, Telangana	15-19 .1.2018
230.	Dr RK Dhall	International training on "Intensive Vegetable Production and Modern Irrigation Technologies"	MATC- MASHAV's International Agricultural Training Center, Shefayim, Israel	(29th .1.2018 to 16.2.2018)
231.	Dr. Mandeep Singh ADT, KVK, Kheri	21st Punjab Science Congress	PAU, Ludhiana	7- 9.2.2018

232.	Dr. Satwinderjit Kaur AP (SS), KVK, Gsp. Dr. Ramesh Kumar AP (An.Sc.) KVK, Gsp. Dr. Dimpy Raina AP (Hort) KVK, Fzr.	National conference on "Innovative technological intervention for doubling farmers income"	SKUAST, Jammu	8- 10.2.2018
233.	Dr. Ankit Sharma AP (Agril. Engg.) KVK, Moga	21 days training on "Innovative approaches and ICT application in Extn. Res. & Teaching work"	at ICAR-Central Rice Research Institute, Cuttack	14.2.2018 to 6.3.2018
234.	Dr. Jatinder Mannan AP (Agron) KVK, Kapurthala	Training on "Statistical advances for agricultural data analysis"	at IASRI, New Delhi	13.3.2018 to 23.3.2018
235.	Dr S K Jindal, Department of Vegetable Science	To attend training on "Contemporary approaches to genetic resources conservation and use"	Wageningen University and Research, The Netherlands	9 -27 .4.2018
236.	Dr. Navjot Kaur Dhillon, AP (PB) KVK, Fatehgarh Sahib	Training on "Advanced computational and statistical tools for data analysis"	Acharya N.G. Ranga Agril. University Andhra Pradesh	21- 30.5.2018
237.	Dr. Amardeep Kour	International training on horticulture sector development for emerging markets	Wageningen Neitherland	14.5.2018 to 1.6.2018
238.	Dr. Gurupdesh Kaur Assoc. Prof. (HSc) KVK, Patiala Dr. Rachna Singla AP (Hort) KVK, Patiala Dr. Parvinder Singh AP (Fruit Sc.) KVK, Patiala	International workshop on "Nutrition sensitive agriculture on nutri smart village"	Bhopal	14.5.2018 to 16.8.2018
239.	Dr. Preetinder Kaur	To attend quarterly project review meeting and work with Dr Deborah Rees on research activities of Project "Bio-based Packaging for Fresh Food (BioFreshPak)" - CSS-94 (PC-6243) for the period from 16.06.2018 to 13.07.2018 at Natural Resources Institute, University of Greenwich, Kent, UK	Natural Resources Institute, University of Greenwich, Kent, UK	16.06.2018-13.07.2018

240.	Dr. Mandeep Kaur Saini, AP (Agron) KVK, Gurdaspur	CAFT training course on "Innovative approaches and strategies for higher profitability and sustainability in organic production system"	at MPUAT, Udaipur (Raj)	1- 21.6.2018
241.	Dr. Ashok Kumar AP (PP) KVK, Ropar Dr. Sunil Kashyap AP (PP) KVK, Pathankot	21 days training on "Production protocol for pro-fertilizer agents quality analysis and quality management of microbial bio pesticides and bio fertilizers"	NIPHM, Hyderabad	7- 27.6.2018
242.	Dr. Mandeep Singh AD (T) KVK, Kheri (Sangrur)	Orientation course on "WTO and its implications on agriculture"	at MANAGE, Hyderabad	4-6.6.2018

Annexure VII

IMPORTANT EVENTS ORGANISED AT PAU (2013 – 18) College of Agriculture

2013-14

Programme and date	Organizing/sponsoring agency
"Agro-processing and Machinery" (August 19-23, 2013)	Training Unit, Department of Processing and Food Engineering and Directorate of Extension Education, PAU
Agricultural Officers Workshop for *Rabi* crops (August 23-24, 2013)	PAU, Ludhiana
Training programme "Unconventional Breeding Approaches to Tackle Emerging Issues of Food Security" (September 10-30, 2013)	Department of Plant Breeding & Genetics, PAU, Ludhiana
QRT meeting on "Underutilized Crops"(September 12, 2013)	PAU, Ludhiana
Review & Planning Meeting of Project "Selection & Utilization of Water Logging Tolerant Cultivars in Pigeonpea" (September 24, 2013)	PAU, Ludhiana
Centre of Advanced Faculty Training (CAFT) on "Management Technologies for Improving Soil Quality and Crop Productivity" (Oct. 9 - 29, 2013)	ICAR, PAU Ludhiana
Training of scientists from Kenya under Trilateral Co-operation between India-Kenya-USA under Govt. Flagship Programme (February 04-09, 2014)	PAU Ludhiana/USDA
2nd National Conference on "Brassica" (February 14-16, 2014)	Society for Rapeseed –Mustard Research, Bharatpur
Training of 50 scouts in "Better Production of Cotton for Economic Growth, Farm Livelihood and Ecosystem Health" in Malwa region of Punjab (March 18-20, 2014)	Department of Entomology/ SRTT, Mumbai
Training of 50 scouts in Better Production of Cotton for Economic Growth, Farm Livelihood and Ecosystem Health" in Malwa region of Punjab (March 25-27, 2014)	Department of Entomology/ SRTT, Mumbai
Annual Group Meeting of All India Coordinated Cotton Improvement Project (April 7-9, 2014)	ICAR
State level training on "Direct Seeded Rice" (May 27, 2014)	Department of Agronomy, PAU, Ludhiana
Seminar on "Climate Change- Effects on Water Resources, Agriculture and Biodiversity" (May 28, 2014)	School of Climate Change & Agricultural Meteorology and Punjab Biodiversity Board, PSCST, Chandigarh
Training course on "Preparation and Dissemination of Agro-advisories" (July 11, 2014)	School of Climate Change & Agril. Meteorology

2014-15

Event	Organizing/sponsoring agency
National Group Meet (Rabi 2014-15) of "AICRP on Forage Crops" (Aug. 26 & 27, 2014)	PAU, Ludhiana

Review and Planning Workshop on "Major Rice Pest and Diseases in South Asia" (Sept. 15 &16, 2014)	In collaboration with International Rice Research Institute, Philippines
National Training Workshop on "Principles and Practices of Direct Seeded Rice" (September 22- Oct.1 2014)	Jointly organized by University of Adelaide, PAU and CCSHAU, Hissar. Sponsored by ACIAR, Australia
National Seminar on "Augmenting Processing and Shelf-Life of Perishable Food Products" (September 26, 2014)	National Productivity Council (NPC), New Delhi organised the seminar at PAU. Sponsered by Union Ministry of Food Processing Industries
USAID Funded Agriculture Innovation Project (AIP) Planning (October 8-10, 2014)	In collaboration with AVRDC-The World Vegetable Centre, Hyderabad; Department of Vegetable Science and Soil Water Engineering, PAU
National Symposium on "Crop Improvement for Inclusive Sustainable Development" (Nov. 7-9, 2014)	Indian Society of Genetics and Plant Breeding, New Delhi; Crop Improvement Society of India, Ludhiana; Indian Society of Plant Genetic Resources, New Delhi; Maize Technologists Association of India, New Delhi; Indian Council of Agricultural Research, New Delhi and PAU, Ludhiana
National Symposium on "Agriculture Diversification or Sustainable Livelihood and Environmental Security" (Nov.18-20, 2014)	Indian Society of Agronomy and Department of Agronomy, PAU, Ludhiana
Guava Show-cum-Seminar at Regional Fruit Research Station, Bahadurgarh (Nov. 27, 2014)	Department of Fruit Science, PAU and FRS, Bahadurgarh
Annual Maize Workshop (April 4-6, 2015)	PAU, Ludhiana
"4th Congress on Insect Science-Entomology for Sustainable Agriculture" (April 16 & 17, 2015)	Indian Society for Advancement of Insect Science in collaboration with PAU
One-day Stakeholder's Workshop on "Socio-Economic Considerations for GM Crops" (May 26, 2015)	Department of Extension Education and Division of Extension Education, IARI, New Delhi
Summer School on "Entrepreneurship Development Program" (July 8-28, 2015)	Department of Extension Education and ICAR, New Delhi

2015-16

Event	Organizing/sponsoring agency
Summer School on "Entrepreneurship Development Programme" (July 8-28, 2015)	Department of Extension Education, PAU
Training programme on "Mendelian Genetics to Molecular Genetics in Relevance to Plant Breeding" (August 5-27, 2015)	Department of Plant Breeding and Genetics, PAU
Annual Group Meet on "*Rabi* Pulses (Chickpea & MULLaRP)" and "Brain Storming Meeting on Promotion of Pulses in Indo-Gangetic Plains of India" (August 31 to September 3, 2015)	Department of Plant Breeding and Genetics, PAU
A 10-day "4th National Training Workshop on Principles and Practices of Direct Seeded Rice" (September 22 to October 1, 2015)	CCS Haryana Agricultural University, Hisar and Punjab Agricultural University, Ludhiana under the aegis of Australian Centre for International Agricultural Research (ACIAR), Australia

Short course entitled, "Advances in Genetic Improvement in Vegetables through Conventional and Biotechnological Approaches" (January 1-10, 2016)	Department of Vegetable Science, PAU, under the aegis of Indian Council of Agricultural Research, New Delhi
Basic Forest Guard Training (February 1 to March 31, 2016)	Department of Forestry and Natural Resources, PAU, and State Forest and Wildlife Preservation, Punjab
Training programme on "Nursery Production, Crop Management and Post-Harvest Handling of Horticultural Crops" (February 15, 2016)	Department of Fruit Science, PAU
Training course on "Pre-harvest Factors Affecting Post-harvest Life of Vegetables" (March 3, 2016)	Department of Vegetable Science, PAU
Basic Beekeeping Training Course (May 2-4, 2016)	Department of Entomology, PAU under the auspices of National Horticulture Mission
"10th Annual Workshop on Monitoring of Pesticides Residues at National Level" and "24th Annual Workshop of All India Network Project on Pesticide Residues" (May 25-27, 2016)	Department of Entomology, PAU, under the aegis of Department of Agriculture Cooperation and Farmers Welfare, Government of India, and Indian Council of Agricultural Research, New Delhi

2016-17

Event and Date	Organizing/Sponsoring Agency
Training course on "Mass Production of *Trichogramma* spp. for Use in Biological Control Programmes" (July 12 and August 10-12, 2016)	Biocontrol Section, Department of Entomology, PAU
Training programme on "Innovative Breeding Techniques for Development of Climate Smart Crop Varieties" (August 23 to September 12, 2016)	Department of Plant Breeding and Genetics, PAU, under the aegis of Centre for Advanced Faculty Training
-Training course on "Making Handmade Paper From *Lantana Camara* Biomass" (October 17-21, 2016) - Training course on "Use of Bush Cutter, Root Puller, Transporter, Charcoal Production Technology and *In situ* Moisture Conservation" (November 29, 2016; January 31, 2017 and March 3, 2017)	Department of Forestry and Natural Resources, PAU, in collaboration with Department of Science and Technology, Government of India
"Basic Beekeeping Training Courses" for scheduled castes at villages Gondwal (October 24-28, 2016), Baraich (November 7-11, 2016), Maherna (May 23-27, 2017) and Andloo (June 12-16, 2017)	Department of Entomology, PAU, under the auspices of *Rashtriya Krishi Vikas Yojna*
Training course on "Soil, Air and Water Pollution and Mitigation Strategies" (November 2-22, 2016)	Indian Council of Agricultural Research, New Delhi, under the aegis of Centre of Advanced Faculty Training
Advance training course on "Beekeeping" (February 6-9, 2017)	Directorate of Extension Education in association with Department of Entomology, PAU
Brain storming workshop on "Identification of Student Competencies in Higher Agricultural Education" (February 8, 2017)	Department of Extension Education, PAU, under ICAR Extra Mural Project
Training the Trainers Programme (March 6-8, 2017)	Department of Entomology, PAU, under the auspices of Agriculture Skill Council of India (ASCI)

"Bioinformatics Surgery" (March 21-24, 2017)	Punjab Agricultural University, Ludhiana, in collaboration with John Innes Centre, United Kingdom
National Group Meet of "All India Coordinated Research Project on Pearl Millet–*Kharif* 2017" (April 28-29, 2017)	Punjab Agricultural University, Ludhiana, in association with Indian Council of Agricultural Research, New Delhi
"Basic Beekeeping Training Course" for HSTC (May 2-4, 2017)	Department of Entomology, PAU, with the support of National Horticulture Mission
Refresher course on "Apiculture" for Gujarat personnel (May 8-12, 2017)	Department of Entomology, PAU
Summer school on "Technological Advances for Enhancing Productivity of Horticultural Crops" (June 7-27, 2017)	Indian Council of Agricultural Research, New Delhi

2017-18

Event and Date	Organizing/Sponsoring Agency
National Symposium on "Biorational, Approaches in Plant Diseases Management" (October 27-28, 2017)	Indian Society of Plant Pathologists, Department of Plant Pathology, PAU and Himalayan Society of Plant Pathology, Dr Y.S. Parmar University of Horticulture and Forestry (YSPUHF), Nauni, Solan, at YSPUHF
Centre for Advanced Faculty Training (CAFT) on "Conservation Agriculture and Soil Health" (November 1-21, 2017)	Department of Soil Science, PAU, under the aegis of ICAR
Training Workshop on "Simulation Modeling in Agricultural Research: Modeling Plant Disease Epidemics and Yield Losses" (November 13-15, 2017)	Indian Society of Plant Pathologists, Department of Plant Pathology, PAU
5th Workshop/Coordination Committee Meeting of Network Project on "Conservation of Lac Insect Genetic Resources" (November 14-15, 2017)	Biocontrol Section, Department of Entomology, PAU
Four training courses: Basic Beekeeping Training for farmers/farm women (November 20-27, 2017) Basic Beekeeping Training Course under National Horticulture Mission (January 8-12, 2018) Beekeeping Training Course for scheduled castes (January15-19, 2018) Advance Training Course in Beekeeping for Agricultural and Horticultural Development Officers, and scientists of *Krishi Vigyan Kendras* (February 6-9, 2018)	Department of Entomology, PAU
Indo-US Symposium on "Curbing Whitefly-Plant Virus: The Departure from Pesticides to Genomics Solutions" (December 4-5, 2017)	Punjab Agricultural University, Ludhiana and The University of Arizona, Tucson, USA
Pre-season training on "*South Asian Association for Regional Cooperation (SAARC)* Surveillance Tool Box" (December 12, 2017)	Department of Plant Breeding and Genetics, PAU, in collaboration with Indian Institute of Wheat and Barley Research (IIWBR), Karnal and Sathguru Management Consultants Pvt. Ltd., Hyderabad

Training course on "Mass Production and Utilization of Biocontrol Agents" for the technical staff of Nawanshaher Co-operative Sugar Mills Ltd., Nawanshaher, Shaheed Bhagat Singh Nagar; Morinda Co-operative Sugar Mills Ltd. Morinda, Roopnagar; and Biocontrol Laboratory, Regional Station, Abohar (March 6-7, 2018)	Biocontrol Section, Department of Entomology, PAU
Punjab Agri and Food Conclave: From Food Bowl of India to Food Processing Hub of India (May 16, 2018)	Confederation of Indian Industry, Government of Punjab and Punjab Agricultural University, Ludhiana
IXth All India Network Research Project on Onion and Garlic Group Meeting (June 8-10, 2018)	Department of Vegetable Science, PAU and ICAR - Directorate of Onion and Garlic Research, Pune

College of Agricultural Engineering and Technology

2013-14

Event	Organizing/sponsoring agency
Summer School on "Natural Resource Management and Technologies" (August 29 , 2013 to October 18, 2013)	FMPE and ICAR
National Seminar on "Sugarcane", organized by PAU and National Federation of Cooperative Sugar Factories Ltd. (NFCSF), New Delhi, (October 17, 2013)	PAU, Ludhiana
Interactive Seminar on "ISO 9001 Certification of Laboratories" by Mr. Amit Gupta, Chief Executive, ACS Registrars, Muzzaffar Nagar, UP, (November 15, 2013)	PAU, Ludhiana
Training Course on "Engineering Technologies for Crop Production and Environmental Control" for the students and faculty from Moscow State University of Environmental Engineering, Moscow, Russia (November 22 to December 4, 2013)	College of Agricultural Engineering & Technology MoU
Faculty workshop of "Quantitative Assessment of Course Outcomes (CO's) for accreditation under NBA (November 20, 2013)	PAU, Ludhiana
"Value addition in Agro-processing" (December 10-12, 2013)	Training Unit, Department of Processing and Food Engineering and Directorate of Extension Education, PAU
Research & Extension Specialists Workshop for Fruits, Mushroom, Agro-forestry along with Post-harvest Management, Farm Power & Machinery, Food Technology and Agricultural Economics (December 19-20, 2013)	PAU, Ludhiana
Collaborative training programme on "Farm Machinery with John Deere India at PAU (January 27- 29, 2014)	CAET, PAU, Ludhiana
Hands on training on "Operation and Programming of CNC Machines" for farm machinery manufactures employees & educated village youth (February 5-12, 2014)	Department of Farm Machinery and Power Engineering, PAU, Ludhiana.
Training course on "Setting-up of Agro-processing Complexes" (February 10-12, 2014)	Department of Processing and Food Engineering and Directorate of Extension Education

Training Workshop on "Office Productivity" (February 17 to 21, 2014)	School of Electrical Engineering & Information Technology
Agricultural Officers Workshop for *Kharif* Crops (February 24-25, 2014)	PAU, Ludhiana
Guest lecture "Accelerating Agricultural Growth – Role of Policy and Technology" by Dr. Ashok Gulati, Chairman Commission for Agricultural Costs & Prices (CACP), Ministry of Agriculture, Govt. of India organised by Dr. Gurdev Singh Khush Foundation for Advancement of Agricultural Sciences (February 26, 2014)	PAU, Ludhiana
Training Course on "Engineering Technologies for Crop Production" for the students and faculty from Moscow State Agro Engineering University, Moscow, Russia (March 3 to 13, 2014)	College of Agricultural Engineering & Technology MoU
National Training on "Ground and Remote Sensors Based Precision Farming for Small Fields" (March 18-28, 2014)	ICAR under NAIP
Campus to Corporate training programme "Learning Island" organized in collaboration with CLAAS India (March 28, 2014)	CAET, PAU, Ludhiana
"Setting-up of Agro Based Industries at Small Scale Level" (May 5-9, 2014)	Department of Processing & Food Engineering and Directorate of Extension Education, PAU
Research & Extension Specialists Workshop for Vegetables, Floriculture and Sericulture along with Post-harvest Management, Farm Power & Machinery, Food Technology and Agricultural Economics (May 22-23, 2014)	PAU, Ludhiana
"Storage and Processing of Horticultural Produce" (May 28-30, 2014)	Processing & Food Engineering and Directorate of Extension Education, PAU

2014-15

Event	Organizing/sponsoring agency
In-house Training program T1 on Agricultural Engineering for 2 batches of second year students of B.Tech (Agri. Engg.) (July 13-27, 2014) -In-house Training program T2 on Agricultural Engineering for 2 batches of Final Year students of B.Tech (Agri. Engg.) (April 3 – May 29, 2015)	Training Unit, COAE&T
State level "Awareness Meeting on Popularization of Solar Gadgets and Photo Voltaic Systems in Punjab" (Oct. 21, 2014)	Department of Mechanical Engineering, PAU
Training course on "Agro-Processing and Value Addition Machinery" (Dec. 10 – 12, 2014)	Training Unit, Department of Processing and Food Engineering in collaboration with Directorate of Extension Education, PAU
Training course on "Watershed Management" (Feb. 4 to March 5, 2015)	Rural Development Department, Punjab Govt.
-Training course on "Establishment of Agro Processing Complexes" (Feb. 9- 11, 2015) -Training course on "Agro Processing Technologies" for HDOs/ADOs/ KVK scientists (April 22-24, 2015) -Training course on "Setting-up of Agro Processing Industries" (May 11-15, 2015)	Training Unit, Department of Processing and Food Engineering in collaboration with Directorate of Extension Education, PAU

49th Convention of ISAE and International Symposium on "Engineering Solutions for Sustainable Agriculture and Food Processing" (Feb. 23-25, 2015)	Indian Society of Agricultural Engineers (ISAE) and College of Agricultural Engineering and Technology (COAE&T), PAU
Training course on "Engineering Technologies for Crop Production" organized for students and faculty from RTSAU-MTAA, Moscow (March 16 to 27, 2015)	Training Unit of COAE&T as a part of exchange program under the MoU with Russian Timiryazev State Agrarian University (RTSAU), Moscow, Russia
Training course on "Use of Laser Land Leveller" for Farmers (April 9, 2015)	Department of Farm Machinery and Power Engineering, PAU
Training course on "Use of Drip, Sprinkler Irrigation and Polyhouses" (April 15-17, 2015)	Training Unit, Department of Soil and Water Engineering in collaboration with Directorate of Extension Education, PAU
Training program on "Custom Hiring of Farm Machinery" (June 9 & 10, 2015)	Training Unit, Department of Farm Machinery and Power Engineering in collaboration with Directorate of Extension Education, PAU

2015-16

Event	Organizing/sponsoring agency
"Northern Regional Convention for Water User Association on Participatory Irrigation Management" (August 25-26, 2015)	Department of Soil and Water Engineering, PAU
-Training course on "Straw Management and Minimum Tillage Machinery" (September 8-9, 2015) -Training course on "Machinery and its Safety for Different Farming Operations" (January 14–15, 2016) -Training course on "Custom Hiring of Farm Machinery" (June 6-7, 2016)	Training Unit, Department of Farm Machinery and Power Engineering in collaboration with Directorate of Extension Education, PAU
Seminar on "Up-scaling Energy Efficiency and Sustainable Practices in Agriculture Sector" (November 3-4, 2015)	School of Energy Studies for Agriculture, PAU; Petroleum Conservation Research Association (PCRA) and PHD Chamber
Training course on "Operation and Maintenance of Submersible Pumps and Electric Motors" (November 4–6, 2015)	Training Unit, Department of Soil and Water Engineering in collaboration with Directorate of Extension Education, PAU
-Training session on "Careers and Start-ups: Leadership Shows the Way" and "Personality Development of Budding Agricultural Engineers" (December 7, 2015) -Training session on "Way to go from Campus to Corporate" (March 2, 2016) -In-house training programme T2 on "Agricultural Engineering" (April 7 to May 23, 2016) -Training course on "Sales and Marketing, Dealership Set-up" through video conferencing session by the team of four experts from John Deere, Pune (May 12, 2016)	Training Unit, College of Agricultural Engineering and Technology, PAU

-Training course on "Agro- Processing and Value Addition Machinery" (December 8-10, 2015) -Training course on "Establishment of Agro-Processing Complexes" (February 9-11, 2016) -Training course on "Agro-processing Technologies" for HDOs/ADOs/ KVKs (April 21-22, 2016) -Training course on "Establishment of Agro-based Industries at Small Scale Level" (May 16 to 20, 2016) -Training course on "Storage and Processing of Horticultural Products" (May 25 to 27, 2016)	Training Unit, Department of Processing and Food Engineering in collaboration with Directorate of Extension Education, PAU
Golden Jubilee Alumni Meet (December 19-20, 2015)	Alumni Association, College of Agricultural Engineering and Technology, PAU
Annual Review Meeting of AICRP on Farm Implement and Machinery (FIM) (January 28-30, 2016)	Department of Farm Machinery and Power Engineering, PAU
Online Video Conference on "Lipid Cane – New Sustainable Bio-Energy" (February 25, 2016)	School of Energy Studies for Agriculture, University of Illinois, USA and College of Agricultural Engineering and Technology, PAU, Ludhiana

2016-17

Event and Date	Organizing/Sponsoring Agency
-Orientation workshop on "MATLAB Software" (August 8, 2016)	School of Electrical Engineering and Information Technology, PAU
- Construction-cum-Maintenance Training Course (August 8-31, 2016) -Turnkey Workers/Self Employed Workers Training Courses (November 18 to December 7, 2016; December 19-28, 2016; and March 8-17, 2017)	Department of Civil Engineering, PAU and sponsored by Ministry of New and Renewable Energy, New Delhi, under the scheme "Regional Biogas Development and Training Centre (CSS-60)"
-In-house training programme T1 on "Agricultural Engineering" (August 19-20, 2016) -In-house training programme T2 on "Agricultural Engineering" (March 10-May 26, 2017)	Training Unit, College of Agricultural Engineering and Technology, PAU
-Workshop on "Study Opportunities in Foreign Institutions" (August 24, 2016) -Workshop on "Personality Development" under SMART series (November 16-17, 2016) -Training course on "Personal Grooming" (January 18, 2017) -Workshop on "Campus to Corporate" (January 21, 2017) -Training course on "Building Self-esteem and Self-confidence" (January 25, 2017) -Training course on "Leadership Skills" (February 8, 2017) -Training course on "Analyzing Strengths and Weaknesses" (February 22, 2017) -Group visit of students and faculty from Kelappaji College of Agricultural Engineering and Technology, Kerala Agricultural University, Tavanur, to PAU as a part of All India Educational Tour (April 3, 2017)	Training Unit and Placement, College of Agricultural Engineering and Technology, PAU

Winter school on advance training programme on "Resource Conservation and Paddy Residue Management" (October 4 – 25, 2016)	Department of Farm Machinery and Power Engineering, PAU, and Indian Council of Agricultural Research, New Delhi
Training programme under *Jal Kranti Abhiyan* (October 21, 2016)	Sponsored by Central Ground Water Board in association with Department of Soil and Water Engineering, PAU
-Training course on "Agro-processing and Value Addition" (December 12-14, 2016) -Training course on "Setting-up of Agro-based Industries" (February 7 - 9, 2017) -Training course on "Agro-processing Technologies" (April 20, 2017)	Training Unit, Department of Processing and Food Engineering in collaboration with Directorate of Extension Education, PAU
COAE&T Alumni Meet – Moments 2016 (December 17-18, 2016)	Alumni Association, College of Agricultural Engineering and Technology, PAU
Training course on "Machinery and its Safety for Different Farming Operations" (January 6, 2017)	Training Unit, Department of Farm Machinery and Power Engineering in collaboration with Directorate of Extension Education, PAU
Training programme on "Decision Support System for Selection of Pumping Units and Irrigation Scheduling" (January 21, 2017)	Punjab Agricultural University, Ludhiana
Training course on "Adjustments and Optimization of Combine Harvesters : Comprehensive Straw Management Begins With Harvest" (April 25, 2017)	Department of Farm Machinery and Power Engineering, PAU, and DEULA-Nienburg, Germany
Faculty development programme on "Networking Simulation (MANET, WSN and IOT) using NetSim Software" (May 11, 2017)	School of Electrical Engineering and Information Technology, PAU, in collaboration with DELLSOFT
Seminar-cum-group discussion on "Subsurface Drip Irrigation" (May 15, 2017)	Department of Soil and Water Engineering, PAU, and Borlaug Institute for South Asia (BISA)
Talk on "Improving Sustainability at the Food –Energy Water Nexus in Changing World" by Dr Mark Johnson, Associate Professor, University of British Columbia and Canada Research Chair, Institute for Resources, Environment and Sustainability, Vancouver (May 26, 2017)	Indian Society of Agricultural Engineers -Punjab Chapter

2017-18

Event and Date	Organizing/Sponsoring Agency
Turnkey Workers/Self Employed Workers Training Courses (August 16 to September 4, 2017 and October 23 to November 6, 2017)	Department of Civil Engineering, PAU, sponsored by Ministry of New and Renewable Energy, New Delhi, under the scheme "Regional Biogas Development and Training Centre (CSS-60)"
Construction-cum-Maintenance Training Course (September 5-17, 2017 and November 21-30, 2017)	

Quinquennial Review Team (QRT) meeting of the scheme "Farm Implements and Machinery" organized for eight centres (Punjab Agricultural University, Ludhiana; Haryana Agricultural University, Hisar; Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad; Indian Grassland and Fodder Research Institute, Jhansi; Indian Institute of Sugarcane Research, Lucknow; Indian Agricultural Research Institute, Delhi; *GB Pant University* of Agriculture and Technology, Pantnagar and Himachal Pradesh Krishi Vishwa Vidyalaya, Palampur) (November 6-8, 2017)	Department of Farm Machinery and Power Engineering, PAU
Collaborative Agriculture Extension Training Programmes for field engineers and executives (December 9-10, 2017; December 18, 2017; February 8-10, 2018 and February 26, 2018)	Training Unit, College of Agricultural Engineering and Technology with Mahindra and Mahindra and Department of Farm Machinery and Power Engineering, PAU
Two training courses on: Machinery and Its Safety for Different Farming Operations (January 11-12, 2018) Precision Technologies for Water Saving and its Recharging (February 15-16, 2018)	Training Unit in collaboration with Directorate of Extension Education and Department of Farm Machinery and Power Engineering, PAU
In-house training programme T2 on "Agricultural Engineering" (February 23 to May 11, 2018)	Training Unit in association with all departments of College of Agricultural Engineering and Technology, PAU
Training course on "Storage and Processing of Agricultural and Horticultural Produce" (May 24-25, 2018)	Training Unit in collaboration with Directorate of Extension Education and Department of Processing and Food Engineering, PAU

College of Home Science

2013-14

Event	Organizing/sponsoring agency
Orientation course on "Effective Teaching, Research and Extension" (August 21-30, 2013)	College of Home Science, PAU, Ludhiana
Training Course on "Latest Trends in Dress Designing & Home Furnishing" (January 13-17, 2014)	Department of Family Resource Management, PAU, Ludhiana
Inauguration of "Consumer Club" in the College of Home Science, PAU, Ludhiana (February 24, 2014)	Bureau of Indian Standards, Chandigarh branch
Celebration of "World Consumer Rights Day" (March 20, 2014)	Federation of Consumer Forum, Punjab
Workshop on "Autistic Spectrum and Attention Deficit Hyperactivity Disorder" (March 28, 2014)	Department of Human Development, PAU, Ludhiana
Workshop on "Developing Self Esteem" (March 29-30, 2014)	Department of Human Development, PAU, Ludhiana
Two-day workshop on "Psychological Assessment" (March 31 - April 1, 2014)	Department of Human Development, PAU, Ludhiana

One day workshop on 'Personality Development'. April 3, 2014	Department of Human Development, PAU, Ludhiana
Seminar on "Food Adulteration Awareness" (April 23, 2014)	Department of Food and Nutrition, PAU, Ludhiana

2014-15

Event	Organizing/sponsoring agency
Workshop on "M.Seal Art, Lamasa Art and Paper Mashie" (Aug. 25 & 26, 2014)	Department of Family Resource Management, PAU
Orientation Course on "Effective Teaching, Research and Extension" for newly recruited PAU faculty (Aug. 26 – Sept. 5, 2014)	Department of Home Science Extension and Communication Management, PAU
Short course on "Advances in Management of Children with Learning Disabilities" (Oct. 27-Nov. 5, 2014)	Indian Council of Agricultural Research, New Delhi
-Training Course on "Commercial Baking" (March 12 - June 11, 2015) -Workshop on "Bakery and Confectionary" (March 14- 15, 2015) -Training course on "Decorative Icings and Fondants" (March 31, 2015) -Short Training Course on "Cooking and Baking" (June 22- 26, 2015)	Department of Food and Nutrition, PAU
Workshop on "Art Creations using Fevicryl Colours/Craft Items" (May 4-6, 2015)	Department of Family Resource Management, PAU

2015-16

Event	Organizing/sponsoring agency
Orientation course on "Effective Teaching, Research and Extension" (August 18 to 28, 2015)	Department of Home Science Extension and Communication Management, PAU
-Inter-College Salad Making Competition (September 2, 2015) -Inter-School Nutrition Quiz (September 3, 2015) -Training course on "Baking Techniques" (November 2 to December 18, 2015) -Training course on "Decorative Icings and Innovative Bakery Products" (December 12-13, 2015) -Training course on "Craft Baker" (March 1 to April 22, 2016) -Training course on "Fondants and Icings" (March 29, 2016) -Short Training Course on "Cooking and Baking" (June 27-July 1, 2016)	Department of Food and Nutrition, PAU
Workshop on "Disability Rehabilitation: Issues and Challenges" (May 12-13, 2016)	Department of Human Development, PAU

2016-17

Event and Date	Organizing/Sponsoring Agency
-Orientation course on "Effective Teaching, Research and Extension" (October 30 to November 7, 2016) -Lecture on "Video Technology" by Dr Nishi Sethi, Director, Training, CCS Haryana Agricultural University, Hisar, Haryana (March 8, 2017) -Lecture on "Women Empowerment" by Dr Lali Yadav, Ex-Professor and Head, CCS Haryana Agricultural University, Hisar, Haryana (March 9, 2017)	Department of Extension Education and Communication Management, PAU

-Lecture on "Diabetes and Renal Nutrition" by Dr Nancy Sahni, Chief Dietitian, PGIMR, Chandigarh (February 23, 2017) -Workshop on "Innovative Bakery Products" (March 11-12, 2017) -Workshop on "Glazed Icing and Chocolate Making" (March 16-17, 2017) -Workshop on "Nutritious Biscuits" (April 3, 2017) -Workshop on "Nutritious Puddings" (April 27, 2017)	Department of Food and Nutrition, PAU
Workshop on "Rethinking Social and Emotional Development" (April 11-12, 2017)	Department of Human Development and Family Studies, PAU

2017-18

Event and Date	Organizing/Sponsoring Agency
-Orientation course on "Effective Teaching, Research and Extension" (November 7-17, 2017) - Four Workshops on: Photography (March 5, 2018) Desktop Publishing (March 7, 2018) Personality Development (March 9, 2018) Engaging Public through Effective Communication (May 4, 2018)	Department of Extension Education and Communication Management, PAU
Two Workshops on: Nutritious Biscuits and Cookies (March 28, 2018) Glazed Icing and Chocolate Making (April 4, 2018)	Department of Food and Nutrition, PAU
A Workshop on: Equipping Children for 21st Century (May 10-11, 2018)	Department of Human Development and Family Studies, PAU
Two Workshops on: Making Artifacts of Worli Art (May 24, 2018) Advance Quelling Techniques (May 25, 2018)	Department of Family Resource Management, PAU

College of Basic Sciences and Humanities

2014-15

Event	Organizing/sponsoring agency
2nd National Seminar on "Sustainable Agricultural Development" (March 3, 2015)	Society of Economics and Development
3rd All India Conference of Linguistics and Folklore (Theme: Emerging Trends in Language, Linguistics and Folklore) (May 28 & 29, 2015)	Department of Agricultural Journalism, Languages and Culture in collaboration with Punjab Linguistics Association, Patiala

2015-16

Event	Organizing/sponsoring agency
"75th Annual Conference of the Indian Society of Agricultural Economics" (November 19-21, 2015)	Department of Economics and Sociology, PAU
-Workshop on "Office Communication Skills" (January 19-25, 2016) -Workshop on "Journalistic and Creative Writing Skills " (February 26, 2016)	Department of Agricultural Journalism, Languages and Culture, PAU
One-day brainstorming session on "Strategies for Fostering Mushroom Production in Punjab" (February 25, 2016)	Department of Microbiology, PAU

Training programme on "Potato Seed Marketing Practices for Potato Seed Growers of Punjab" (June 9-10, 2016)	School of Business Studies, PAU

2016-17

Event and Date	Organizing/Sponsoring Agency
Dr S.S. Guraya Memorial Seminar on "Recent Advances in Reproduction" (October 12, 2016)	Zoological Society, PAU
Workshop on "Policy Dissemination" (November 10, 2016)	National Centre for Agricultural Economics and Policy Research (NCAP), New Delhi
National Seminar on "Doubling Indian Farmers' Income by 2022 : Opportunities and Challenges" April 7, 2017)	Society of Economics and Development, PAU

2017-18

Event and Date	Organizing/Sponsoring Agency
21st Punjab Science Congress "Scientific Advances for Inclusive Development and Environmental Protection" (February 7-9, 2018)	Organized by PAU and sponsored by Punjab Academy of Sciences
World Suicide Prevention Day (September 10, 2017)	PAU under National Agricultural Science Fund (ICAR) project
National Seminar on "Reproductive Health Advances for Adolescents" (September 7-8, 2017)	Department of Zoology, PAU



DELEGATION OF FINANCIAL POWERS BY THE BOM

SCHEDULE PART - B

DELEGATION OF FINANCIAL POWERS

S. No.	Nature of powers	Registrar/ Comptroller (Rs.)	Estate Officer -cum-Chief Engineer (Rs.)	Dean/ Director/ Librarian except Director of Research (Rs.)	Director of Research (Rs.)	Head of Deptt./ Addl. Director (C) (Rs.)	Professor & equivalent specially Authorized by Head of Deptt. (Rs.)	Group A Employees Specially authorized by Head of Deptt. or by Estate Officer (Rs.)	Deputy Registrar (Rs.)	Admn-cum-Account Officer (SPO) (Rs.)	Asstt. Registrar (Rs.)	Professor & equivalent Assoc. Director (Rs.)	Assoc. Prof. or equivalent (Rs.)	Addl. Director (Rs.)
1.	Purchase of books, periodicals, maps etc. for official use	Full powers to the extent of budget provision	Full powers to the extent of budget provision	25000 Librarian/ full powers to the extent of budget provision	No change	15000	2000 in a year in each scheme	500 in a year in each scheme	1000 a year	1000 a year	Nil	15000	1000 a year	20000
2.	To make local purchase of stationery for office in case of urgency	2000 a year	2000 a year	10000	10000	5000	1000 a year	No change	1000 a year	5000	1000 a year	2000 a year	1000 a year	5000
3.	To give out urgent printing work to a private press	2000 in each case (subject to the limit of Rs. 10000 a year)	2000 in each case (subject to the limit of Rs. 10000 a year)	50000 Librarian	50000	25000	2000 a year subject to no objection from PAU Press	500 in each case with limit of Rs.2500 subject to no objection from PAU Press	1000 in each case with limit of Rs.5000 subject to no objection from PAU Press	Full powers subject to no objection from PAU Press (Material to be got approved from the Dean/ Director concerned)	Nil	15000	500 in each case with limit of Rs. 5000 a year	No change
4.	To rent or lease buildings or lands for University work	2500 p.m. in each case	2500 p.m. in each case	2500 p.m. in each case	5000 p.m. in each case	2500 p.m. in each case	1000 p.m. in each case	Nil	Nil	1000 p.m. in each case	Nil	1500 p.m. in each case	Nil	1500 p.m. in each case
5.	To sanction permanent advance to a subordinate officer	No change	Upto Rs. 4000 for imprest	Full powers with the concurrence of Comptroller (Librarian upto Rs. 5000/- each case	Full powers with the concurrence of CAU (Librarian upto Rs. 5000/-)	Upto 1000 in each case	Nil	Nil	Nil	500/- p.m. in each case	Nil	Nil	Nil	Upto 1500 in each case
6.	To authorize urgent repairs of buildings of the Campus	No Change	No change	50000 in each case subject to no objection from E.O.	50000 in each case subject to no objection from E.O.	10000 in each case subject to no objection from E.O.	2000 in each case subject to no objection from E.O.	1000 in each case subject to no objection from E.O.	Nil	2000 in each case subject to no objection from E.O.	Nil	2000 in each case subject to no objection from E.O.	1000 in each case subject to no objection from E.O.	25000 in each case subject to no object-ion from E.O.

DELEGATION OF FINANCIAL POWERS BY THE BOM

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7.	To sanction purchase of store and articles of capital nature such as scientific instruments apparatus & machinery (including livestock)	200000 in each case	200000 in each case	200000 in each case	200000 in each case	100000 in each case	30000 in each case	Nil	Nil	30000 in each case	Nil	30000 in each case	30000 in each case	50000 in each case
8.	To sanction estimate to manufacture and repair in workshop controlled by PAU	Nil	Nil	25000	25000	10000 in each case	5000 in each case	No change	Nil	5000 in each case	Nil	10000 in each case	2000 in each case	15000
9.	To sanction purchase of stores required for the manufacture and repairs undertaken by the workshop	Nil	Nil	25000	25000 in each case	15000 in each case	5000 in each case	Nil	Nil	5000 in each case	Nil	15000 in each case	2000 in each case	20000
10.	Contact for sale of farms or garden produce	Nil	Nil	75000 in a year	100000 in a year	50000 in a year	10000 in a year	No change	Nil	50000 in a year	Nil	20000 in a year	5000 in a year	---
11.	To dispense with earnest or security money when plants and machinery, implements, spares etc. are supplied and erected by the firms of undoubted financial standing and repute	Nil	Full powers	Full powers	Full powers	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
12.	To sanction the purchase and manufacture of the office furniture and necessary estimate thereof	5000 a year	5000 a year	25000	25000	15000	2000 a year	1000 a year	2000 a year subject to budget provision	2000 a year subject to budget provision	Nil	15000 a year	1000 a year	20000
13.	To sanction hiring of furniture	1000 for offices under him and 500 for his own offices not more than a period of two months in a year	1000 for offices under him and 500 for his own offices not more than a period of two months in a year	15000	15000	3000	1000 a year	500 a month not exceeding two months in a year	500 a month not exceeding two months in a year	1000 a year	Nil	3000	--	4000



DELEGATION OF FINANCIAL POWERS BY THE BOM

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14.	To sanction the purchase of Tents and Chowldaries	1000 in each case	1000 in each case	Full powers with the concurrence of the CAU (Librarian upto 25000)	Full powers with the concurrence of the CAU (Librarian upto 25000)	15000	500 in each case	Nil	Nil	1000 in each case	Nil	15000 in each case	500 in each case	20000
15.	To sanction purchase of type writer, duplicators and calculating machines	5000 for offices under them not including purchase for their own offices	5000 for offices under them not including purchase for their own offices	25000 for offices under them not including purchase for their own offices	25000 for offices under them not including purchase for their own offices	15000 in each case	5000 in each case	Nil	Nil	10000 in each case	Nil	15000 in each case	1000 in each case	20000 for offices under them not including purchase for their own offices
16.	To dispose off through commission agent or by auction or otherwise stocks (as disinct from surplus stock) of articles manufactured in workshop	Nil	Nil	2000	1500	1000	Nil	Nil	Nil	1000	Nil	Nil	Nil	Nil
17.	To sanction the refunds of revenue	No change	No change	Full powers with the concurrence of the CAU (Librarian-No change)	Full powers with the concurrence of the CAU (Librarian-No change)	Nil	Nil	Nil	Refund of exam fee upto 250 in each case	Nil	Refund of exam fee upto 100 in each case	Nil	Nil	250 in each case
18.	To write off losses arising from stores of any kind (including machinery, implements, bullocks, horses, misc, articles etc. purchased from farm or any other grants) which deteriorate to become surplus or unserviceable to the extent that they must be sold or written off	1000 in each case	1000 in each case	5000 in each case	2000 in each case	2000 in each case	1000 in each case	250 in each case	100 in each case	2500 in each case	100 in each case	1000 in each case	1000 in each case	3000 in each case

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19.	(i) To write off irrecoverable dues of seed stores farms and gardens in cases in which recovery is not practicable	No change	Nil	2000 in each case	1500 in each case	1000 in each case	500 in each case	Nil	Nil	1000 in each case	Nil	500 in each case	250 in each case	1000 in each case
	(ii) To write off losses of store due to unusual occu-rrence e.g. damage by weevils, rats, white-ants, rains etc.	Nil	Nil	1% of total stock subject to a maximum of Rs. 2000	1% of total stock subject to a maximum of Rs. 2000	1% of total stock subject to a maximum of Rs. 2000	1% of total stock subject to a maximum of Rs. 1000	Upto Rs. 200 in a year	Upto Rs. 200 in a year	Nil	Upto Rs. 100 in a year	1% of total stock subject to a maximum of Rs. 1000	1% of total stock subject to a maximum of Rs. 1000	1% of total stock subject to a maximum of Rs. 1500
20.	To write-off losses due to petty thefts, weighments and in transit	No change	Upto 1000	Upto 10% of total stock	Upto 10% of total stock	Upto 5% of total stock	Nil	Upto 100	Upto 200	Upto 5% of the total stock	Upto 100	Upto 2% of the total stock	Upto 2% of the total stock	Upto 7.5% of the total stock
21.	To write-off dryage in plants and grafts	Nil	Nil	Nil	Nil	No change	Nil	Upto 2% of the total stock	Nil	Upto 5% of the total stock	Nil	Upto 2% of the total stock	Upto 2% of the total stock	Nil
22.	To sanction expen-diture on demons-tration of implements seeds & fertilizer etc.	Nil	Nil	10,000 in each case	20,000 in each case	5,000 in each case	3,000 in each case	1,000 in each case	Nil	Nil	Nil	3,000 in each case	2,000 in each case	5,000 in each case
23.	To sanction at a reduced rate sur-plus stock (seed, plants and grafts)	Nil	Nil	Upto 10 lb of seed of each kind and value not exceeding 1000 in each case	Upto 10 lb of seed of each kind and value not exceeding 1000 in each case	Upto 10 lb of each kind and value not exceeding 1000 in each case	Nil	Upto 250 in each case	Nil	Upto 10 lb of seed of each kind and value not exceeding 500 in each case	Nil	Nil	Nil	Upto 10lb seed of each kind and value not excee-ding 1000 in each case



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24.	To sanction payment of demurrage wharfage charges	No change	No change	1000	No change	500 in each case	Nil	Nil	Nil	Nil	Nil	500 in each case	Nil	No change
25.	To sanction expenditure in connection with civil suits instituted with sanction of the Vice-Chancellor	No change	No change	No change	2000	500	Nil	200 in each case	200 in each case	200 in each case	Nil	Nil	Nil	Nil
26.	To sanction expenditure on book binding (including other binding works)	No change	No change	5000	5000	3000	Nil	250 in each case	Nil	500 in each case	Nil	3000	Nil	4000
27.	To sanction hiring of typewriters required for existing and new offices	No change	No change	Upto one year	Upto one year	Upto six months	Upto six months	Upto 3 months	Nil	Upto six months	Nil	Upto six months	Upto six months	---
28.	To sanction purchase of bicycle for the use of their own offices as well as for the subordinate offices	No change	No change	25000	No change	15000	Nil	Nil	Nil	Full powers	Nil	15000	Nil	No change
29.	To sanction supply of liveries summer clothing to employees of the University	No change	No change	No change	No change	15000	Nil	Nil	Nil	Full powers	Nil	15000	Nil	No change
30.	To sanction expenditure for prizes and awards	Upto 2000	Nil	Upto 4000 per function	Upto 4000 per function	2000 per function	Nil	Nil	Nil	1000 per function	Nil	1000 per function	1000 per function	---
31.	To sanction scholarship or stipends in the colleges	Full powers as laid down prospectus of the institute or scheme	Nil	Full powers as laid down prospectus of the institute or scheme	Full powers as laid down prospectus of the institute or scheme	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

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32.	To remit late fee fines imposed on students	Full powers according to the prescribed rules	Nil	Full powers according to the prescribed cribed rules	Full powers according to the pres-cribed rules	Full powers according to the pres-cribed rules	Nil	Nil	Full powers according to the pres-cribed rules	Full powers according to the pres-cribed rules	Nil	Nil	Nil	Nil
33.	To sanction expen-diture connected with fruit, vege-tables and other agricultural and livestock shows	Nil	Nil	10000 in each case	10000 in each case	No change	Nil	Nil	Nil	1000 in each case	Nil	Nil	Nil	1500 in each case
34.	To sanction employ-ment of skilled and unskilled labour on daily and monthly wages	Full powers for University press	No change	No change	No change	No change	Nil	Nil	Nil	Full powers at rates pub-lished as rea-sonable by D.C. con-cerned and subject to the condition that the period of employment does not ex-ceed 12 months at a time in the case of a monthly paid labour	Nil	Full powers at rates pub-lished as rea-sonable by D.C. con-cerned and subject to the condition that the period of employment does not ex-ceed 12 months at a time in the case of a monthly paid labour	Full powers at rates pub-lished as reasonable by D.C. con-cerned and subject to the condition that the period of employment does not ex-ceed 12 months at a time in the case of a monthly paid labour	---
35.	To fix limits of security deposits of University emp-loyees and to prescribe method of recovery thereof	Full powers/ limit of security in each case to be fixed in consultation with CAU	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
36.	To fix sale rate of agricultural, dairy and poultry prod-ucts, nursery plants bacterial culture etc.	Nil	Nil	Full powers provided that the rates fixed are not less than the prevailing market rates	Full powers provided that the rates fixed are not less than the prevailing market rates	Full powers provided that the rates fixed are not less than the prevailing market rates	Nil	Nil	Nil	Full powers provided that the rates fixed are not less than the prevailing market rates	Nil	Full powers in perishable commodity provided that the rates fixed are not less than the pre-vailing market rates	Full powers in perishable commodity provided that the rates fixed are not less than the pre-vailing market rates	---



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37.	To fix rates of commission payable to commission agents etc. on sale of agricultural production etc.	Nil	Nil	No change	No change	No change	Nil	Nil	Nil	Full powers subject to the control of Dean/Director	Nil	Nil	Nil	---
38.	To lay down scales for the issue of concentrate fodder etc. for feeding livestock	Nil	Nil	No change	No change	No change	Nil	Nil	Nil	Full powers subject to the control of Dean/Director	Nil	Nil	Nil	---
39.	To declare animals, agricultural produces nursery plants, fruit trees, FYM compost etc. as surplus to requirement	Nil	Nil	No change	No change	20000	20000	Upto 5000 in each case	Nil	20000	Nil	20000 in each case	10000 in each case	---
40.	To declare animals, agricultural produces, nursery plants, fruit trees, FYM compost etc. as unserviceable	Nil	Nil	No change	No change	20000 in each case	Nil	Upto 1000 in each case	Nil	2000 in each case	Nil	Upto 2000 in each case	Upto 1000 in each case	---
41.	To sanction sale of animals, agricultural produce, nursery plants, fruit trees, FYM Comp. declared surplus by competent authority at book value or mkt. value whichever is greater	Nil	Nil	150000 in each transaction subject to any condition imposed by V.C.	150000 in each transaction subject to any condition imposed by V.C.	Upto 100000 in each transaction subject to any condition imposed by V.C.	Upto 2000 in each transaction subject to any condition imposed by V.C.	Upto 5000 in each transaction subject to any condition imposed by V.C.	Nil	Upto 50,000 in each transaction subject to any condition imposed by V.C.	Nil	Upto 40,000 in each transaction subject to any condition imposed by V.C.	Upto 15000 in each transaction subject to any condition imposed by V.C.	---
42.	To sanction sale by public auction of animals agricultural produce, nursery plants, fruits, trees, FYM compost etc. declared surplus or unserviceable by competent authority	Nil	Nil	150000 in each transaction	150000 in each transaction	100000 in each transaction	20000 in each case subject to any condition imposed by V.C.	2000 in each case subject to any condition imposed by V.C.	Nil	50000 in each transaction	Nil	30000 in each transaction subject to any condition imposed by V.C.	10000 in each transaction subject to any condition imposed by V.C.	

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43.	To sanction disposal by sale or otherwise of animals, agricultural produce, nursery plants, fruit trees, FYM compost etc. declared unserviceable by the competent authority	Nil	Nil	Upto 10000 in each transaction (subject to any condition imposed by V.C.)	Upto 10000 in each transaction (subject to any condition imposed by V.C.	Upto 4000 in each transaction (subject to any condition imposed by V.C.	Upto 2000 in each transaction	Upto 1000 in each transaction	Nil	Upto 2000 in each transaction	Nil	1000 in each transaction (subject to any condition imposed by) V.C.)	1000 in each transaction (subject to any condition imposed by V.C.)	---
44.	To sanction sale of seeds and seedlings at market rates	Nil	Nil	No change	No change	No change	Nil	Nil	Nil	Full powers subject to control of Dean/Director	Nil	Nil	Nil	---
45.	To sanction write-off of books periodicals and maps/ lost or rendered unserviceable	No change	No change	2000 in each case	2000 in each case	No change	Nil	Upto 500 in each case	Nil	Upto 500 in each case	Nil	Nil	Nil	---
46.	To write-off the value of animals died or destroyed	Nil	Nil	No change	No change	No change	Nil	No change	Nil	Upto 5000 in each case	Nil	Nil	Nil	---
47.	To fix rates of depreciation in respect of articles of stores and livestock	Nil	Nil	Full powers with the concurrence of the CAU (Librarian-Nil)	Full powers with the concurrence of the CAU (Librarian-Nil)	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	---
48.	To approve mortality in young nursery etc.	Nil	Nil	No change	No change	Full powers	Nil	Nil	Nil	Full powers	Nil	Nil	Nil	---
49.	To approve mortality in mature plants	Nil	Nil	No change	No change	Full powers	Nil	Nil	Nil	Full powers	Nil	Nil	Nil	---
50.	To declare articles of store or stock surplus or unserviceable	No change	Upto book value of 2500 in each case	Full powers with the concurrence of the CAU (Librarian No change)	Full powers with the concurrence of the CAU (Librarian No change)	Upto book value of 2000 in each case	Upto book value of 2000 in each case	Upto book value of 1000 in each case	Upto book value of 1000 in each case	Upto book value of 1000 in each case	Nil	Upto book value of 2000 in each case	Upto book value of 1000 in each case	---



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51.	To sanction the sale of articles of stores or stocks declared surplus or unserviceable by competent authority	No change	Upto 7500 in each transaction	Full powers with the concurrence of the CAU (Librarian upto 7500 in each case)	Full powers with the concurrence of the CAU (Librarian upto 7500 in each case)	Upto 5000 in each transaction	Nil	Upto 2000 in each transaction	Upto 2000 in each transaction	Upto 5000 in each transaction	Nil	Upto 4000 in each case	Upto 3000 in each case	---
52.	To sanction expenditure on service postage stamps for use in office and institutions	No change	No change	Full powers with the concurrence of the CAU (Librarian upto 10000)	Full powers with the concurrence of the CAU (Librarian upto 10000)	10000	2000 at a time	2000 at a time	Upto 1000 at a time	5000 at a time subject to the budget provision	Nil	10000	2000 at a time	15000 at a time
53.	To sanction expenditure on ordinary postage stamps (foreign postages)	Upto 1500 per annum	Upto 1500 per annum	Full powers with the concurrence of the CAU (Librarian upto 1500 per annum	Full powers with the concurrence of the CAU (Librarian upto 1500 per annum	1000 per annum	Nil	500 per annum	500 per annum	1000 per annum	500 per annum	100 per annum	100 per annum	---
54.	To sanction write-off finally or irrecoverable value of stores or public money lost by fraud or negligence of individuals or similar cases	No change	No change	No change	No change	No change	Nil	Upto 50 in each case	500 annually	Upto 500 in each individually case	Nil	Nil	Nil	---
55.	To sanction expenditure on entertainment functions etc.	5000	5000	5000 Librarian 1000 in each case	5000 in each case	2500 in each case	500 in each case	Nil	500 in each case	1000 in each case	Nil	500 in each case	250 in each case	1000 in each case
56.	To sanction contingent expenditure not otherwise provided for in these delegation orders	Registrar upto 25,000 in each case and full powers in respect of payment of electricity charges only 50,000 in each case full powers in	60,000	Deans/ Directors 60,000 and full powers Librarian upto 15000 for any one time	70,000 and full powers #	Upto 40,000 for any one time	10,000	Nil	2,000 in each case	15,000 at a time	Nil	40,000 and 70,000 # (see note below)	Upto 10,000 in each case (30,000 # in each case to the Assoc. Prof. (trg). The Incharge of KVKs is 3700-5700 scale (see note below)	50,000 and 1,00,000 # (see note below)

DELEGATION OF FINANCIAL POWERS BY THE BOM

S. No.	Nature of powers	Registrar/ Comptroller (Rs.)	Estate Officer -cum-Chief Engineer (Rs.)	Dean/ Director/ Librarian except Director of Research (Rs.)	Director of Research (Rs.)	Head of Deptt./ Addl. Director (C) (Rs.)	Professor & equivalent specially Authorized by Head of Deptt. (Rs.)	Group A Employees Specially authorized by Head of Deptt. or by Estate Officer (Rs.)	Deputy Registrar (Rs.)	Admn-cum-Account Officer (SPO) (Rs.)	Asstt. Registrar (Rs.)	Professor & equivalent Assoc. Director (Rs.)	Assoc. Prof. or equivalent (Rs.)	Addl. Director (Rs.)
		respect of advertisement of the Univ. in various newspapers and in respect of advertisement of the Univ. in various newspapers and in respect of payment of electricity charges only												
57.	Powers to sanction printing of technical reports	Nil	Nil	Full powers with the concurrence of the Comptroller (Librarian upto 25000)	Full powers with the concurrence of the Comptroller (Librarian upto 25000)	Upto 15000	Nil	Nil	Nil	Upto 2000 at a time	Nil	Upto 15000 at a time	Upto 1000 at a time	20000
58.	To renew liveries etc. at the University expenses before the prescribed period	Full powers	Full powers	Full powers	Full powers	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
59.	Waiving of the discrepancies relating to stores received short or found damaged in respect of overseas consignments received in an unopen and outwardly good condition	Upto the value of 500 in each case	Upto the value of 500 in each case	Upto the value of 500 in each case	Upto the value of 500 in each	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
60.	To sanction the waiving in half or whole of recover-	upto 1000/-	upto 1000/-	upto 1000/-	upto 1000/-	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil



DELEGATION OF FINANCIAL POWERS BY THE BOM

S. No.	Nature of powers	Registrar/ Comptroller (Rs.)	Estate Officer -cum-Chief Engineer (Rs.)	Dean/ Director/ Librarian except Director of Research (Rs.)	Director of Research (Rs.)	Head of Deptt./ Addl. Director (C) (Rs.)	Professor & equivalent specially Authorized by Head of Deptt. (Rs.)	Group A Employees Specially authorized by Head of Deptt. or by Estate Officer (Rs.)	Deputy Registrar (Rs.)	Admn-cum-Account Officer (SPO) (Rs.)	Asstt. Registrar (Rs.)	Professor & equivalent Assoc. Director (Rs.)	Assoc. Prof. or equivalent (Rs.)	Addl. Director (Rs.)
	ies of charges pointed out by audit													
61.	To sanction over-time allowance ministerial staff, peons, daftries, drivers etc.	Full powers in respect of employees working under them	Full powers in respect of employees working under them	Full powers in respect of employees working under them	Full powers in respect of employees working under them	Full powers in respect of employees working under them	Nil	Nil	Nil	Full powers in respect of employees working under them	Nil	Nil	Nil	---

Note : The powers delegated in this schedule are subject to provision of funds, scales fixed and procedure prescribed.

* A.S.P.O. authorised to sanction expenditure upto Rs. 5000/- for any one item in the absence of A.O. (S.P.O.)

In case of purchase of fertilizers, pesticides (insecticides, weedicides and fungicides) and food/fodder and agril. operations e.g. fixing of rates of combines, tractors, transplanting of paddy, picking of cotton, hiring of contractors, labour etc. in respect of electricity charges only.

Annexure iX

Faculty Awards at National Level

2013-14

Name	Award/Honour
Dr B.S. Dhillon	J.C. Bose Fellowship Award, Department of Science & Technology (DST)
Dr S.S. Kukal	Nominated Member of Sustainable Rice Platform, UNEP (2013-15)
Dr P.S. Aulakh	Shri G.L. Chadha Gold Medal by Horticultural Society of India
Dr S.S. Banga	ICAR National Professor
Dr V.K. Benbi	ICAR National Professor
Dr Bijay Singh	INSA Senior Scientist
Dr G.S. Buttar	Dhiru Morarji Memorial Award by FAI
Dr G.S. Buttar	Distinguished Scientist Award by Society of Recent Developments in Agriculture
Dr S.S. Walia	Gold Medal by Society of Recent Developments in Agriculture
Dr S.S. Kukal	12th International Congress Commemoration Award, Indian Society of Soil Science, New Delhi
Dr M.S. Dhaliwal	Fellow, Indian Society of Vegetable Science
Dr Gulshan Mahajan	NAAS Associate
Dr Gulshan Mahajan	Fellow, Indian Society of Weed Science
Dr Neerja Sharma	Fellow, Indian Society of Agricultural Biochemists
Dr (Mrs.) Rajinder Kaur Kalra	Recognition Award, Indian Society of Extension Education
Dr N.K. Khullar	Best Teacher of the Chapter Award from ISTE
Dr S. K. Jawandha	Shiksha Rattan Puraskar by IIFS, New Delhi
Dr Shashi Banga	Fellow by Society for Rapeseed-Mustard Research, Bharatpur
Dr V. K. Sardana	Fellow by Society for Rapeseed-Mustard Research, Bharatpur
Dr Anoop Dixit	Certificate of Appreciation by the Indian Society of Agricultural Engineers during the 48th Annual Convention held at MPUAT, Udaipur
Er. Arshdeep Singh	Certificate of Appreciation by the Indian Society of Agricultural Engineers during the 48th Annual Convention held at MPUAT, Udaipur

2014-15

Dr B.S. Dhillon	B.P. Pal Award (NAAS)
Dr Neelam Grewal	Member, Panel of Experts for NASI-ICAR Award for Innovation and Research on Farm Implements by ICAR; Member, Task Force on Micronutrients by ICMR, New Delhi; and Member, Management and Monitoring Committee on Women in Agriculture by DAC, Ministry of Agriculture, Government of India
Dr Manmohanjit Singh	Sumer Memorial Award, Soil Conservation Society of India
Dr S.K. Chauhan	Coordinator of International Union of Forestry Research Organization, Short Rotation Forestry Unit, Vienna
Dr Hari Ram	Distinguished Scientist Award by Society for Scientific Development in Agriculture & Technology, Meerut
Dr H.S. Thind	NAAS Fellow
Dr S.S. Kukal	NAAS Fellow
Dr G.S. Buttar	NAAS Fellow
Dr Jagmeet Kaur	Fellow, Indian Society of Pulses Research and Development
Dr Sarvjeet Singh	Fellow, Indian Society of Pulses Research and Development
Dr Navneet Aggarwal	Fellow, Indian Society of Pulses Research and Development

Dr Samanpreet Kaur	Jawaharlal Nehru Award For Outstanding Doctoral Thesis Research In Natural Resource Management
Dr Samanpreet Kaur	NAIP-ICAR Fellowship
Dr Rakesh Sharda	Appreciation letter from Agriculture Commissioner, GoI for research on Protected Cultivation
Dr Satnam Singh	Raman Post-Doctoral Fellowship by UGC, New Delhi to work in the Department of Entomology, University of Kentucky, USA for a period of one year
Dr Manmeet Kaur	Presidential Appreciation Award 2015" from Society for Community, Mobilization and Sustainable Individual Development, IARI, New Delhi
Dr Rohinish Khurana	ISTE Best Teacher of the Chapter Award" from ISTE Section Faculty Convention (Punjab, Chandigarh, Himachal Pradesh, and Jammu & Kashmir)
Dr J.K. Gulati	Recognized as National Resource Person-2014 by Ministry of Human Resource Management and United Nations Population Fund
Dr J.K. Gulati	Selected as a member of the expert group of United Nations Population Fund for developing a proposal for assuring quality of life skills integrated self learning material.
Dr Tejpreet Kang	Professional Commitment Award 2014 from Academy for Instructional Planning (IAIP), Indore

2015-16

Dr Baldev Singh Dhillon	Lifetime Achievement Award by Punjab Science Academy
Dr Yadwinder Singh	Prof. K.S. Bilgrami Memorial Prize, Indian National Science Academy (INSA)
Dr Harmanjit Singh	FAI Golden Jubilee Award for Outstanding Doctoral Research in fertilizer usage
Dr G.S. Manes	Commendation Medal, Indian Society of Agril. Engineers (ISAE)
Dr H.S. Dhaliwal	Fellowship of Horticultural Society of India
Dr J.S. Mahal	ISAE Fellow Award
Dr Gurpreet Singh Makkar	Achiever Award 2015 from Dr Y.S. Parmar University of Horticulture and Forestry, Nauni, Solan.
Dr Sukhpal Singh	Vice-President of Indian Society of Agricultural Economics
Dr Baljinder Kaur Sidana	Dr N. A. Mujumdar Prize Award 2015 by Indian Society of Agricultural Economics
Dr Sandeep Singh	ICAR Certificate of Appreciation for developing PAU Fruit Fly Trap

2016-17

Dr W.S. Dhillon	Distinguished Scientist Award from High-Tech Horticultural Society of India
Dr T.S. Thind	Dr Y.L. Nene Outstanding Plant Pathology Teacher Award, Indian Society of Mycology & Plant Pathology
Dr M.S. Hadda	Gold Medal, Soil Conservation Society of India
Dr A.S. Dhatt	Fellow of Horticultural Society of India
Dr P.S. Sandhu	Fellow of the Society for Rapeseed-Mustard Research, Bharatpur
Dr PPS Gill	Fellow Award 2017 from Society for Plant Research, Meerut
Dr U.S. Tiwana	Society Fellow Award 2017 from Range Management Society, Jhansi
Dr Ramanna Koulagi	Professor D.J. Raski Academic Merit Award 2016" from Nematological Society of India, IARI, New Delhi
Dr T.S. Thind	Y.L. Nene Outstanding Plant Pathology Teacher Award 2016 by Indian Society of Mycology and Plant Pathology, Udaipur
Dr Shayla Bindra	Gold Medal by Himotkarsh Sahitya Sanskriti Avem Jan Kalyan Parishad, Himachal Pradesh, in 2017

Dr Navprem Singh	Appreciation Certificate from ICAR-National Research Centre on Litchi in 2017 for commitment to furtherance of litchi research in Punjab
Dr N.K. Khullar	Best Teacher Award 2017 from the Indian Society for Technical Education

2017-18

Dr K.K. Sharma	Young Scientist Award 2017" by Society for Scientific Development in Agriculture and Technology, Jhansi.
Dr Prakash Mahala	Young Scientist Award from All India Agricultural Students Association (AIASA), New Delhi.
Dr Prakash Mahala	"Best Ph.D. Thesis Award 2017" from Society for Scientific Development in Agriculture and Technology.
Drs N.S. Bains, V.S. Sohu, Kuldeep Singh, Parveen Chhuneja and G.S. Mavi	Gene Stewardship Award 2018 by Borlaug Global Rust Initiative (BGRI).
Dr Mehak Gupta	Young Scientist Award 2018" from Indian National Science Academy (INSA), New Delhi.
Dr Ashok Kumar Dhakad	Junior Scientist of the Year Award - 2017" from National Environmental Science Academy, New Delhi.
Dr Ravinder Singh	Fellows of Indian Society of Pulses Research and Development, Kanpur
Dr Gaurav Kumar Taggar	Fellows of Indian Society of Pulses Research and Development, Kanpur
Dr Virender Sardana	Fellows of Indian Society of Oilseeds Research, Hyderabad,
Dr Satwinder Kaur Dhillon	Fellows of Indian Society of Oilseeds Research, Hyderabad,
Dr Guriqbal Singh	ISPRD Excellence Award 2017" of Indian Society of Pulses Research and Development (ISPRD), Kanpur.
Dr Shayla Bindra	Gold Medal by Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishvavidyalaya, Palampur.
Drs A.S. Dhatt and M.K. Sidhu	Dr Harbhajan Singh Gold Medal from Indian Society of Vegetable Science
Dr A.K. Jain	Granted copyright for mobile app by Copyright Office, Ministry of Commerce and Industry, Government of India.
Dr M.S. Alam	International Fellowship by Nufiic, Holland under Netherlands Fellowship Programme
Dr M.S. Alam	Commendation Medal by Indian Society of Agricultural Engineers
Dr Anoop Dixit	Fellow Award 2017-18" from Indian Society of Agricultural Engineers.
Dr Manpreet Singh	Best Trainee Award 2017" from Punjabrao Deshmukh Agricultural University, Akola, Maharashtra
Dr Rajeev Kumar	"Early Career Research Award 2018" from Department of Science and Technology (DST) - Science and Engineering Research Board (SERB).
Dr Priya Katyal	Best Data Representation Award" during Winter School on "Technological Innovations in Processing and By-products Utilization of Agricultural Produce" organized by ICAR-Central Institute of Post-Harvest Engineering and Technology (CIPHET), Ludhiana

International Level (including Doctoral and Post Doctoral fellowships)

2013-18

Dr Naveen Aggarwal	Commonwealth Academic Fellowship, UK
Dr Rabinder Kaur	NFP Fellowship (Nuffic), The Netherlands
Dr Chetan Singla	International Fellowship under Netherlands Fellowship Programme (NFP) for training on Groundwater Resources & Treatment

Dr Gursharan Singh	Representative of India for participation in the workshop on "Raising Productivity in Higher Education" held at Yogyakarta, Indonesia
Dr Manjeet Singh	Selected as one of the leading engineers of the world (2013) by International Biographical Centre (IBC), Cambridge, England
Dr K.S.Suri	University of Tennessee, Knoxville, USA
Dr Johar Singh	Washington State University, USA
Dr Iqbal Singh	Washington University, USA
Dr G.S.Dheri	Ohio State University, USA
Dr.Anil Sharma	Fulbright Alumni Award, USIEF
Dr V.P. Sethi	Guest Faculty at University of Guelph, Ontario, Canada
Dr S K Chauhan	Coordinator of IUFRO-2014 Short Rotation Forestry Section, Vienna, Austria.
Dr Sandeep Singh	International Steering Committee, Tephritid Workers of Asia, Australia and Oceania (TAAO), Australia
Dr Manjeet Singh	Executive Committee Member from India for the 6th Asian Conference on "Precision Agriculture," held at South China Agricultural University, China
Dr H.S. Rattanpal	International "Fellowship 2016" under Netherlands Fellowship Programme by Wageningen University, The Netherlands
Dr Beant Singh	Rothamsted International Fellowship 2016" from Rothamsted Research, Harpenden, United Kingdom
Dr Johar Singh	Washington State University, USA
Dr Ritu Rani	Centre for Development Innovation, Wageningen, Netherlands
Dr Vikas Jindal	Kansas State University, USA
Dr Beant Singh	Rothomstod Research, UK
Dr Ruma Devi	Ohio State University, USA
Mr Hira Singh	Ohio State University, USA
Mr Inderjeet Yadav	John Innes Centre, Norwich, UK
Dr Satnam Singh	Nuffic Fellowship by Dutch government to attend a training course on "Integrated Pest Management (IPM) and Food Safety" at Wageningen, The Netherlands, in June 2018.
Drs N.S. Bains, V.S. Sohu, Kuldeep Singh, Parveen Chhuneja and G.S. Mavi	Gene Stewardship Award 2018 by Borlaug Global Rust Initiative (BGRI).
Dr Sarwan Kumar	Australian Government's Endeavour Research Fellowship by Department of Education and Training, Australia.

State Level

2013-14	
Dr HS Dhaliwal	Punjab Sarkar Parman Patar
Dr Sukhpal Singh	Punjab Govt. Parman Patra (State Award)
Dr Sukhpal Singh	Member, Sub-group on Farmers' Indebtedness and Suicide by Punjab Government Reforms Commission
Dr RS Singh	State Award on Independence day for promotion of Science

Internal (Recognition by University)

2013-14	
Dr HS Thind	PAU Plaque & Certificate for Outstanding Research, Teaching and Extension
Dr SS Kukal	PAU Merit Certificate for Meritorious Researcher
Dr RS Singh	PAU Best Outstation Scientist Award
Dr (Mrs.) Poonam Aggarwal	PAU Merit Certificate for Outstanding Contributions in Research

2014-15	
Dr OP Choudhary	PAU Plaque and Merit Certificate for Outstanding Contributions in Research, Teaching and Extension
Dr AS Dhatt	Appreciation Letter from PAU for outstanding research in vegetable crops
Dr Kuldip Singh	Appreciation Letter" from PAU for outstanding research in sugarcane agronomy
2015-16	
Dr KG Singh	Prof. Manjeet S. Chinnan Distinguished Professor Award
Dr AS Dhatt	Harpal Kaur Memorial Prize 2016 by PAU
Dr MIS Gill	Hans Raj Pahwa Award 2016 from PAU
Dr Harminder Singh	Sardar G.S. Nihalsinghwala Award 2016 by PAU
Dr Parveen Chhuneja	Award of Citation and Plaque 2016 from PAU for best researcher
Dr N S Bains	Prof. Manjeet S. Chhinan Distinguished Professor Chair 2016 from PAU
Dr Amarjeet Kaur	Prof. Manjeet S. Chhinan Distinguished Professor Chair 2016 from PAU
Dr (Mrs) Param Pal Sahota	Prof. Manjeet S. Chhinan Distinguished Professor Chair 2016 from PAU
Dr PPS Pannu	Prof. Manjeet S. Chhinan Distinguished Professor Chair 2016 from PAU
Dr KG Singh	Prof. Manjeet S. Chhinan Distinguished Professor Chair 2016 from PAU
Dr S Kapoor	Appreciation Certificate 2016 from PAU
Krishi VigyanKendra, Patiala	Dr G.S. Khush Team Award 2014-15 for technology transfer
Dr Sandeep Singh	PAU Appreciation Certificate for developing PAU Fruit Fly Trap
2016-17	
Dr MS Bhullar	Appreciation Certificate from PAU in 2016 for outstanding research work on the development of weed management technologies for the field and horticultural crops
Dr Narinder Singh	Appreciation Certificate from PAU in 2017 for outstanding research work on *Trichoderma* (bioagents)
Dr SK Jindal	Appreciation Certificate from PAU in 2017 for outstanding research work on vegetable breeding
Dr GS Manes	Dr G.S. Khush Team Award 2016-17 by Dr Gurdev Singh Khush Foundation for Advancement of Agricultural Sciences, PAU.
Dr GS Kocher	Appreciation Certificate from PAU in 2017 for his contributions to wine and vinegar production.
2017-18	
Dr M.I.S. Gill	Hans Raj Pahwa Award 2017" from PAU.
Dr Guriqbal Singh	Dr Harcharan Singh Sandhu Memorial Award by PAU
Dr Harminder Singh	"Gurcharan Singh Nihal SinghWala Award 2017" by PAU.

Annexure X

Action Taken Report

PUNJAB AGRICULTURAL UNIVERSITY, LUDHIANA

Sr. No.	Suggestions of Accreditation Board, ICAR, New Delhi	Action taken
1.	The academic facilities are needed to be utilized in attracting the young talent from within and outside the State of Punjab	The Information Technology service is upgraded, PAU website is updated constantly and PAU achievements and rankings at the national level is highlighted to attract the young talent for various programmes. The faculty members, College level academic affairs committees chalk out a plan in collaboration with the scientists at *Krishi Vigyan Kendras* to apprise the trainee-farmers regarding various academic programmes of the university for the benefit of attracting young talent especially from rural areas. Regular counseling sessions and exposure visits are being organized for the students from different schools of Punjab to make them aware about the programmes being offered by PAU. To attract the talent, advertisements are given in the regional/national newspapers apart from personal contact campaigns for various academic opportunities in the university. Six year programme in B.Sc. Agriculture has been started to attract young talent from rural background to agriculture. The students from other states (with competitive fellowships) are admitted against additional seats in various programmes of the university. Various scholarships are provided to the students for encouraging their admission at PAU.
2.	Efforts are required to forge multi-dimensional partnership by intensifying the Public Private Partnership	Public private partnership has been developed with various industries like FCI; Markfed; Sugarfed; PAIC;Verka Chandigarh; Sharon Biotech, Abohar; Sampooran Agro, Fazilka; Nestle India; Gilco Agro Pvt Ltd; Field Fresh Ladhowal; Overseas Foods Pvt. Ltd.;Bonn Food Products PVT LTD.; Paras Spices Pvt Ltd; Varun Beverages PVT Ltd; Shabab drinks; etc. MOAs have been signed with 180 industries for transfer of technology to manufacture the product. Various technological developments like Super Straw Management System, Lucky Seed Drill, PAU straw cutter-cum-spreader machines, PAU Multi-Purpose High Clearance Sprayer and Auto Rotate Gun Type Sprayer, tractor-operated cotton stripper harvester have been developed in collaboration with industry and were transferred to them. Various commercial technologies for processed food/probiotic beverages has been developed in association with private/government agencies. The commercialization of varieties/hybrids vegetables was finalized with 28 private firms. Trials of forced draft paddy straw Bale Combustor Technology for water heating using paddy straw, developed by Department of Mechanical Engineering in collaboration with industrial partner. Dissemination of Integrated Pest Management strategies for whitefly on cotton in Punjab and direct seeded rice adoption with M/s P I Industries was carried out. Seven Kisan Melas are being organized by PAU in collaboration with a large number of private agro-industries twice a year (March and September). Food Craft Mela is also organized annually in collaboration with food industry.

3.	Necessary measures are required to check inbreeding among the faculty	The faculty is recruited strictly on merit through an open national level advertisement giving chance to all the deserving candidate to compete on meritious ground. During last 5 years, 63 faculty members with education from other universities/ institutes were recruited at PAU. The University facilitates foreign visits of faculty members for advanced training in various cutting edge technologies. The Ph.D. students study the courses for one semester in other universities like CCSHAU, Hisar; CSKHPKV, Palampur and YSPUHF, Solan.
4.	There needs to be a member to be nominated in the cadre of Dean/Director of the University in the Board of Management as per ICAR Model Act	The PAU is established by the Act of Parliament of India. The university is already in correspondence with the state Govt. to incorporate the said amendments in the university act on the basis of ICAR Model Act. The matter is being regularly pursued.
5.	The existing cadres of Dean Postgraduate Studies and Director, Student Welfare to be redesigned as Director of Education and Dean of Students' Welfare	-do-
6.	The mode of selection of Vice-Chancellor and tenure of appointment to be on par with the ICAR Model Act	-do-
7.	The tenure of Officers in the university is to be for five years as against the existing four years	-do-
8.	The ratio between teachers and other staff has to be kept under check	The ratio between teachers and other staff is being maintained
9.	There is a need to establish a separate Education Technology Cell and Institutional and Manpower Planning Unit	The separate Education Technology cell has been created in the University under Dean, Postgraduate Studies. Project Monitoring Evaluation Cell was created under Director of Research to monitor the manpower requirements.



10.	Interface with all the stakeholders essentially be conducted on regular basis	The Research and Extension Specialists Workshops for *rabi* and *kharif* crops, fruits, vegetables, mushrooms and agroforestry, are a regular feature where extension officers of the state departments interact with scientists/officers for newer technologies and feedback. Regular monthly meetings of Kisan Club at PAU campus provide platform for interaction of young farmers with the scientists. A scientist-farmers interface is organized at PAU, Ludhiana during 15 Kisan Melas (farmer's fair) are held twice every year, where the university scientists interact one-to-one with the farmers. Apart from these, 3 Horticultural Kisan Divas (at Gurdaspur, Bathinda and Amritsar) are also organized twice every year. Food Craft Mela is organized every year to promote the interface with industry and stakeholders. A monthly meeting is also convened regularly with Punjab State Agricultural Implement Manufacturer Association for active collaboration in the field of mechanization and food. Meeting is also convened by DR with Industrial Stakeholders especially food and processing Industry, to understand the requirement of industry and develop technologies for them. The scientists of the university are an integral part of the district level camps organized by the state department of Agriculture and Farmer's Welfare. All the colleges are also interacting with different stakeholders; guest lectures by experts from industry and scientists of repute are organized regularly by the departments.
11.	The vacancy percentage of the faculty is to be addressed on priority through a long-term recruitment policy	The faculty in the University is recruited as per the need and budgetary provisions.
12.	Motivating the faculty to undertake higher studies outside the University	The University grants study leave to in-service faculty to pursue their Ph.D. programmes in different universities from India and abroad. The faculty is also encouraged to undertake trainings/short courses/refresher courses outside University.
13.	There is a need to explore the possibility of entering into MoU with other AUs for provision to undertake Doctoral studies by its faculty	Negotiations with IARI and other Universities for undertaking Doctoral studies by PAU faculty were undertaken.
14.	Encouraging the movement of faculty from within and outside through sabbatical leave arrangement	Rules are already in place for sabbatical leave to enhance professional competence of faculty in all the colleges of the University. A faculty member from College of Home Science availed sabbatical leave for one year. Continuous efforts are being made to motivate the faculty to opt for Post-Doctoral Fellowship or to work in collaboration with international institutes by availing sabbatical leave.
15.	The faculty of College of Agricultural Engineering and Technology needs to take initiative to compete for extramural funding support through research projects.	Seventeen projects have been submitted by the faculty of College of Agricultural Engineering & Technology to various funding agencies and eight projects have been sanctioned/funded by DBT, DST and ICAR.

16.	The faculty need to take part in the text book writing programmes of ICAR	The faculty members have written practical manuals for various courses of the departments. They are also involved in writing text book of programmes of ICAR. A faculty member from Department of Climate Change & Agrometrology has submitted the proposal of writing a book on Environmental Agrometrology to ICAR.
17.	The mandatory requirement of 21 days Summer/Winter School participation under CAS promotions for faculty should be recommended for other universities and home university should be discouraged.	The faculty is undertaking such courses in other universities for fulfillment of the required condition for promotion under CAS and this is being strictly followed in the university.
18.	There is need to intensify participatory research involving end users, like industry to develop commercially acceptable technologies	The participatory research involving farmers (major stake holders) is being done in a continuous mode. All the technologies are first tested as adaptive research trials at farmers' field. The farmer representatives are part of research and extension council meetings, PAU Kisan club meetings and Board of Management, the apex body governing PAU. MOAs have been signed with 180 industries to commercialize the varieties/ hybrids/technologies in different parts of the country. PAU Super SMS has been developed in collaboration with Gurdeep Combines, Nabha and Borlaug Institute for South Asia (BISA). Participatory research with end users was taken up with UNATI, a self help group, for developing and scaling up vinegar production and low alcoholic naturally carbonated beverages. Portable Maize Dryer (3 ton capacity) developed in collaboration with Nutech Pvt. Ltd., Ambala. Tractor operated cotton stripper harvester is being developed and fabricated in collaboration with Mahindra & Mahindra, Mohali and M/s Bajaj Steel Industries Ltd., Nagpur.
19.	Examine and find alternate cropping system to mitigate the alarming ground water table depletion in Punjab	Alternate cropping systems like i.e. Maize-Potato-Onion, Maize-Potato-Mentha, Maize-Gobhi Sarson - Summer moong, Groundnut - Toria + Gobhi Sarson, Maize / Summer groundnut -Green Onion-Onion, Maize- Potato/ Toria-Sunflower, Groundnut - Potato/Toria-Wheat and Maize- Vegetable pea have been recommended for arresting the depletion of groundwater. Niche areas have been identified for intensifying research on moongbean, pea, groundnut, celery seasme and vegetables.
20.	"Centre of Excellence" may be established on one leading subject for backward and forward linkage in Agriculture	'Integrated Beekeeping Development Centre in the discipline of Apiculture has been established in the University with support from National Bee Board, Ministry of Agriculture & Farmers Welfare (GoI). A Centre of Excellence on mushrooms at PAU has been approved by State Government.
21.	Introduction of health insurance to benefit the students in emergencies must be taken up.	The hospital facility, both indoor and outdoor, exists in the university campus which caters to emergent situations for the students. For outside hospitalization of students, the reimbursement provision to the tune of 75% of the amount subject to maximum of Rs. 40,000/- has been made. Accidental Insurance of students is being taken up with the Insurance Company.

22.	Alumni data to be maintained with periodical updating	Alumni portal exists on the website.The Alumni database of the university has been made online and updated regularly at College level. The link for the database has been provided on the homepage of the university. The Alumni Meets of all the Colleges of University are being held regularly.
23.	There is need to prepare guideline for the students to undertake higher studies outside the University under JRF and SRF	Special cell headed by Chairman, Academic Affairs Committee at College level headed by Dean motivates the students to appear for JRF/SRF competitions and organize special coaching sessions for them. The students are constantly motivated to go for such examinations.
24.	The University may introduce part-time employment to graduate students by way of Teaching Assistantship against the vacant faculty positions	The UG and PG students are working on part-time basis in the library, laboratories and experimental fields on payment basis. A policy was framed by the university to involve the final year students of B.Sc. Agriculture (Hons.) and Postgraduate students for pest surveillance in the state as part of their internship programme and part-time employment, respectively, on payment basis.
25.	The University has to take-up the issue of employability of B.Tech. (Agri.Engg) and B.Sc. (Hons) Home Science with the Government of Punjab	The B.Sc. (Hons.) Home Science and B.Tech (Agri. Engg.) students have been placed in various education, industrial, agro-industrial and government sectors. To further improve the employability of the students from these programmes the linkages with private sector industries are being strengthened. Campus placement of students of Agri Engineers is also done.
26.	Centralized CCTV may be put in place for effective real time monitoring activities in the classrooms/labs and workshops.	CCTV cameras have been installed at all important places of the university which are continuously monitored by the Deans of the colleges through a central monitoring system in their offices.
27.	Studies on 'Crop Modeling' may be taken up on priority.	Based on crop modeling concept using CERES model, the forecasting of wheat and rice yields prior to harvesting of crops has been standardized and the model for changes in duration and yield of maize is in the developmental stage. The crop modeling work on wheat, rice and maize is in progress using SPSS, DSSAT and INFOCROP models.
28.	The external examination system of different academic programmes has to be brought under the ambit of Controller of Examination as they have the status of University Examinations	The external examination system of UG programme is under the control of Controller of Examinations.
29.	There should be a periodic academic audit about the various degree programmes so as to keep pace with the human resource requirement in different sectors	In all the constituent colleges of the university, the course curricula has been revised as per the 5th Deans' Committee and approved from Academic Council and implemented w.e.f. academic session 2016-17. A new School of Organic Farming with multidisciplinary faculty was created recently in the university. A new College of Horticulture and Forestry has been approved by the Board of Management in October 2018.

30.	There is urgent need to re-visit the B.Sc. (Medical) UG degree programme being offered by Basic Sciences and Humanities faculty	The B.Sc. (Medical) degree programme has been named as B Sc degree in College of Basic Sciences & Humanities.
31.	The University needs to make a provision for nomination of one eminent agricultural educationist from outside the University in the Academic Council to facilitate a better interaction and have visibility	One eminent agricultural educationist from CCS Haryana Agricultural University, Hisar has been appointed as member of Academic Council of PAU.
32.	The number of Smart Classrooms should be proportionately upgraded in the constituent colleges	All constituent colleges in the University have smart class rooms. Ten new smart class rooms have been added.
33.	The practical manuals developed by other AUs in the respective fields are to be made available in the Library	The practical manuals of Acharya N.G.Ranga Agricultural University, Hyderabad (23) and Tamil Nadu Agricultural University (TNAU), Coimbatore (51) along with those of PAU have been made available to the users through library webpage of the university. In addition to these, practical manuals of PAU and other Agricultural Universities are also available through krishi kosh on the PAU library webpage. http://krishikosh.egranth.ac.in/
34.	Courses on vocational training leading to diploma/certificate programme to provide intermediate qualified manpower for agriculture and allied fields	The university is running the vocational training courses ranging from 3 months to 2 year duration in different fields like Agriculture, Agrochemicals, Floriculture and Landscaping, Horticultural Supervisor Training, Ornamental Nursery Production, Gardeners Training, Commercial Bakery, Geriatric and Child Care etc. Different trainings programmes were organized under Skill Development in Agriculture like 20-day Baking Technician course, 4-day Tractor Operator course, 52-day Craft Baker course in PAU and nine training programmes on Drip Irrigation and Protected cultivation in KVKs.
35.	The Basic Science and Humanities faculty needs to be supported through adhoc research projects in priority areas by ICAR in line with the earlier Cess fund projects	About 62 adhoc proposals were submitted to various agencies by the Basic Science & Humanities faculty as Principal Investigator since 2014, out of which 38 proposals were sanctioned and are in operation. The faculty members of Basic Sciences & Humanities are also being involved in the research proposals developed and submitted by faculty of agriculture to ICAR.
36.	It is urgently required for sectoral allocation of funds for education in relation to research needs to ensure educational quality	The total budget allocation for education was raised from 21.25% to 22.9% from the year 2016-17 to 2017-18. Moreover, the teaching, research and extension aspects of the university being integrated, lead to high quality manpower.



37.	More measures have to be put in place to enhance internal resource generation of the University	Substantial internal resources are being generated through self-financing degree programmes, sale of seed /fruit, byproducts, bio-fertilizers and forest nursery plants, sale of university literature and commercialization of technologies generated by PAU. Seed production of field crops has increased from 50,000q (2010-11) to 58,900q (2016-17) while, nursery production increased from 1.48 lacs to 4.91 lacs during the subsequent period.
38.	The ratio of salary cost of operating and maintenance to be monitored to fall in line with proposed national ratio of 70:30	There has been an increase in the number of schemes funded by external agencies (other than ICAR) during the last two years which has helped to bear operating and maintenance cost to a considerable extent in the year 2016-17. During the year 2016-17, the externally funded schemes and grants received were 391 and Rs.32.76 crore, respectively compared to 390 schemes and Rs.31.73 crore, respectively in the year 2015-16. More schemes being funded by external agencies are being prepared and submitted to the concerned agencies for approval.
39.	The Government of Punjab should extend enhanced budgetary support to the University for Overall Qualitative improvement in academic programmes	The grant-in-aid to the extent of Rs.272.55 crore was released by State Government to the PAU during the year 2012-13 which has been increased to Rs.372.85 crore in the year 2017-18. Efforts are being made to get enhanced budget provision from the State Government in future.

Annexure XI

List of MoUs executed from the year 2013 to 2018

2013			
1	PAU	Kansas State University Manhattan, USA (w.e.f. 9.1.2013	Research, teaching & extension in areas of natural resources management & food sciences.
2	PAU	Junagadh Agricultural University, Junagadh (Gujarat)	To promote student and faculty exchange To collaborate research and extension education To exchange software and expertise in the area of e-governance To undertake joint staff development programmes.
3	PAU	Gujarat State Seeds Corporation Ltd.	Development and Commercialization of Transgene Cotton Hybrids.
4	PAU	Sher-e-Kashmir University of Agricultural Sciences & Technology of Jammu, Chatha, Jammu (J&K)	To undertake joint research work in the areas of mutual interest. To formulate research projects and HRD plans for joint work with due approval of both the participating institutions. Impart training to students and technical personnel with the areas of cooperation.
5	PAU	Central University of Punjab, Bathinda	To promote cooperation between two organization in the field of education & research. To enhance the academic interchange between the two institutions.
6	PAU	Central Potato Research Institute (CPRI), Shimla through (ICAR)	Evaluation of advanced potato hybrids already developed by CPRI at different locations in Punjab. Evaluation and selection of advanced clones for release as varieties in different regions of Punjab.
2014			
7	PAU	AVRDC – The World Vegetable Centre, Taiwan	Scientific research & capacity building institutional exchange of staff & students Intellectual Property rights.
8	PAU/ Govt. of Punjab	The Borlaug Institute for South Asia (BISA)/Govt. of Punjab/PAU.	To initiate a collaborative work schedule to address the principal challenges to form profitability and sustainability which Punjab farmers are facing as a result of an increasingly plateauing yields, depleted water tables, unstable climate, labour shortages and increasing fertilizer prices.
9	PAU	Dayanand Medical college & Hospital, Ludhiana	To Promote inter-disciplinary research in human health, food & dietetics. To promote research in environment & other social areas. To strengthen internship & outreach activities in collaborative mode.
10	PAU	Knox Educational Services, Ludhiana	Conduct of classes for GRE/TOFEL/IELTS.

11	PAU	University of Kashmir, Hazrat Bad, Srinagar	To promote linkage & academic collaboration for the benefit of students & faculty, To undertake joint research projects. To allow joint supervision of postgraduate research Due credit will be given to the Co-guide/supervisor.
12	PAU	Purdue University College of Agriculture, West Lafeyette, Indiana, USA	Faculty commitment of conducting research.
13	PAU	The Central Potato Research Institute, Bemloe, Shimla (ICAR)	Aid & promote breeder seed production of potato of notified varieties of CPRI etc.
14	PAU	Landcare Research New Zealand Limited and Massey University, New Zealand	To strengthen existing relationship.
15	PAU	Syngenta India Limited, Pune	To collaborate and support projects that shall be initiated to develop, demonstrate and come up with solution to educate the farmers/growers in different fields to enhance productivity, quality and shelf life of the farm produce and other related research and development activities.
2015			
16	PAU	Punjab Biotechnology Incubator (PBTI) Mohali Punjab	Collaboration in education and research, guide PG students of different streams for carrying out dissertation work at PAU & PBTI and other research collaborations from time to time.
17	PAU	Sardar Swaran Singh National Institute of Renwable Energy, Kapurthala (Pb)	Joint R&D activities in the areas of management, thermal conversion of biomass, biogas, etc. Exchange of Ph.D students
18	PAU	Jiangsu Academy of Agricultural Sciences, China	To collaborate on research, exchange of faculty & students of agriculture & allied sciences cooperate in PG & post doctoral level.
19	PAU	Agriculture Skill Council of India, Gurgaon (Haryana)	-Training programme with ASCI to develop qualification packs as per national skill qualification frame work. Both will join hands in creating skill development centre for training and capacity building across various segments of agriculture.
20	PAU	The Maharashtra State Seeds Corporation Limited, Akola, Maharasthra	All matters relating to seed production/ supply ext.
21	PAU	Aston University of Aston, Birmingham, UK	To establish a formal partnership to further mutual interest.

2016			
22	PAU	M/s Nutech Dairy Engineers Pvt. Ltd. Ambala	To fabricate portable maize grain dryer by M/s Nutech Dairy Engineers Pvt. Ltd. Ambala
23	PAU	University of Prince Edward Island, Canada	Exchange of academic staff for the purpose of teaching & research.
24	PAU	International Crops Research Institute for the Semi-arid Tropics (ICRISAT), Patancheru-502324 Telengana State India	To develop cooperation and collaboration in research for development, particularly breeding for resistance to shoot fly and stem borer in sorghum & pearl millet, training including academics & other agreed activities.
25	PAU	Field Fresh Food Pvt. Ltd., Gurgaon	To promote research, extension, exchange of information related to vegetable and fruit cultivation.
26	PAU	Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur	To promote research, teaching, extension and technology commercialization and strengthen infrastructure support system.
27	PAU	The Bayer Crop Science Limited, Thane, (MAH)	To promote research, extension, exchange of information & technology between themselves in the area of mutual concern.
28	PAU	GADVASU, Ludhiana	To promote teaching, research and exchange.
29	PAU	The Khalsa College, Amritsar	Production of berseem BL-42 certified seed on an area of 10 acres.
30	PAU	ICAR, New Delhi	Scientific & technical cooperation in implementation of the project of Krishi Vigyan Kendra at Pathankot
2017			
31	PAU	CCSHAU, Hisar	To promote and accelerate the programmes of academic and research cooperation in the areas of mutual concern.
32	PAU	The Maharashtra State Seeds Corporation Ltd, Mahabeej Bhawan, Krishi Nagar, Akola, 444104 (MAH)	To organize the seed production programme of maize hybrid PMH-1.
33	PAU	M/S Stargene Hybrid Seeds, Jakhal Road, Sunam- 148028(Pb)	To produce certified seeds
34	PAU	-IPRO Oconsut GMBH, Germany -GIZ Indo German Environmental programme GIZ Office, India	- Exchange of Scientists & Technologists. - Development & implementation of collaborative projects.
35	PAU	ICAR-Indian Institute of Maize Research, Ludhiana	Promotion of students teachings and quality postgraduate research in cutting edge areas

36	PAU	Central Institute of Post Harvest Engg. & Technology (CIPHET), PAU	Exchange of scientists, technologists & students and their proper placements mutual relation between teaching, research & extension.
37	PAU	Indian Institute of Technology (IIT), Hauz Khas, New Delhi	To develop mechanism and proper networking among educational institutions, district authorities and to select the sustainable rural clusters based on backwardness & potential.
38	PAU	CCS Haryana Agricultural University, Hisar	To exchange Ph.D. students of PAU admitted in the disciplines of Agronomy, Entomology, Microbiology, Soil Science or any other mutually agreed discipline who will study courses for the first semester of Ph.D. programme at CCS, HAU, Hisar.
39	PAU	Dr Y.S. Parmar University of Horti-culture & Forestry, Nauni, Solan	To exchange Ph.D. students.
2018			
40	PAU	Department of Industries and Commerce, Chandigarh	To provide facilities to food processing sector and to promote new schemes, to create infrastructure etc.
41	PAU	International Center for Agricultural Research in the Dry Areas (ICARDA), Beirut, Lebanon (Headquarter)	Cooperation in agricultural research, education and training. Exchange of scientists, technologists and students Exchange of scientific literature, information and methodology; etc.
42	PAU	M/s. EdCIL (India) Limited, Vijaya Building, 5th Floor, 17-Barakhamba Road, New Delhi	To offer admission based on the selection of overseas candidates made through the counseling process on central admission portal.
43	PAU	M/s. CDSL Ventures Ltd., Marathan, Futurex, 'A' Wing, 25th Floor, Mafatlall Mills Compound, M.M. Joshi Marg, Mumbai-400013	Enabling the lodging, authentication and verification of academic awards.
44	PAU	Galilee International Management Institute, Israel	To collaborate on cooperative research & hold joint academic seminar agricultural sciences and trainings of 200 scientists and extension workers. To pursue faculty and students exchange programmes. To cooperate in exchange of scholarship plans of mutual interest.
45	PAU	Tel Aviv University, Israel	To collaborate on cooperative research & hold joint academic seminar agricultural sciences. To pursue faculty and students exchange programmes. To cooperate in exchange of scholarship plans of mutual interest.
46	PAU	ARAWA Institute, Israel	To collaborate on cooperative research & hold joint academic seminar agricultural sciences. To pursue faculty and students exchange programmes. To cooperate in exchange of scholarship plans of mutual interest.

Steering Committee for the Institutional Accreditation

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Convener **Dr G K Sangha, Dean Postgraduate Studies**

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2. Dr S S Kukal, Dean (Addl. Charge), College of Basic Sciences & Humanities
3. Dr Ashok Kumar, Dean, College of Agril. Engg. & Technology
4. Dr Sandeep Bains, Dean, College of Home Science
5. Dr Navtej Singh Bains, Director of Research
6. Dr Jaskaran Singh Mahal, Director of Extension Education
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11. Dr Vishvajeet Singh Hans, Estate officer
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Task Force for the Institutional Accreditation

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Member:

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2. Director Students' Welfare, PAU
3. Estate Officer, PAU
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5. Controller of Examinations, PAU
6. Addl. Director of Communication, CCIL, PAU (Editor of Self Study Report)
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8. Dr D S Bhatti, ADE-II
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23. Dr Mohit Gupta, Assoc. Professor, School of Business Studies
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