

# ANNUAL REPORT 2014-15



**Punjab Agricultural University**  
**Ludhiana**

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LUDHIANA**



**This Annual Report covers the period from  
July 1, 2014 to June 30, 2015**

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## EXECUTIVE SUMMARY

The Punjab Agricultural University (PAU) is involved in research, teaching and extension activities in agriculture, agricultural engineering, basic sciences, home science and allied disciplines. The University has developed several crop varieties along with their matching production-protection technologies to enhance food production in the country, in general and Punjab, in particular. The University made remarkable contributions during the period July 2014 to June 2015 as summarized below:

### RESEARCH

The University released 14 varieties of field crops and seven varieties of horticultural crops at the state level. These are PBW 660 and WH 1105 (wheat), PR 124 (rice), PMH 9 and PMH 10 (maize), Co118 and Co 23B (sugarcane), GSC 7 (canola type gobhi sarson), PBR 357 (raya), PBG 7 (chickpea), Punjab Til No. 2 (sesame), Punjab Sudax Chari 4 (sorghum), OL 10 (oats), PHB 2884 (grain pearl millet), CH 27 (chilli), Punjab Varkha Bahar 4 (tomato), MH 27 (muskmelon), Palam Samridhi (broccoli), RB 21 (radish), PAU Kinnow 1 and PAU Kinnow 2. Two varieties namely SL 979 (soybean) and LH 2256 (cotton) were identified for release at the national level. In addition, the University produced 79,604 q raw seed (breeder, foundation and certified/TL) of different field crops during 2014-15.

About 1300 accessions of wild germplasm species of rice were screened against bacterial blight and new sources of resistance were identified. One novel gene for resistance against

Xoo-pathotype 10 from *O. rufipogon* accession IRGC 93216 was mapped on chromosome 4. Besides, a set of 190 *Aegilops tauschii* accessions were genotyped by sequencing and around 11,000 mapped SNP markers were identified to map quantitative trait loci for grain iron, zinc, copper, manganese and grain length, width and weight on different *Ae. tauschii* chromosomes.

In crop production, the technologies recommended include: consortium culture of *Rhizobium* (LLR 12) and *Rhizobacterium* (RB 2) as biofertilizer to improve grain yield in lentil; new cropping systems namely maize-summer groundnut-kharif, onion-onion, turmeric-onion/late sown wheat, organic cropping system turmeric-onion; sowing of moongbean in the second fortnight of July led to higher grain yield; Biozyme @ 8kg/acre at the time of sowing and earthing up followed by its foliar spray @ 200 ml/acre in potato; and two sprays of 15 g NAA (naphthalene acetic acid) once in second fortnight of October and again in second fortnight of November to reduce the physiological fruit drop in 'Umran' ber.

The plant protection recommendations given by the university during this period are: *Trichogramma chilonis* for the control of maize stem borer; biocontrol based integrated pest management in organic basmati rice for yellow stem borer and leaf folder; Fame 480 SC (flubendiamide) for the control of stem borer and leaf folder in rice and basmati rice; Marktriazio 40 EC (triazophos) to manage stem borer and leaf folder in rice; Marktriazio 40 EC (triazophos) for



effective control of whitefly in cotton; Indokacarb 14.5 SC to control tomato fruit borer; Nativo 75 WP (trifloxystrobin+tebuconazole) to control sheath blight and brown spot in rice; and Bumper 25EC (propiconazole) and Orius 25.9 EC (tebuconazole) for the management of sheath blight in rice.

In food science, technologies were developed for extruded snacks and porridge from maize, mungbean and pearl millet; pasta from multigrain and brown rice, gluten free flat bread, rollabe maize *chapattis* and cereal health bar utilizing kinnnow pomace and peel.

Among post-harvest technologies, a bioprocess for production of debittered citrus juices and beverages using naringinase enzyme ( $\alpha$ -L-rhamnosidase and  $\beta$ -D-glucosidase), produced by yeast *Clavispora lusitanae*, was developed. Besides, packaging of bell pepper fruits in paper moulded trays followed by wrapping with heat shrinkable film or cling film improved shelf life, maintained the fruit quality and enhanced the consumer appeal under super market and ordinary market conditions for 10 and 7 days, respectively, as against 5 and 2 days when not packed.

King oyster mushroom (*Pleurotus eryngii*) was successfully cultivated for the first time under Punjab conditions. AVT14-07, white accession of *Agaricus bisporus* produced maximum yield of about 20 kg/q compost.

In agro-forestry, Eucalyptus clones C-413, C-72 and C-2045 were released for commercial cultivation in Punjab. The productivity of these clones was 239, 223 and 214% higher than the seedlings (control), respectively.

Farm engineers developed and evaluated several machines. A six row tractor operated small seed planter was designed and developed for planting small seeds like onion, carrot etc. Besides, a tractor operated six row garlic planter having row to row spacing of 15 cm was developed. Apart from this, a tractor operated fertilizer broadcaster,

electrostatic nozzle, and self-propelled tangential axial flow combine harvester for moongbean were evaluated. An innovative, low cost hybrid hydroponics technology was also indigenously developed, by combining the features of two existing hydroponic technologies, for greenhouse vegetable raising. Rooftop based 12 pot single layer and 16 pot double layer hydroponic systems were developed for home vegetable gardening on urban roofs. A twin-chamber community solar cooker with efficient cooking vessel design was developed for cooking food for 90 to 100 people at one time.

Double burrow baiting with rodenticide during vegetative stage along with paper baiting at reproductive stage in wheat crop, sown under rice and maize, and residue management with Happy Seeder and Zero tillage technology were found more effective in controlling rodent pests. In view of increasing number of farm inputs and implements, research also emphasized on promoting the use of alternative manures such as green manure, farm yard manure coupled with natural pest control and integrated pest management.

In home science, a traditional smocking technique was used to develop contemporary cloth articles such as cushion cover, handbag, bolster cover, folder, lampshade etc. Besides, the nutrition counselling in subjects suffering from celiac disease, lactose intolerance, post-menopausal women and gestational diabetes resulted in significant improvement in the dietary pattern, decrease in fasting blood glucose by 33% and postprandial blood glucose level by 20.7% and improvement in lipid profile of the gestational diabetics. A study was also conducted on gender dynamics in perception of stress, coping and resilience among adolescents in low-income families, which revealed that major proportion of the respondents perceived average level of stress.

## EDUCATION

Academic programmes of the University are run through its four constituent colleges at Ludhiana namely College of Agriculture (COA), College of Agricultural Engineering and Technology (COAE&T), College of Basic Sciences & Humanities (COBSH), College of Home Science (COHS) and two Institutes of Agriculture at Gurdaspur and Bathinda. During 2014-15, the University offered 12 undergraduate programmes, 43 Master's programmes, 29 doctorate programmes, and one diploma programme.

A total of 3562 students were enrolled during the academic session 2014-15. Admission to various undergraduate and postgraduate programmes was made through entrance tests.

As many as 877 students in various programmes were awarded scholarships and financial assistance. Besides academics, students excelled in sports and cultural activities. Punjab Agricultural University got second position in North Zone Inter-Varsity Hockey (M) Tournament, held at Punjab Agricultural University in February, 2015. In addition, PAU awarded 33 Merit Certificates, 12 University Colour and 3 Roll of Honour to the outstanding sportspersons/artists of the University for their proficiency in sports, game, cultural and literary events.

In cultural activities, PAU students won Gold Medals in light vocal solo, group song Indian, cartooning, Silver Medal in clay modelling and 4th position in poster making during the 15th All India Inter Agricultural Universities Youth Festival, organized by Indian Council of Agricultural Research (ICAR) at National Dairy Research Institute, Karnal from March 18-21, 2015.

## EXTENSION

The university undertakes transfer of new technologies to the farmers through various extension activities. It organized 14 *Kisan Melas/Kisan Divas* during the months of September 2014 and March 2015. A large number of farmers

from Punjab and adjoining states participated in these *melas/divas*, discussed their farm queries with experts, purchased seeds and farm literature, and participated in produce competitions. Nine progressive farmers were honoured during PAU *Kisan Melas* at Ludhiana for their outstanding contributions to agriculture, horticulture and allied occupations.

A total of 933 adaptive research trials were conducted at different locations in the state to test new varieties, production and protection technologies, etc. Besides, 151 on farm trials and 1,688 training programmes were conducted by various KVKs. Also, 2096 front line demonstrations were conducted on improved varieties of oilseed crops (groundnut, sesame, *gobhi sarson*, *toria*, *raya* and sunflower), pulses (summer *moong*, *kharif moong*, mash, soybean, gram and lentil), rice, basmati, cotton (American, *desi*, Bt and Non Bt varieties), maize and fodder maize. Four Research and Extension Specialists' Workshops, one State level Training and Planning Workshop, and a Farmers-Scientists Interface on "Skill Development in Agriculture and Challenges and Research Strategies in Agriculture" were organized. Besides, 175 field days were organized on various aspects such as cultivation of pulses, IPM in paddy/basmati rice, mechanical transplantation of paddy, nutrition garden, mushroom cultivation, use of happy seeder, mat-type nursery raising, etc. About 1900 crop samples, affected with insect-pests, diseases, nutritional deficiencies and other disorders were diagnosed at the Plant Clinic of PAU. The University enrolled 1248 PAU Doots in different villages of Punjab and about 90 advisory messages on various aspects of crop production and protection were sent to them.

## COMMUNICATION AND MEDIA

The university maintained a constant liaison with the print and electronic media including Doordarshan and AIR Jalandhar to publicize the activities/programmes of PAU. The Centre provided TV coverage to different events and






also coordinated with Doordarshan, Jalandhar for 310 TV talks by PAU scientists. It issued 811 press releases (421 in English and 390 in Punjabi). It also sent 20 articles (8 in English and 12 Punjabi), authored by PAU scientists, for publication in various newspapers and magazines. It publishes two monthly farm magazines namely *Changi Kheti* (in Punjabi) and *Progressive Farming* (in English). The combined circulation of these magazines has increased to 1,89,075 in 2014-15. The Centre also published Package of Practices for Crops of Punjab, twice a year, both in English and Punjabi. Besides, the Centre brought out six farm publications in English and 15 in Punjabi.

## MEMORANDA OF UNDERSTANDING

To strengthen linkages with the national and international institutions/organizations, PAU signed six memoranda of understanding (MoUs) with Purdue University, West Lafayette, Indiana, USA; Massey University, New Zealand and Landcare Research New Zealand Limited; Central Potato Research Institute, Shimla; Punjab Biotechnology Incubator, Mohali; Sardar Swaran Singh National Institute of Renewable Energy, Kapurthala; and Syngenta India Limited, Pune.

## ADMINISTRATION

The Board of Management and the Academic Council took several decisions to smoothen/strengthen the working of the University. The Board approved enhancement in fee structure for the year 2015-16 @ 10% including self-financing programmes. It also approved the conferment of degree of Doctor of Science (*honoris causa*) upon Dr K.S. Gill, former Vice-Chancellor, PAU; Dr S.S. Parihar, former Head, Department of Soils, PAU and Dr S.K. Vasal, former Distinguished Maize Scientist, CIMMYT (World Food Prize Awardee). The Academic Council approved the admission process management system (APMS) portal for the academic session 2015-16, both online and offline. Besides, it approved the starting of MCA 2-year programme from the academic session 2015-16 and the establishment of Skill Development Centre at PAU, Ludhiana. It also approved the admission of candidates to M.Sc. programme in the discipline of Horticulture (Fruit Science) and Horticulture (Vegetable Science) for Postgraduate Institute for Horticulture Research & Education (PGIHRE), Amritsar from the academic session 2015-16 with transit camp at PAU, Ludhiana.



## RESEARCH

Punjab Agricultural University (PAU) undertakes research in different disciplines of agriculture and allied fields with the main aim of providing solutions to the farm related problems. The University has been continuously reorienting its research agenda keeping in view the needs of agriculture. Recently, a greater thrust has been given on developing technologies to meet the emerging challenges of climate change and natural resource conservation. Location specific technologies are required to improve agricultural productivity and enhance input use efficiency. For this purpose, the university undertakes research not only at main campus but also at its Regional Research Stations representing different agro-ecological conditions. These research centres are located at Abohar, Bathinda, Ballowal Saunkhari, Faridkot, Gurdaspur and Kapurthala. Apart from developing new crop varieties and their production and protection technologies, much focus is being laid on post-harvest handling and processing technologies.

Salient research achievements during the period under report are given below:

### AGRICULTURE

Keeping in view the current agricultural challenges, crop improvement research has been reprioritized. More emphasis is being laid on breeding for abiotic/biotic stress tolerance and improving quality. Besides, due attention is being given to conservation of natural resources and environment safety.

#### Crop Improvement

##### New Varieties/Hybrids Released

During the period under report, PAU released 14 varieties of field crops and seven varieties of

horticultural crops at the state level. Three varieties including one each of soybean, cotton, and brinjal have been identified for release at the national level. In addition, nine varieties of different crops have been identified for conducting adaptive trails at farmers' fields.

#### Field Crops

**PBW 660 (Wheat):** It is a dwarf variety recommended for rainfed conditions. Its average grain yield is 17 q/acre. It is resistant to yellow rust and brown rust.

**WH 1105 (Wheat):** It is a double dwarf variety with an average grain yield of 23 q/acre. It is resistant to yellow rust and brown rust.

**PR 124 (Rice):** It matures in about 135 days after seeding. It is resistant to all the 10 prevalent pathotypes of bacterial blight pathogen in the state with an average yield of 30.5 q/acre.

**PMH 9 (Maize):** This hybrid has been released for cultivation in winter season. It matures in 180 days and its average yield is 32.5 q/acre.

**PMH 10 (Maize):** It has been released for cultivation in spring season. It matures in 120 days with an average yield of 32 q/acre.

**GSC 7 (Canola type Gobhi sarson):** Its average grain yield is 8.9 q/acre. It is canola quality genotype having 62.2% oleic acid and 0.5% erucic acid in its oil and 14.5  $\mu$  moles glucosinolates/g in defatted cake.

**PBR 357 (Raya):** It is a bold seeded variety having an average grain yield of 8.5 q/acre and tolerance to *Alternaria* blight and moderate resistance to white rust.

**PBG 7 (Chickpea):** It is moderately resistant to *Ascochyta* blight and resistant to *Fusarium* wilt and dry root rot. Its average yield is 10 q/acre.



PBW 660



PR 124



PMH 10

**Punjab Til No. 2 (Sesame):** It is a white seeded high yielding variety having better tolerance to *Cercospora* leaf blight and phyllody. Its average yield is 2.8 q/acre.

**Co 118 (Sugarcane):** It gives an average cane yield of 322 q/acre. Its juice contains 16% sucrose during November and 17% in December. It is tolerant to cold and all the prevalent pathotypes of red rot pathogen.

**Co 238 (Sugarcane):** It gives an average cane yield of 365 q/acre. Its juice contains 17% sucrose in January. It is tolerant to all the prevalent pathotypes of red rot pathogen. It is a good ratooner. However, it is highly susceptible to top borer.

**Punjab Sudax Chari 4 (Sorghum):** It is a multi-cut forage sorghum hybrid. It is moderately resistant to leaf spot disease and shoot fly. Timely sown crop gives three good cuttings with an average fodder yield of 445.5 q/acre.

**OL 10 (Oats):** It is a multi-cut oats fodder variety. This variety gives 275 q/acre green fodder yield of better quality with higher values of *in vitro* dry matter and crude protein digestibility. Its average seed yield is 9.2 q/acre.

**PHB 2884 (Grain pearl millet):** It is a high yielding grain pearl millet hybrid. It is tolerant to downy mildew, ergot, smut and blast diseases and gives an average grain yield of 13.2 q/acre.

#### Horticultural Crops

**CH 27 (Chilli):** It is resistant to leaf curl virus, fruit rot and root knot nematode, and tolerant to sucking pests such as thrip and mite. Its average fruit weight is 3.6 g and yield of red ripe fruits is 96 q/acre. It is suitable for processing/powder making.

**Punjab Varkha Bahar 4 (Tomato):** The fruits are firm, round and uniform in ripening with an average weight of 90 g. It is suitable for cultivation in rainy/autumn season. It is resistant to leaf curl virus. Its average yield is 245 q/acre.

GSC 7



PBG 7



CH 27





Punjab Varkha Bahar 4



MH 27

**MH 27 (Muskmelon):** It has long shelf life and is suitable for distant transportation. Flesh is thick, salmon orange, medium juicy with 12.4% TSS. First picking is possible 63 days after transplanting. Average fruit weight is 850 g and average yield is 88 q/acre. It is tolerant to *Fusarium* wilt and root knot nematode.

**RB 21 (Radish):** Root length is about 34 cm. It takes 40-45 days for first harvest when sown in first week of October. Average yield is 265 q/acre.

**Palam Samridhi (Broccoli):** Head is round, compact and green with average weight of 300g. Its average yield is 72 q/acre.

**PAU Kinnow 1:** It is a mid-season variety and matures in January. The fruits are low-seeded having 0-8 seeds per fruit. The flesh is orange colored and juicy with rich and sweet flavour, having TSS of 10-11°Brix and 0.6-0.8% acidity. Average yield of five year old Kinnow plant is about 45 kg.



PAU Kinnow 1

**PAU Kinnow 2:** It is a mid-season variety and matures in January. The fruits are low-seeded having 0-10 seeds per fruit. The flesh is orange colored and juicy with rich and sweet flavour, having TSS of 10-11°Brix and 0.8-0.9% acidity. Average yield of five year old plant is about 59.5 kg.

**Eucalyptus (clones C-413, C-72 and C-2045):** These were released for commercial cultivation in Punjab. The productivity of these clones is 239, 223 and 214% higher than the seedlings (control), respectively.

#### Varieties Identified for Release at the National Level

**SL 979 (Soybean):** This variety has been identified for North Plain Zone comprising Punjab, Haryana and Uttarhand states. Its average yield is 9.3 q/acre. It is resistant to yellow mosaic virus and soybean mosaic virus.

**LH 2256 (Cotton):** It has been identified for North Zone comprising the states of Punjab, Haryana and Rajasthan. Its average seed cotton yield is 8.6 q/acre.

**PBHL 52 (Brinjal):** It was identified for Zone IV (Punjab, UP, Trai Area of U.K. and Bihar). Its plants are medium tall fruits are shining purple, long and borne in clusters. Its yield is 265 q/acre.

#### Varieties Identified for Adaptive Research Trials

Adaptive research trials are being conducted at farmer's fields to test the performance of new varieties or to evaluate new crop production and



protection technologies. Based on the performance in the adaptive research trials and research experiments, the technology is recommended to the farmers for adoption. New varieties of wheat (PBW 672 and PBW 725), rice (RYT 3378 and RYT 3379), tomato (PAU IND Tomato 1, PAU IND Tomato 2 and Punjab Red Cherry), brinjal (PBHL-51) and pumpkin (PPH-1) were identified for conducting adaptive trials.

### Germplasm Strengthening

A large number of germplasm accessions in different crops have been procured from different parts of the country and abroad to strengthen the ongoing crop breeding programmes. These include rice (272), wheat (2312), maize (68), chickpea (115), lentil (14), guar (6), cowpea (8), pearl millet (150), chilli (11), tomato (14), bittergourd (8), bottlegourd (2), cucumber (1), carrot (7), citrus (6), grapes (17), peach and nectarines (10), plum (6), ber (2), mango (6), strawberry (4), pear (rootstock) (3), poplar clones (14), shisham (4), *Melia dubia* and *Eucalyptus grandis* (2), chrysanthemum (2), gladiolus (2), tuberose (2), marigold (17) and rose (2).

### Biotechnology

School of Agricultural Biotechnology is working on genomics assisted alien introgressions, gene mapping and marker assisted breeding, identification of new genes, genome and transcriptome sequencing, gene cloning, genetic transformation, bioinformatics and micropropagation for rapid multiplication of disease free plants. Some of the salient achievements are as under:

- In rice, four improved versions of PAU 201 with white aleurone colour having gene *rc7*, bacterial blight resistance gene *Xa21* and intermediate to high amylose content have been developed and are in 3rd year of multi location trial under AICRIP.
- Nearly, 1300 accessions of wild germplasm species of rice were screened against bacterial blight and new sources of resistance were identified. One novel gene for resistance against Xoo pathotype 10 from *O. rufipogon* acc. IRGC 93216 is mapped on chromosome 4.
- Allele Mining for Phosphorus Starvation Tolerance Gene 1 (*PSTOL 1*) undertaken in

about 80 accessions of *O. rufipogon* and seven haplotypes identified. Allele mining for Phospholipase D (*PLD a1*) undertaken in more than 100 accessions of wild species and few accessions with truncated gene identified.

- Ten pathotypes of *Xanthomonas oryzae* pv *oryzae*, the causal organism of bacterial blight of rice, sequenced to identify variation in *Tal* effector genes.
- In collaboration with international wheat genome sequencing consortium, draft sequence of hexaploid wheat generated. More than 120,000 high confidence genes identified and 50,000 virtually ordered markers identified. About 40,000 fingerprinted BACs of 2AL have been assembled into 1204 contigs containing 7853 BACs forming Minimum Tilling Path which adds to 776 Mb. Gene annotation for several thousand genes completed and a web resource (wingDB) has been developed to house all the information generated.
- Four pathotypes of wheat stripe rust *Puccinia striiformis* sequenced and pathotype specific markers developed.
- Differential gene expression was studied in *Lr57* near isogenic line and recipient parent WL711 by total RNA sequencing. A total of 1130 genes were found to be differentially expressed with maximum number of genes differentially expressed at initial stages of infection. Differentially expressed genes included R genes, pathogenesis-related proteins and transcription factors.
- A set of 190 *Aegilops tauschii* accessions were genotyped by sequencing (GBS) and around 11,000 mapped SNP markers were identified which were used for mapping QTL for grain iron, zinc, copper, manganese and grain length, width and weight on different *Ae. tauschii* chromosomes using Genome Wide Association Mapping.
- A set of 368 *T. durum*-*Ae. speltoides* chromosome segmental substitution lines has been genotyped for various yield and heat tolerance components in replicated trials under normal

and heat stress conditions. Quantitative trait loci for heat tolerance component traits have been mapped. These QTLs are being transferred to hexaploid wheat using MAS.

- Gene [Limonoid UDP-glucosyltransferase gene (GTase)], responsible for bitterness in kinnow mandarin (*Citrus reticulata*) was isolated, cloned in pGEMT-easy vector and sequenced. PCR amplification of GTase gene in different citrus species and fragment of 1500bp was observed in all the species.

## Seed Technology

- Seed production by PAU is undertaken at university seed farms located at Faridkot, Ladhawal, Nabha and Naraingarh and at various KVVKs. The University produced 79,604 q raw seed (breeder, foundation and certified/TL) of different field crops during 2014-15, out of which, 5270 q seed was produced through public-public partnership (BISA). The details are given in Table 1:
- Three formulations of *Trichoderma harzianum* obtained from Tamil Nadu Agricultural University, Assam Agricultural University and G.B. Pant University of Agriculture and Technology along with formulation from PAU were tested as seed bio-priming, soil application by mixing it in FYM and their combinations. Bio-priming of the seed with PAU formulation along with its application in soil proved best in managing seed associated wilt and root rot of chickpea. It gave 76.3% and 62.8% reduction, respectively.

## Crop Production

In crop production, the university conducts studies to standardize (i) crop geometry, (ii) fertilizers' requirement, (iii) cropping systems,

and (iv) technology for weed management. The technologies recommended from the above studies are as under:

- After green manuring or incorporation of summer moong straw after picking of pods, there is no need to apply urea to basmati varieties namely Punjab Basmati 2, Punjab Basmati 3 and Pusa Basmati 1121.
- Consortium culture of *Rhizobium* (LLR 12) and *Rhizobacterium* (RB 2) as biofertilizer in lentil to increase grain yield.
- New cropping systems viz. maize/summer groundnut-kharif onion-onion; turmeric-onion/late sown wheat and organic cropping system turmeric-onion.
- Intercrop one row either of maize or cowpea as fodder and summer moong as grain crop in Bt cotton sown at row to row spacing of 67.5 cm. Maize and cowpeas can be harvested for fodder at 45-55 days after sowing.
- It has been recommended to intercrop one row either of cowpea, maize or teosinte as fodder and groundnut for pods in maize sown at row to row spacing of 60 cm. Cowpea, maize and teosinte fodder can be harvested 45-55 days after sowing.
- Sowing of *moongbean* in the second fortnight of July to get higher grain yield.
- In multicut oats, apply 30 kg N/acre (66kg urea) to first cut in two splits-half N at sowing and half N 30 days after sowing. In second cut, apply 20 kg N/acre (44kg urea).
- Biozyme @ 8kg/acre at the time of sowing and again at earthing up followed by its foliar spray @ 200 ml/acre improves the yield of potato.

Table 1

Crops	Breeder Seed (q)	Foundation Seed (q)	Certified Seed (q)	Truthfully Labelled Seed (q)	Total (q)
Wheat	5697	19,858	1367	20,609	47,531
Paddy	368	1067	1718	21,282	24,435
Other field crops	772	400	625	2510	4307
Vegetable crops	58	1212	1226	835	3331
<b>Total</b>	<b>6895</b>	<b>22,537</b>	<b>4936</b>	<b>45,236</b>	<b>79,604</b>



Heading back guava plant in senile orchard



Rejuvenation of guava plant after 14 months

- Soak the seeds in potassium dihydrogen orthophosphate 10-1M (13.6g/ litre of water) for 24 hr and then keep it in moist gunny bags for 48 hr to improve germination of bittergourd seeds.
- Apply FYM @ 5 tonnes/acre before planting and 25 kg N/acre in two equal splits at 75 and 100 days after planting in turmeric.
- Two sprays of 15 g NAA (naphthalene acetic acid) in 500 litres of water once in second fortnight of October and again in second fortnight of November reduced the physiological fruit drop in 'Umran' ber.
- Senile guava trees (15 years old) were rejuvenated by head back of the trees at 1.5m from the ground level in the month of March leaving 2-3 primary scaffolds followed by Bordeaux paste application on the cut ends. In August, it was followed by thinning out of the crowded and intermingled shoots and pruning of 50% portion of the newly emerged shoots from the top. This promoted flowering and fruiting in winter season crop.
- To rejuvenate senile mango trees (30 years old), head back of the trees was done at the height of 2m from the crotch angle in first week of January by retaining four to five outward growing branches. Bordeaux paste was applied on the cut ends and exposed branches, were white

washed. In June, 3-4 healthy outward growing shoots were retained on each stub. Trees started bearing fruits after three years of rejuvenation.

## Plant Protection

The major thrust in plant protection is on managing insect-pests and diseases in field and horticultural crops through integrated pest management, chemicals, bio-agents etc. The following recommendations were made for the control of various insect-pests, diseases and weeds:

### Field Crops

- Biological control of maize stem borer using *Trichogramma chilonis* for effective control of maize stem borer.
- Biocontrol based IPM in organic basmati rice to reduce the incidence of yellow stem borer and leaf folder.
- Fame 480 SC (flubendiamide) @ 20 ml/acre for the control of stem borer and leaf folder in rice and basmati rice.
- Marktriaz 40 EC (triazophos) @ 350 ml/acre for the control of stem borer and leaf folder in rice.
- Marktriaz 40 EC (triazophos) @ 600 ml/acre to control whitefly in cotton.
- Nativo 75 WP (trifloxystrobin+tebuconazole) @ 80g/acre to manage sheath blight and brown spot in rice.

- Indoxacarb 14.5 SC @ 200 ml or Spinosad 45 SC @ 60 ml/acre at flower initiation stage for the management of spotted pod borer in pigeonpea.
- Bumper 2SEC (propiconazole) and Orius 25.9 EC. (tebuconazole) @ 200 ml/acre to manage sheath blight in rice.
- Post emergence application of Parimaze 10 SL (imazethapyr) @ 180 ml/ha provided effective control of mixed weeds flora including grasses, broadleaves and sedges in soybean.
- New brand formulations of Pendimethalin (Penda 30 EC @ 1litre/acre, Markpendi 30 EC @ 1litre/acre), Sulfosulfuron (Markosulfo 75 WG @ 13g/acre) and Clodinafop (Markclodina 15 WP @ 160 g/acre, Columbus 15 WP @ 160g /acre) for effective control of *Phalaris minor* and of Sulfosulfuron + Metsulfuron (Markpower 75 WG @ 16g /acre) for the control of joint infestation of *P. minor* and broadleaf weeds in wheat.

### Vegetable Crops

- Application of paddy straw mulch @ 2.5 t/acre for weed control in potato.
- Application of Indoxacarb 14.5 SC @ 200 ml/acre provided effective control of tomato fruit borer.
- Application of 100 q/ha paddy straw mulch at the time of planting and if needed, one hand weeding at 3 months after planting was found effective for the management of weeds in organic turmeric. Without straw mulch, three hand weedings at 1, 2 and 3 months after planting are required.
- Besides, the findings of others studies related to plant protection conducted during the period are given as under:
  - Juvenile hormone esterase and vitellogenin gene were silenced in whitefly and preliminary results showed the mean fecundity and survival of whitefly decreased at higher concentration of dsRNA (2.5µg/ul) as compare to control.
  - Simple, sensitive and cost effective analytical methodologies were standardized for the estimation of fluopyram, oxadiargyl, metribuzin, ipconazole, penflufen and trifloxystrobin residues on different commodities. Out of 744 samples of different food commodities analyzed, 33 samples of vegetables were found to be contaminated with commonly used pesticides and 9 samples with monocrotophos, deltamethrin, cypermethrin, indoxacarb and chlorpyrifos were found to be above their respective maximum residue limits (MRL).
- The impact of adoption of IPM technology in rice resulted in 28% reduction in number of pesticide sprays in IPM fields in comparison to non-IPM fields.
- Effect of rise in minimum temperature on food consumption and larval duration of *H. armigera* on Egyptian clover, biology of *Spodoptera litura* and *Pieris brassicae* infesting cole crops, development and survival of cotton jassid on BG II cotton, biology and physiology of rice planthopper, on rice was studied.
- The highest resistance ratio (4.95-fold) was found in fenazaquin followed by propargite (2.98-fold) while it was minimum in spiromesifen i.e. 0.74-fold for *T. urticae* in brinjal. Predatory phytoseiid mite, *Neoseiulus longispinosus* released @ 15 mites/plant significantly reduced the population of spider mites on beans under net house conditions.
- Under biosystematic studies, morphological characterization and taxonomic studies on 29 species of 2 families of order Lepidoptera were carried out. Out of 63 representative samples of cerambycid beetles, DNA barcoding of 20 samples was done.

### Food Science and Technology

- Extruded snacks and porridge have been developed from maize, moongbean and pearl millet. The products developed include pasta from multigrain and brown rice, gluten free flat bread formulations, rollabe maize *chapattis* and





cereal health bar utilizing kinnow pomace and peel.

- Potato products viz. *aloo wari*, *papad*, *aloo bhujia*, *chakli*, maize- potato tortilla chips and ready to fry frozen potato snacks and pre-mixes from medium and high sugar potato varieties, have been developed. The technology for premix for ready to fry potato snacks has been transferred to White Gold Food Processing Private Limited, Jalandhar.

### Post-Harvest Technologies

- Packaging of bell pepper fruits in paper moulded trays followed by wrapping with heat shrinkable film or cling film improved shelf life, maintained quality and enhanced consumer appeal for 10 and 7 days, respectively, as against 5 and 2 days with unpacked product. This minimizes the post-harvest losses of bell pepper during retail marketing.
- Winter season tomatoes, packed in plastic crates lined with newspaper, were ripened in 7-10 days in ventilated polyhouse conditions or ripening chamber (20°C temperature and 85-90% RH). The fruit attained uniform colour and quality during ripening.
- A bioprocess for production of debittered citrus juices and beverages using naringinase enzyme ( $\alpha$ -L-rhamnosidase and  $\beta$ -D-glucosidase), produced by yeast *Clavispora lusitanae*, was developed.
- Scale up studies on grape (var. Perlette) vinegar at 50L revealed vinegar production in 27 days with a volatile acidity of 5.1% (w/v) and a recovery of 68%.
- Button mushrooms were efficiently processed into paste, which could be packed in plastic containers and polypropylene bags.

### Subsidiary Occupations

#### Beekeeping

- Effect of date of sowing of sunflower on *Apis mellifera* revealed that mean foraging intensity of *A. mellifera* and mean nectar secretion were significantly higher in timely sown crop than the late sown crop.

### Mushrooms

- King oyster mushroom (*Pleurotus eryngii*) was successfully cultivated for the first time under Punjab conditions. AVT14-07, a white accession of *Agaricus bisporus* produced maximum yield of about 20 kg/q compost.
- The existing compost formulation was modified by using one kg DAP in place of SSP and 2 kg urea per 300 kg straw that gave similar yields. Casing soil mixtures comprising coir pith (CP) and combination of FYM+CP (3:1) were identified that yielded 14-16 kg of fresh mushrooms per 100kg compost.

## AGRICULTURAL ENGINEERING

The University is focusing on the development of farm machinery, food processing, soil and water engineering, non-conventional energy sources etc. It has very good linkages with the farm machinery manufacturers, agro processing enterprises and farmers to develop and evaluate new farm machinery for the mechanization of different field operations. The technology designed and recommended during this period are given as under:

- Combine mounted straw management system (SMS) was developed and recommended for uniform distribution of paddy straw.
- A six row tractor operated small seed planter was designed and developed for planting small seeds like onion, carrot etc. The field capacity of the machine is 0.4 acre/hour. There is saving of about 50% in cost of operation and 81% in labour as compared to traditional method of onion cultivation.
- A tractor-operated six row garlic planter having row to row spacing of 15 cm was developed. Field capacity of the machine is 0.5 acre/hour. There is saving of 82% in labour requirement and 57% in cost of operation as compared to manual planting. The machine is under modification for refinement of seed metering mechanism.
- A tractor-operated fertilizer broadcaster was evaluated. There was saving of about 82% in labour as compared to traditional method of fertilizer spreading. Prototype feasibility testing

of fertilizer broadcaster was conducted at farmer's field covering an area about 7 acres.

- Electrostatic nozzle was evaluated at PAU farm and on farmer's field in district Mansa. The developed and imported electrostatic nozzles performed well having better spray deposition with uniformity coefficient of 1.10 for Imported Electrostatic Nozzle and 1.93 for Developed Electrostatic Nozzle.
- Self-propelled tangential axial flow combine harvester for mungbean was evaluated. The mungbean crop was harvested with tangential axial flow combine harvester after application of leaf defoliant. The combine was operated at forward speed of 1.5 km/h and cylinder speed of 800 rpm (18.91 m/s). The shattering loss ranged from 4.2 to 5.5%.
- An innovative, low cost hybrid hydroponics technology has been developed by combining the features of two existing hydroponic technologies for greenhouse vegetable raising. The main feature of this pot based technology is that besides increasing the yield of cucumber and tomato per plant by about 30 and 20%, supply of water and nutrients can also be recovered using a recirculation system. By using this technology, about 80-90% of water and 50-60% nutrients can be saved as compared to existing polyhouse based drip fertigation system.
- Rooftop based 12 pot single layer and 16 pot double layer hydroponic systems have also been developed for home vegetable gardening on urban roofs. The developed systems can easily be installed on rooftops at a very nominal cost. The testing of these systems by growing vegetables has shown very encouraging results.
- For cooking food for 90 to 100 people at one time, a twin-chamber community solar cooker with efficient cooking vessel design has been developed by placing 18 cooking vessels inside the cooker. Twin-chamber design can cook lighter meals (which take lesser time) and heavier meals (which take longer time) simultaneously without disturbing the stagnation temperature of each chamber.

## BASIC SCIENCES & HUMANITIES

- Integrated bird pest management methods like the wrapping of maize cobs and reflective ribbon provided 95% protection from bird damage at maturing stage. Combination of black poly bags and reflective ribbon provided 100% protection from bird damage at germinating stage in wheat crop.
- Artificial nests were monitored at Bhattian (Gurdaspur) and 40% occupation by Common Myna was observed. At Mehalkhurd (Barnala), Kular, Sudhar, Doraha, Laddowal, Sarabha, Ratipur, Machiwara and urban areas (Ludhiana), occupation ranges from 40-80% by Common Myna and Spotted Owllet. Nesting of Barn Owl was also observed in the artificial wooden nest, installed at farmer's field in Sahouli village of Ludhiana district.
- Bait containing 0.001% Bromadiolone and 0.005% Cholecalciferol in combination was found cost effective for management of *Bandicota bengalensis* population.
- Double burrow baiting with rodenticide during vegetative stage along with paper baiting at reproductive stage in wheat crop, sown under rice and maize, and residue management with Happy Seeder and Zero tillage technology were found more effective in controlling rodent pests.
- In direct seeded and transplanted basmati crops, single burrow baiting with rodenticides during vegetative stage along with paper baiting during reproductive stage were found effective for rodent control.
- Nitrogen and Sulphur as urea (31.25 kg N/ha) and gypsum (20 kg S/ha) alone or in combination significantly increased seed yield and decreased N:S ratio in developing soybean leaves, seeds, roots and stems. N and S increased total soluble proteins, free amino acids and S-containing amino acids in developing leaves and seeds. Methionine and cysteine (S amino acid) increased significantly in all the treatments. Gypsum increased glycinin (11S) relative to  $\beta$ -conglycinin (7S) in soybean seeds indicating improvement in soybean seed quality.



- Cotton genotypes, tolerant to salinity (LD 949, FDK 226, F846, LH 2076, LH 2108), accumulated more sodium in roots and leaves than the susceptible ones (FDK 253 and F 2560). The resistant genotypes registered higher superoxide dismutase (SOD), catalase (CAT), peroxidase (POD), glutathione reductase (GR) and ascorbate peroxidase (APX) activity than the susceptible genotypes.
- The use of inputs *viz.* chemical fertilizers, pesticides, insecticides, irrigation potential and agricultural labour in Punjab have increased at a growth rate of 4.7, 2.0, 2.0, 0.8 and 3.1% per annum, respectively, over the last three decades along with the number of tractors and farm implements. For sustaining Punjab agriculture, use of alternative manures such as green manure, farm yard manure coupled with integrated pest management should be encouraged besides judicious use of farm resources.
- It was found that only a small section of farmers in Punjab has opted for direct payment of their produce. A large number of farmers are unaware of Direct Payment Scheme. Therefore, farmers need to be made aware of the benefits of direct payment scheme through print media as well as electronic media. Farmers are dependent on the commission agents due to their cash needs during emergency. There is also a need to provide consumption loan to the farmers and create awareness among them regarding the lower rate of interest being charged by banks. Generally, the supply of farm inputs is routed through the commission agents. The farmers are exploited for these activities with the supply of spurious inputs and charge of higher prices. Therefore, there is a need to encourage and monitor the supply of agricultural inputs through cooperative societies.

## HOME SCIENCE

The research mandate of College of Home Science included food and nutrition security, vocational interests of adolescents, stress coping measures, work environment, resource management practices, drudgery reducing technologies; value

addition of textile crafts for entrepreneurship development and dissemination of homestead practices/ technologies. The salient achievements are as follows:

- Baked and extruded functional foods namely bread, extruded snack and noodles were prepared from Metabolic Syndrome specific designed ingredient mixes. The acceptable products had significantly higher lysine, crude protein, fibre and a significantly lower carbohydrate content against control i.e. 69 to 72% against 83% in bread, 66 to 70% against 82% in extruded snacks and 68 to 71% against 83% in noodles, hence appropriate for Metabolic Syndrome patients.
- A significant increase in serum calcium by 13 and 28%, serum phosphorus by 15 and 31% while a decline of 16 and 21% alkaline phosphate in pre-and post-menopausal group of 30 osteoporotic females, respectively was observed by supplementation of ready to eat wholesome nutrient bar comprised of cereal mix, soy flour, fruit mix, honey, fat, herbs and flax seed.
- The impact of diet and physical activity level on body composition of 90 adult males engaged in field, laboratory and office work from Punjab Agricultural University, Ludhiana was studied in the month of March to August, 2014. Bicycling and agricultural activity showed a negative relationship with body weight, body mass index, waist circumference and fat mass.
- A significant improvement in the dietary pattern, decrease in fasting blood glucose by 33%, postprandial blood glucose level by 21% and improvement in lipid profile of the 30 gestational diabetics was observed by nutrition counseling for a period of three months in Dayanand Medical College and Hospital, Ludhiana.
- Protective clothing (*Kurta Pyjama*) was designed using non woven fabric and tested for 60 days on 15 farm workers of Gurre and Jagraon villages of Ludhiana district involved in plucking 'ber' fruit. It was found to safeguard the workers from thorns, irritation, itching and was easy to don and doff, thus recommended for trials on larger samples.

- Exploration of eco-friendly auxiliary agents for wet processing was carried out to optimize the printing conditions for Arjun (*Terminalia arjuna*) dye. Cassia gum (*Cassia obtusifolia*) was used as natural thickening agent. It was found that the fastness grades in case of 5% Cassia Gum was very good, whereas, at 2.5% it was fairly good for printing on both cotton and silk fabric with block and screen printing techniques.
- Ten fashion articles namely belt, border, jacket, scarf, yoke, footwear, headband, bracelet, handbag and potli bag prepared after refashioning of traditional craft of 'Phulkari' through Computer Aided Designing were commercially viable and could fetch 30 to 40% profit.
- Smocking (embroidery technique) was used to develop contemporary articles earning profit ranging between 27 to 54% depending upon the type of article. Ten articles including cushion cover, handbag, bolster cover, folder, lampshade, footwear, pillow cover, jewellery box, curtain canopies and trimming for bed sheet were developed. Single coloured fabric and polyester material was the most preferred.
- A study on self-esteem, defense mechanisms and subjective well-being in 160 infertile women of Ludhiana district revealed that women from higher socio-economic status perceived themselves to be mentally healthier than those from low socio-economic status. Rural infertile women manifested higher aggression towards themselves as a defense mechanism where as their urban counterparts used rationalization and intellectualization as a defense mechanism to resolve their interpersonal and intrapersonal conflict.
- Research on gender dynamics in perception of stress, coping and resilience among 120 adolescents in low-income families of Ludhiana was conducted. The results revealed that girls were although more stressed as compared to boys, however they were better able to cope with the stress because of their greater proactive approach and better strategic planning.
- A study on impact of social intelligence on socio-emotional competence of 200 adolescents of Ludhiana district revealed that rural respondents were socially more competent as compared to their urban counterparts. The adolescents who possessed better memory and greater patience were socially more competent.
- Computer aided learning facilitated better learning in case of government school students. However, lack of infrastructural and support facilities created hurdles in effective implementation of use of computer aided learning.

## COMMERCIALIZATION OF TECHNOLOGY

### Technologies commercialized

- **Aroma-therapeutic Textile Products:** The technology of Aroma-therapeutic textile products has been licensed to N.P. Fresh Foods Private Limited, Ludhiana on non-exclusive basis.
- **Maize Hybrid PMH-5 and PMH-6:** The parent lines of Maize Hybrid PMH-5 and PMH-6 were licensed to Ashwariya Seeds India Private Limited, Telangana on non-exclusive basis to produce and sell their seeds.
- **Chilli Hybrid CH-27:** The parent lines of Chilli hybrid CH-27 were licensed to Kalash Seeds Private Limited, Jalna on non-exclusive basis to produce and sell its seeds.
- **Premix for Ready to Fry Potato Snacks:** PAU has provided the technology of premix for ready to fry potato snacks to the White Gold Food Processing Private Limited, Jalandhar on non-exclusive basis.
- **PGPR Culture (Bio-fertilizer):** 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.
- **Consortium Bio-fertilizer:** The university has granted the rights to the OMS53, Patiala for manufacturing and marketing of the Consortium bio-fertilizer developed by PAU on non-exclusive basis.



### Patents filed

S. No.	Year	Invention	Department	Application No.
1.	2014	Metabolic Syndrome Specific Ingredient Mix for making chapaties, breads, noodles and extruded products	Department of Food and Nutrition	IPR/FA/140009/2014
2.	2014	A gluten free whole grain flour composition and food product	Department of Food Science and Technology	914/DEL/2015
3.	2014	Flour composition of gluten free food grain	Department of Food Science and Technology	768/DEL/2015
4.	2014	Development of ready to eat shelf stable green (Mint,coriander) chutney	Department of Food Science and Technology	Awaited
5.	2014	Ready-to-eat wholesome nutrient bar specific to osteoporosis	Department of Food and Nutrition	Awaited
6.	2014	Paddy Straw Bale Combustor or Rice Bale Geysler	College of Agri. Engineering and Technology	2038/DEL/2015
7.	2015	Pot based hybrid substrate hydroponics technology with water and nutrient re-circulation system	Department of Mechanical Engineering	1567/DEL/2015
8.	2015	Bioprocess development for production of $\alpha$ -L-rhamnosidase to convert bitter naringin to non-bitter rhamnose and prunin in citrus juice	Department of Microbiology	1359/DEL/2015
9.	2015	Bed maker-cum-cotton sowing machine	FASS Bathinda	Awaited



## EDUCATION

Academic programmes of the University are run through its four constituent colleges at Ludhiana namely College of Agriculture (COA), College of Agricultural Engineering and Technology (COAE&T), College of Basic Sciences & Humanities (COBSH), College of Home Science (COHS) and two Institutes of Agriculture, one each at Gurdaspur and Bathinda.

## ADMISSIONS

During 2014-15, the University offered 12 undergraduate programmes, 43 Master's programmes, 29 doctorate programmes, and one diploma programme.

Programme Class/programme	No. of seats		No. of students admitted	No. of students passed out
	General & Reserved	ICAR		
<b>UNDERGRADUATE</b>				
B.Sc Agri.(Hons.)-4 year	83	15	98	66
B.Sc Agri.(Hons.)-6 year at Gurdaspur*	63	-	60	-
B.Sc Agri.(Hons.)-6 year at Bathinda*	63	-	60	-
B.Tech (Agril. Engg.)-4-year	73	11	84	35
B.Sc (Hons.) H.Sc.-4-year	42	08	17	32
B.Sc (Hons.) H.Sc.-6-year**	-	-	-	24
B.Sc. Nutrition & Dietetics 4- year	50	-	50	11
B.Sc. Nutrition & Dietetics 3-year***	-	-	-	06
B.Sc. Biotech.(Hons.)-4-year	53	09	62	37
B.Tech Food Tech.-4-year	55	09	64	36
B.Sc (Hons.) Fashion Designing 4-year	50	-	28	-
B.Sc. Interior Design 4-year	30	-	28	-
<b>POSTGRADUATE</b>				
M.Sc. Agriculture	135	32	167	125
M.Sc. Home Science	44	10	33	26
M.Sc. Basic Sciences	99	23	90	72
5-year Integrated M.Sc. (Hons.)	80	-	79	9
M.Tech.	71	6	49	30
MBA	50	1	43	35
MBA Agribusiness	30	7	14	4
MJMC	7	-	6	5



Programme	No. of seats		No. of students admitted	No. of students passed out
	General & Reserved	ICAR		
Ph.D.	127	36	143	76
Diploma course in Hybrid Seed Production Technology	20	—	19	12

\*The students will study for 1st two years and then will be shifted to PAU, Ludhiana.

\*\* Programme discontinued from 2010-11

\*\*\* Programme discontinued from 2011-12

## EXAMINATION CELL

The Examination Cell conducted entrance tests for admitting meritorious students to various academic programmes of PAU as per the following details:

- Conducted entrance tests for admission to B.Sc. (Hons.) Fashion Designing 4-year, B.Sc. (Hons.) Interior Design 4-year, B.Sc. Agri. (Hons.) 6-year programme, B.Sc. Agri. (Hons.) 4-year, B.Sc. Biotech. (Hons.) 4-year, B.Tech Food Tech. 4-year, B.Sc (Hons.) Home Science 4-year, B.Sc (Hons.) Nutrition & Dietetics 4-year, and 5-year Integrated M.Sc. (Hons.) programmes in June, 2015 and 6824 candidates applied for admission.
- Conducted 13 Masters' entrance tests for admission to M.Sc./MBA(AB)/MJMC/M.Tech. programmes during May-June, 2015 for which 1042 candidates applied for admission.
- Conducted entrance tests for admission to 29 Ph.D. programmes during November 2014.
- Conducted written test for recruitment to the posts of Network-cum-Programme Assistants on February 13, 2015 for 216 candidates. For recruitment to the posts of General Assistants, typewriting test in Punjabi was conducted on April 25, 2015 for 25 candidates. Besides, written test for recruitment to the posts of Assistants at KVVs was conducted on April 26, 2015 for 1137 candidates. Also conducted written test for recruitment to the posts of Clerks on compassionate grounds on April 26, 2015 for four candidates. Six papers of Higher Standard Departmental Examination for the PAU employees were also conducted during September 2014 and Feb.-March 2015.



Students appearing for Common Entrance Test

## NEW COURSES

**College of Agriculture:** A course on 'Conservation Agriculture', Agron.512 (2+1) was introduced in the Department of Agronomy.

### College of Basic Sciences and Humanities

Course title	Course no.	Credit hours
Conversational Structure and Communicative Function	Eng 93 (revised)	1+2
Discourse Patterns in Spoken English	Eng 94 (revised)	1+2
Introduction to Morphology and Reproductive Botany	Bot. 91	3+1
Basics of Systematic Botany and Ecology	Bot. 92	3+1
Introduction to Plant Histology and Genetics	Bot. 93	3+1
Basics of Plant Physiology	Bot. 94	3+1
Fundamental Inorganic Chemistry	Chem. 91	3+1
Introductory Organic Chemistry	Chem. 92	3+1
Fundamentals of Physical Chemistry	Chem. 93	3+1
Fundamental Organic Chemistry	Chem. 94	3+1
Mechanics	Phys. 91	3+1
Matter Properties and Thermodynamics	Phys. 92	3+1
Electricity and Magnetism	Phys. 93	3+1
Modern Physics	Phys. 94	3+1
Elementary Cell Biology	Zoo. 91	3+1
Elementary Animal Diversity	Zoo. 92	3+1
Elementary Animal Physiology	Zoo. 93	3+1
Human Welfare and Environment	Zoo. 94	3+1

## STUDENTS' ACADEMIC ACCOMPLISHMENTS

### College of Agriculture

- Three students namely Mandeep Singh, Sharadshree Upadhyay and Kumar Anurag Bhaskar secured 2nd, 18th and 25th rank, respectively, in ICAR-JRF in the disciplines of Plant Breeding and Soil Science.
- A total of 69 students qualified UGC-NET examination.
- Simranjit Singh (L-2012-A-106-M) was awarded "S. Kartar Singh Kahlon Gold Medal" for being adjudged as the best all-round student in M. Sc. (Agr. Sciences) in the University during 2014-15.
- Navneet Kaur (L-2012-A-11-M) was awarded "Dr Gurbaksh Singh Gill Medal" for scoring highest OCPA in M.Sc. Agronomy.

- Ritika Joshi (L-2011-A-107-M) bagged "Zonal Award (North Zone)" from Indian Society of Soil Science, New Delhi for best presentation of research of M.Sc programme (2014).

### College of Agricultural Engineering and Technology

- Dhimate Ashish Satish (L-2K1-AE-139-M) won "Best Thesis Award" at 44th Annual Convention of Indian Society for Technical Education, held at Trivandrum, Kerala.

### College of Basic Sciences and Humanities

- As many as seven students qualified ICAR-NET, two ICAR-SRF, eight ARS-NET 2014, three UGC-CSIR NET, two GATE, and one each JEST 2015 and ICMR-JRF.
- Nancy and Ramandeep Kaur were awarded "Young Scientists' Presentation Award" of





International Union of Biological Sciences at 5<sup>th</sup> International Conference on Rodent Biology Management held at Zhergzhou China (Aug-25-29, 2014)

### College of Home Science

- Two students qualified NET and one was awarded USIAD project by Ohio State University, USA.
- A total of 16 students qualified ICAR-Junior Research Fellowship (JRF).

## SCHOLARSHIPS AND FINANCIAL ASSISTANCE

### College of Agriculture

- Prashant Kaushik (Vegetable Science) won ICAR International Fellowship to pursue Ph.D at the University of Valencia, Spain.
- As many as 29 UG students were awarded ICAR National Talent Scholarship (NTS), 175 Punjab State Agricultural Marketing Board Scholarship, six S. Gurdit Singh Kang Foundation Scholarship, 19 G.S. Khush Scholarship, 11 COA Alumni Association Awards, 56 Post-matric Scholarship and 96 PAU Merit Scholarship.
- A total of 30 PG students got ICAR-Junior Research Fellowship (JRF), three ICAR Senior Research Fellowship (SRF), six ICAR Foreign Student Fellowship, four Monsanto Beachell Borlaug International Scholarship, two Monsanto Merit Fellowship, 27 INSPIRE Fellowship from Department of Science and Technology (DST), nine Rajiv Gandhi National Fellowship, and 132 PG students got PAU Merit Scholarship/stipend.
- Six students got Bharti Field Fresh Fellowship and one each was awarded ASPEE Fellowship, UGC-SRF, Department of Biotechnology (DBT)-JRF, and Post-matric Scholarship.

### College of Agricultural Engineering and Technology

- As many as nine UG students of the college were awarded NTS (ICAR), four G.S. Khush Scholarship, one R.N. Kaul Scholarship, 29 PAU

Merit Scholarship and 17 Post-matric Scholarship (Punjab Government).

- One PG student got ICAR-JRF, one received Jain Irrigation Research Fellowship, 28 were awarded PAU Merit Fellowship and two Post-matric Scholarship.

### College of Basic Sciences and Humanities

- One student was awarded Senior Research Fellowship by ICAR
- Nine students qualified for UGC-JRF, one each got Indian Council of Social Science Research (ICSSR) Fellowship, Council of Scientific and Industrial Research (CSIR)-UGC JRF, Women Scientists Scholarship (UGC), Postgraduate Indira Gandhi Scholarship, Bihar Samajya Kalyan Vibhagya Fellowship, seven got INSPIRE Fellowships from DST, seven Maulana Azad Minority Fellowship and six Rajiv Gandhi National Fellowship from UGC, two got Minority-cum-Means Scholarship from Ministry of Minority Affairs (GOI), four Dr G.S. Khush Award, 44 PG students got University Merit Fellowship and 18 received student aid fund.

### College of Home Science

- Four UG students got Dr G.S. Khush Award and 35 got PAU Merit Scholarship.
- Two PG students each got ICMR-SRF and ICAR-SRF, six got ICAR-JRF, 11 UGC-JRF, one National Fellowship, 14 INSPIRE Fellowship and 34 PAU Merit Fellowship.

## CONVOCATIONS

- The 14<sup>th</sup> Annual Convocation of the College of Agriculture, PAU, was held on January 28, 2015. On the occasion, Dr R.R. Hanchinal, Chairperson, Protection of Plant Varieties and Farmers' Rights Authority, Government of India was the chief guest. A total of 192 pass-outs of B.Sc. Agriculture (Hons.), 78 of B.Sc. Biotechnology (Hons.) and 22 of B.Tech Food Technology (Hons.) during the years 2012 and 2013 were awarded degrees. Besides, six students were awarded University Gold Medals, and 13 other medals. In addition, one student was conferred with Dr J.S. Pruthi



Dr R.R. Hanchinal, Chairperson, Protection of Plant Varieties and Farmers' Rights Authority, Government of India delivering his convocation address at PAU

Prize, six with Academic Roll of Honour, 44 with Merit Certificates and 37 with prizes for having achieved academic distinctions.

- The Convocation-cum-Prize Distribution Function of the College of Home Science, PAU was held on February 24, 2015. Dr B. Meenakumari, Deputy Director General (Fisheries), ICAR, New Delhi was the chief guest. As many as 190 pass outs of B.Sc. Home Science (Hons.) 4-year and 6-year programmes, B. Sc Fashion Designing (Hons.), and B. Sc Nutrition and Dietetics (Hons.) during the years 2011-12 to 2013-14 were awarded degrees. Besides, five students were conferred with Gold Medals, 19 with Merit Certificates, and many others with College Colour and prizes for excelling in academics, sports and co-curricular activities.
- The Annual Convocation and Prize Distribution Function of the College of Agricultural Engineering and Technology was held on June 24, 2015. S. Parminder Singh Dhindsa, Minister for Finance and Planning, Punjab was the chief



Dr B. Meenakumari, Deputy Director General (Fisheries), ICAR, New Delhi awarding a Merit Certificate to PAU student



S. Parminder Singh Dhindsa, Minister for Finance and Planning, Punjab awarding a Merit Certificate to PAU student

guest. All the B.Tech Agricultural Engineering students who completed their degree programmes till March 2, 2015 were awarded degrees at the convocation. Besides, students were awarded Gold Medals, Merit Certificates, running trophies and cash awards for excellence in academics and extra-curricular activities.

## STUDENTS' WELFARE ACTIVITIES

### Important Sports Achievements Inter-Varsity Tournaments

The PAU teams participated in the North Zone/ All India Inter-Varsity tournament in Lawn Tennis (M), Cricket (M), Football (M), Table Tennis (M&W), Basketball (M&W), Swimming (M&W), Kabaddi (M), Cycling (M&W), Handball (M&W), Badminton (M&W), Volleyball (M), Shooting (W) & Weight Lifting (M).

### North Zone Inter-Varsity Hockey

The PAU organized North Zone Inter-Varsity Hockey (M) Tournament from February 13-19,



North Zone Inter-Varsity Hockey (M) Tournament at PAU



2015. The University got second position in this tournament.

### University Level Tournaments

The teams from the constituent colleges of PAU participated in Inter-College Tournaments for Volleyball (M), Basketball (M&W), Football (M), Swimming (M&W), Lawn Tennis (M), Handball (M&W), Hockey (M), Badminton (M&W), Weight Lifting (M), Cricket (M), Table Tennis (M&W) & Cycling (M&W). Sandeep Singh (COA) was declared Best Cyclist, Arjun Singh (COA) Best Hockey Player and Sunil Kumar (COAE&T) as Best Swimmer (M) for the session 2014-15.

### Annual Athletic Meet

The 49<sup>th</sup> Annual Athletic Meet of PAU was held at University Athletic Track on March 9, 2015. A large number of students from the constituent colleges of the University took part in different athletic events. Gurinder Singh (COAE&T) and Mehakpreet Randhawa (COA) were declared Best Athletes in men and women category, respectively.



49<sup>th</sup> Annual Athletic Meet at PAU

### University Colour/Merit Certificate

The PAU Sports and Youth Activities Council in its 51<sup>st</sup> meeting held on November 25, 2014 awarded 33 Merit Certificates, 12 University Colour and 3 Roll of Honour to the outstanding sportspersons/artists of PAU for their proficiency in sports, game, cultural and literary events for the session 2013-14. The students were awarded these honours during 49<sup>th</sup> Annual Athletic Meet of the University.

### Sports Camp

Annual National Sports Organisation (NSO) coaching camp was organized at PAU for the session 2014-15. As many as 175 trainees enrolled under NSO programme attended the camp. Technical

skills and intensive training were imparted to the participants in various games.

### Sports Scholarships

The Sports Scholarship Committee in its meeting held on May 29, 2015 approved 10 sports scholarships of the value of Rs 350/- per month each in one major and nine minor games for the academic session 2014-15 to the outstanding sportspersons for their proficiency in sports and games.

### Outstanding Players

- The PAU Hockey (M) team got second position in North Zone Inter-Varsity Hockey (M) Tournament, held at PAU in February 2015. They also participated in All India Inter-Varsity Hockey (M) Tournament held at Barkatullah University, Bhopal during February-March, 2015. Besides, they participated in Champion Universities Hockey (M) Tournament, organized jointly by Association of Indian Universities and Jawaharlal Nehru Hockey Tournament Society during February-March 2015 in New Delhi.
- Nimrat Kaur Sekhon (L-2013-A-54-BVI) got Gold Medal in three categories of Rifle/Pistol events during the 49<sup>th</sup> Punjab State Shooting Championship held at Jalandhar in August 2014. She also got third position in the 58<sup>th</sup> National Shooting Championship held at Balewadi Shooting Ranges, Pune in December in 2014.
- Sirtaj Singh (L-2013-A-56-M) got third position in All-India Inter Varsity Weight Lifting (M), Power Lifting (M) and Best Physique (M) Tournament, held at Sri Sai Group of Institute, Pathankot in January 2015.
- Arshdeep Singh (L-2013-A-34-BVI) got second position, Loveleen Kaur (L-2010-A-82-BVI) and Lovepreet Kaur (L-2010-A-81-BVI) secured third position in Punjab State Junior Boys and Girls Handball Championship, held at Jharkhar in January 2015.
- Davinder Singh Dhillon (L-2014-A-70-M) got second position in 73 kg Weight Category in Power lifting in the Northern India Power lifting and Bench Press Championship held at Shimla in March 2015. He also got Gold Medal in the

Junior Punjab Power lifting Championship held at Patiala.

- Pukhraj Singh Brar (L-2013-A-55-BVI) got second position in Punjab State Junior Boys and Girls Basketball Championship, held at Bhaini Sahib in June 2015.

### National Service Scheme Activities

- Special NSS camp was organized on the theme 'Swachh Bharat Abhiyan' at PAU from January 12-18, 2015.



NSS volunteers of PAU taking out awareness rally

- Special lectures on health awareness, traffic rules and regulations, personality development, spirituality, self-reliance and stress management by the eminent speakers were organized for the volunteers. A play on 'Road Safety' was also organized.
- One-day workshop on 'Traffic and Health Awareness' was organized in collaboration with District Administration, Ludhiana and Fortis Hospital Group on January 16, 2015.
- The awareness about HIV/AIDS, drug abuse, road safety, environmental pollution and role of PAU in agriculture was spread among the masses through banners, posters, distribution of pamphlets, handbills and interactions with rural as well as urban people during the Kisan Melas and in the form of the rallies in the city.

### Cultural Activities

- Independence Day (August 15, 2014), 'Swachh Bharat Abhiyan' (October 2, 2014) and Republic Day (January 26, 2015) were celebrated in which a large number of students, staff and faculty of PAU participated.

- Silika Gupta won Gold Medal in North Zone Elocution Competition at PAU on October 10, 2014.

- PAU Inter-College Youth Festival for the academic session 2014-15 was organized from October 30-November 5, 2014. Students participated in the literary, fine arts, music, and theatre and dance events. The overall running trophy was bagged by College of Agriculture.

- A contingent of 40 PAU students participated in 30<sup>th</sup> North Zone Inter-University Youth Festival organized by the Association of Indian Universities at the University of Jammu, Jammu in January 2015. PAU students won Bronze Medals in group mime, clay modelling and cartooning events.

- PAU contingent participated in Punjab State Inter-University Youth Festival organized by Punjab Art Council, Chandigarh at Sikh National College, Banga (Shaheed Bhagat Singh Nagar) in January 2015. PAU students won Silver Medal in slogan writing and Bronze Medals in *hekan wale geet*, mimicry, debate, *bhand*, painting, cartooning and poetic recitation.

- A contingent of 27 PAU students participated in the 15<sup>th</sup> All India Inter Agricultural Universities Youth Festival organized by ICAR at National Dairy Research Institute, Karnal in March 2015. PAU students won Gold Medals in light vocal solo, group song Indian, cartooning; Silver Medal in clay modeling and 4<sup>th</sup> position in poster making.



Independence Day and Republic Day at PAU



## EXTENSION

The university undertakes the transfer of improved agricultural technologies among the farmers and capacity building of farmers and extension functionaries in these technologies through 15 Farm Advisory Service Centres (FASC) and 17 *Krishi Vigyan Kendras* (KVKs) located at different district headquarters in Punjab and various departments; Agricultural Technology Information Centre (ATIC); and Advanced Centre of Training at *Kairan Kisan Ghar* (KKG) on the main campus. These centers transfer the technologies through various extension modes like *Kisan Melas/Kisan Divas*, field days, workshops, adaptive research trials, on farm trials, demonstrations, trainings (short, vocational and in-service), exhibitions, camps, campaigns, technical guidance, TV/radio talks, *kisan club*/committees meetings, agri-publications and sale of farm literature.

### KISAN MELAS AND FIELD DAYS

*Kisan Melas/Kisan Divas* play a key role in the dissemination of improved knowledge among the masses. The farmers are acquainted with new technologies through live demonstrations, exhibitions and technical sessions. The question-answer session during these *melas/divas* addresses the queries of the farmers. A total of 14 *Kisan Melas/Kisan Divas* were organized during the period under report, seven *kisan melas/kisan divas* each during the month of September 2014 and March 2015, at main campus of Ludhiana, Regional Research Station (RRS) Bathinda, RRS Gurdaspur, RRS Faridkot and RRS Ballowal Saunkhri, KVK Rauni (Patiala) and KVK Nag Kalan (Amritsar). The theme of these *melas/divas* in September, 2014 was "Use Improved Seed, Reduce Cost and Enhance Profits" and that of March, 2015, was "Adopt Crop Diversification, Save Natural



Farmers make a beeline to purchase new and improved crop varieties at PAU



Jathedar Tota Singh, Minister of Agriculture and NRI Affairs, Punjab inaugurating Kisan Mela at PAU on March 20, 2015

Resources." A large number of farmers from the Punjab and adjoining states participated in these *melas/divas*. Field demonstrations and elaborate exhibitions on improved varieties, production and protection technologies, bee-keeping, mushroom cultivation, nutritional gardening, protected cultivation etc. were arranged for the farmers. The seeds of improved varieties of crops, vegetables, fodders, saplings of fruit plants and farm literature were also sold to the farmers in these melas/divas. In addition, the exhibition of other farm inputs including fertilisers, pesticides, implements and farm machinery was also arranged.

Besides, the university also holds field days in order to popularise improved technologies and practices based on the principle of "seeing is believing". A total of 175 field days at different villages were organised to promote cultivation of pulses, IPM in pormal/basmati rice, mat-type nursery raising, mechanical transplanting of paddy, nutrition garden, mushroom cultivation, use of happy seeder etc.

### Awards to Progressive Farmers

The progressive farmers were honoured during the PAU *Kisan Melas* for their outstanding contributions to the field of agriculture, horticulture and allied occupations. During the *Kisan Mela* (Ludhiana) on September 12 and 13, 2014, four progressive farmers of Punjab namely Hardeep Singh of village *Karmuwala*, district Ferozepur; S. Nirbhay Singh Sidhu of village *Sema*, district Bathinda; S. Jaswant Singh of village *Rode Jalewala*, district Ferozepur; and Bibi Gurdeep Kaur of *Nabha*, district Patiala were honoured with Sardar Dalip Singh Dhaliwal Memorial Award, Parwasi Bharti Award,



Award winning progressive farmers alongwith the chief guest and dignitaries at PAU Kisan Mela

Sardar Surjit Singh Dhillon Award and State Awardee Sardarni Jagbir Kaur Grewal Memorial Innovative Woman Farmer Award, respectively.

During the *Kisan Mela* (Ludhiana) on March 21 and 22, 2015, five progressive farmers from Punjab were honoured. S. Harvinder Singh of village *Bhadalwad*, district Sangrur; and S. Ravinder Singh Brar of village *Kauni*, district Muktsar; were conferred with the "Chief Minister Award" for excellence in agriculture. Besides, S. Gurjit Singh Mahal of village *Burj*, district Bathinda was awarded "Chief Minister Award" for excellence in horticulture. S. Ramandeep Singh of village *Rori Kapura*, district Faridkot; and S. Rajinder Pal Singh of village *Kalal Wala*, district Bathinda were awarded "CRI Pumps Award" for adopting farm mechanization and for excellence in organic farming, respectively.

### ADAPTIVE RESEARCH TRIALS

Adaptive research trials (ARTs) are conducted at the farmers' fields under different agro-climatic conditions to test the new technologies generated by the research system. A total of 933 adaptive research trials were conducted at different locations to evaluate new varieties and crop production and protection technologies. Based on these trials, 51 recommendations were made, out of these, 24 were of new varieties (14 field crops, 7 vegetables, 3 forestry), 13 each of production and plant protection technologies and one of farm machinery.

### ON FARM TRIALS (OFTs)

On Farm Trials (OFTs) are conducted to test a new technology/idea under farmer's field conditions.



along with PAU recommended practice and farmer's own practice as control. A total of 151 OFTs were conducted by the KVKs scientists.

Some salient findings of OFTs are listed below:

- Addition of phosphorus solubilising bacteria (PSB) along with application of DAP increased the yield of wheat as compared to application of recommended dose of DAP alone @ 55 kg/acre
- In basmati rice the recommended practice of seed treatment + seedling root dip with Bavistin gave effective control of foot rot disease as compared to root dip in Bavistin solution only or broadcasting of Bavistin in field one week after transplanting.
- Application of 27kg DAP/acre (farmer practice) to Bt cotton sown after wheat increased the yield as compared to existing recommendation of no phosphorus application.
- Application of magnesium sulphate @ 0.5% increased the seed cotton yield as compared to 1% magnesium sulphate spray in Bt cotton.
- Herbicide application of Imazethapyr 10% SL at first cutting of berseem gave better weed control as compared to Fluchloralin 45EC followed by Pendimethalin 30EC @ 2.5 l/ha.
- Cultivation of *khariif* onion on 60 cm beds with 3 rows at a spacing of 15 x 7.5 cm proved better than flat sowing with same spacing.
- Significantly less incidence of shoot and fruit borer and higher yield were recorded in brinjal with application of Indoxacarb and Chlorantroniliprol as compared to the recommended insecticide (Fenvalerate).
- Seed dip treatment with Emisan gave better control for black scurf of potato as compared to spray treatment.

## DEMONSTRATIONS

For the promotion of crop production, protection and other improved agricultural technologies developed by PAU, demonstrations are conducted on farmers' fields and KVK farms. A total of 2,096 front line demonstrations (FLD's) were conducted on improved varieties of oilseed crops (groundnut,

sesame, *gobhi sarson*, *toria*, *raya* and sunflower), pulses (summer moong, *khariif* moong, mash, soybean, gram and lentil), pormal rice, basmati rice, cotton (American and *desi*), maize and maize fodder. The FLDs were also conducted on other technologies such as nitrogen management in paddy using leaf colour chart; control of foot rot in basmati; weed control in direct seeded rice; weed control in maize; management of stem borer/leaf folder in pormal rice and basmati rice; green manuring before rice cultivation; crop residue management particularly of rice; use of rice transplanter; wheat sowing with happy seeder; management of maize borer using *Trichoderma harzianum*; use of fertilizer on soil test basis; etc.

Besides, demonstrations were carried out on the use of cobalt chloride for control of parawilt in cotton; control of jassid in cotton; mixed cropping of sarson and toria; and intercropping of gobhi sarson in sugarcane. Demonstrations on nutrition gardening of summer and winter vegetable crops; use of paddy straw chopper; use of balercum-knotter; seed treatment of wheat; turmeric cultivation; low tunnel technology for vegetable crops; orchard protection in summer; use of hydrogel in wheat/potato/pea; bulb set technique in *khariif* onion production; cultivation of rainy season tomato and broccoli; fungicidal management of foot rot/gummosis in citrus were also given.

A total of 955 method demonstrations on the collection of soil and water samples; seed treatment; *Rhizobium* inoculation in berseem/gram/peas/lentil; spray techniques of agro-chemicals; identification of weed flora; how to calculate economic threshold levels for plant protection; nursery raising of vegetables; on different aspects of cooking and home management; and animal sciences were conducted. Method demonstrations related to subsidiary occupations (bee keeping, mushroom cultivation etc.) were also organized to promote the adoption of these occupations by farmers, specially, small farmers.

## TRAININGS AND EXHIBITIONS

PAU *Krishi Vigyan Kendras* (KVKs) and Centre for Training at PAU Campus organized 1937 trainings



PAU's Krishi Vigyan Kendra, Sangrur (Kheri) holding awareness campaign against paddy residue burning

(1,342 short, 294 vocational, 160 in-service and 143 sponsored) for the farmers, farm women and extension functionaries to enhance their knowledge for increasing agricultural productivity and farm income. Vocational trainings were given on precision farming, hybrid seed production, protected cultivation of vegetables, mushroom cultivation, apiculture, value addition or agricultural produce (preparation of pickle/*murabba*/ketchup and other recipes), pruning and trimming of fruit plants, poultry, dairying, tie and dye, stitching and embroidery etc. A total of 20,294 farmers, 9,113 farm women and 2,225 extension personnel participated in these training programmes.

A one year 'Horticulture Supervisor Training Course' each was conducted at Department of Fruit Science, PAU, Ludhiana; KVK Bathinda and KVK Gurdaspur in which 51 students were enrolled. Two 'Gardener Training Courses' at KVK, Bathinda and one at KVK Gurdaspur, each of six months duration were also organized, and 54 trainees successfully completed this course. Besides, two 'Young Farmers' Training Courses' of three months duration were organized at PAU, Ludhiana, in which 66 young farmers received training in scientific techniques of crop cultivation and other advanced agricultural technologies and practices.

In addition, under capacity building programme, two trainings on "Commodity Future Market" were

organized, where in 38 trainees received training on how to use future markets of crops to realise better prices of agricultural produce. Fifteen training courses with 327 participants were organized for the officers of Food Corporation of India in order to enhance their skills in quality control of grains during storage. Six trainings were conducted for the officials of the Kisan Call Centre, which were attended by 94 officers, to upgrade their knowledge in crop production, protection and other technologies and practices. Two training courses on 'Fruit Cultivation' for 53 farmers and farm women of Himachal Pradesh and one training course on "Commercial Bee-Keeping" for 20 farmers of Rajasthan were also arranged.

The extension scientists of PAU also acted as resource person in 755 farmers' training camps organized by different line departments (Agriculture, Horticulture, Soil Conservation, IFFCO, KRIBHCO, NFL, etc.).

## Exhibitions

Exhibitions are arranged during *Kisan Melas/ Divas*, district level training camps, field days, scientific advisory committee meetings and technology week celebrations, special days etc. to create awareness among farmers on the use and benefits of improved/new technologies and practices. A total of 629 exhibitions were arranged during this year, wherein important





production, protection and resource conservation technologies; live and preserved specimens, models of drip irrigation, integrated farming system, vermi-compost, kitchen gardening along with farm literature were displayed.

## WORKSHOPS

Workshops are organised regularly by PAU in which the university scientists and extension officers of lined departments discuss results of latest technologies developed by the university and finalize the Package of Practices to be followed by the farmers. Extension officers also provide feedback of the farmers to the scientists about the challenges in the field in order to find solution to these challenges. Five workshops were organized: Research and Extension Specialists'



Dr B.S. Dhillon, PAU VC addressing the agriculture officers at Research and Extension Specialists' Workshop for Rabi Crops

Workshop on *Rabi Crops* (August 12-13, 2014); Research and Extension Specialists' Workshop for Fruits, Mushroom, Agro-forestry, Post-harvest Management, Food Technology and Agricultural Economics (January 22-23, 2015); State Level Training & Planning Workshop (January 29, 2015); Research and Extension Specialists' Workshop on *Kharif Crops* (February 16-17, 2015); and Research and Extension Specialists' Workshop for Vegetable, Floriculture and Sericulture along with Post-harvest Management, Farm Power Machinery, Food Technology and Agricultural Economics (May 29-30, 2015). A total of 1,689 scientists and extension personnel from the State Departments of Agriculture and Horticulture participated in these workshops.

## FARMERS' ORGANIZATIONS/ FEEDBACK COMMITTEES

A joint meeting of PAU Farmers' Committee and PAU Fruit and Vegetable Growers Committee was held on July 25, 2015 in which 148 progressive farmers and officers from Departments of Agriculture and Horticulture and PAU scientists participated. Farmers discussed emerging problems being faced by them and experts suggested on-the-spot solutions. Farmers also gave feedback on researchable issues to help the scientists in re-orienting their research programmes and to refine some of the earlier recommendations.



Farmers-Scientists Interface at PAU



**PAU expert explaining Direct Seeded Rice Technique**

In addition, 10 monthly training camps for the members of PAU Kisan Club including women's wing were organized in which 5,075 farmers and 626 farm women participated. Besides, 10 monthly training camps for the members of Progressive Bee Keepers Association were organized in which 484 farmers participated. Four training camps were also organized for the members of Seed Producers & Nursery Growers' Association involving 155 farmers. These training camps were held to equip the farmers and farm women with latest advances in their respective areas.

In addition, Farmers-Scientists Interface on "Skill Development in Agriculture, and Challenges and Research Strategies in Agriculture" was organized on May 25, 2015 in which 170 progressive farmers from different districts of Punjab participated and flagged the important occupations/sub-disciplines such as fruits and vegetable processing, gardening and landscaping, protected cultivation, bakery, operation

and maintenance of farm machinery etc. in which skills need to be imparted/improved for enhancing rural income.

## PLANT CLINIC AND TECHNICAL GUIDANCE

PAU provides diagnostic service pertaining to various crop disorders including nutritional deficiencies, weed, pest and disease infestation in field, vegetable, fruit, forest and ornamental crops. This service is being provided from the Plant Clinic at PAU, KVKs and FASCs in different districts of the State. A total of 8015 plant samples brought by farmers were diagnosed and farmers were provided with the suitable remedial measures for their management.

The extension scientists provide technical guidance on different aspects of crop production and subsidiary occupations. Technical guidance was provided to 64,205 farmers in office, field and through telephone helplines.

## PAU DOOTS

The university enrolls farmers, having an access to internet, as PAU doots for the transfer of technologies in their respective villages through public address system and other modes of communication. These doots are being sent 2-3 messages per week on various agricultural practices through e-mail for further spread. During this year, 1248 doots were enrolled and 90 messages were sent to them. So far, 4790 farmers have been enrolled as PAU doots.



## COMMUNICATION AND MEDIA

### COMMUNICATION THROUGH MASS MEDIA

The Centre for Communication and International Linkages (CCIL) maintains a constant liaison with the print and electronic media including Doordarshan and AIR Jalandhar to publicize the activities and achievements of the University in agriculture research and higher education. It issues press releases to different newspapers and news channels on regular basis. During the period under report, the Centre issued a total of 811 press releases (421 in English and 390 in Punjabi). It also sent as many as 20 articles (8 in English and 12 Punjabi), authored by PAU scientists, for publication in various newspapers and magazines. It provided TV coverage to 87 different events and also produced 14 Kisan Mela reports for telecast from Doordarshan. It also coordinated with the Doordarshan, Jalandhar for 310 TV talks of PAU scientists.

### FARM PUBLICATIONS

The CCIL publishes two monthly farm magazines *Changi Kheti* (in Punjabi) and *Progressive Farming* (in English). The combined circulation of these magazines has increased by 53% from 1,23,048 copies in 2013-14 to 1,89,075 in 2014-15. The Centre also publishes Package of Practices for Crops of Punjab, twice a year, both in English and Punjabi. Besides, technical farm bulletins are published regularly on various crops and technologies. During the period under report, the Centre brought out six new/revised farm publications in English and 15 in Punjabi on Field problems of important crops, Cultivation of fruits, Cultivation of vegetables and their problems, Cultivation of flowers, Weed management in crops, Plant diseases, Beekeeping, Operation and maintenance of tractors, Lawn improvement and maintenance etc.



Farmers in large number purchasing PAU farm publications during Kisan Mela



## HUMAN RESOURCE, FINANCE AND INFRASTRUCTURE DEVELOPMENT

### NEW APPOINTMENTS, PROMOTIONS AND RETIREMENTS

#### New appointments

During the period under report, following new appointments were made. Besides, 27 Assistant Professors and equivalent were directly recruited.

Name	Designation and Department	Date of appointment
Dr Jaskaran Singh Mahal	Dean, College of Agril. Engg. and Tech.	28.07.2014
Dr Balwinder Singh	Director of Research	28.10.2014
Dr R.S. Sidhu	Director of Extension Education	28.10.2014
Dr (Mrs) Neelam Grewal	Dean, Postgraduate Studies	26.02.2015
Dr (Mrs) Gurinder Kaur Sangha	Dean, College of Basic Sciences and Humanities	30.03.2015
Dr (Mrs) Jatinder Kishwana	Dean, College of Home Science	07.04.2015
Dr Pushpinder Singh Aulakh	Additional Director of Extension Education	28.07.2014
Dr Ashok Kumar	Additional Director of Research (Farm Mechanization and Bio-energy)	09.01.2015
Dr N.K. Khullar	Controller of Examinations	01.12.2014
Dr Karanjeet Singh Thind	Head, Department of Plant Breeding and Genetics	28.07.2014
Dr Harmit Singh Thind	Head, Department of Soil Science	28.07.2014
Dr (Mrs) Sandeep Bains	Head, Department of Apparel and Textile Science	28.07.2014
Dr Veer Parkash Sethi	Head, Department of Mech. Engg.	29.08.2014
Dr Rishi Indra Singh Gill	Head, Department of Forestry and Natural Resources	28.10.2014
Dr (Mrs) Jagdish Kaur	Head, Department of Agril. Jsm. Lang. and Culture	28.10.2014
Dr (Mrs) Satinder Kaur Uppal	Head, Department of Chemistry	03.12.2014
Dr Thakar Singh	Head, Department of Agronomy	30.03.2015
Dr Rajan Aggarwal	Head, Department of Soil and Water Engg.	30.03.2015
Dr (Mrs) Anita Kochhar	Head, Department of Food and Nutrition	08.04.2015
Dr Parvinder Singh Sekhon	Head, Department of Plant Pathology	01.05.2015
Dr J.S. Brar	Director (Seeds)	28.07.2014
Dr Bipen Kumar	Director, RRS, Kapurthala	10.10.2014
Dr Paramjit Singh	Director RRS, Bathinda	28.10.2014
Dr Ram Sakal Singh	Director RRS, Gurdaspur	28.10.2014
Dr Vishavjeet Singh Hans	Director, School of Energy Studies for Agriculture	13.01.2015
Dr Manmohanjit Singh	Director, RRS, Ballowal Saunkhri	01.04.2015



## Promotions and retirements

During the period under report, 66 Assistant Professor level teachers in the pay scale of Rs 15,600-39,100 having grade pay of Rs 6000/- were placed in the grade pay of Rs 7000/-; 30 Assistant Professor level teachers in the pay scale of Rs 15,600 - 39,100 having grade pay of Rs 7000/- were placed in the grade pay of Rs 8000/-; 5 Assistant Professors in the pay scale of Rs 15,600-39,100 having grade pay of Rs 8000/- were promoted/designated to the post of Associate Professor & equivalent in the pay scale of Rs 37,400-67,000 with grade pay of Rs 9000/-; and 28 Associate Professors in the pay scale of Rs 37,400-67,000 having grade pay of Rs 9000/- were promoted to the post of Professor & equivalent in the grade pay of Rs 10,000/- . A total of 29 teachers retired/resigned from the University service.

## Faculty Strength

Category	Sanctioned posts	Posts in position
State	1056	485
ICAR	186	179
KVK	119	105
Others	23	20
<b>Total</b>	<b>1384</b>	<b>789</b>

## AWARDS, DISTINCTIONS AND RECOGNITIONS

- Dr Baldev Singh Dhillon, Vice Chancellor, PAU was conferred with "Dr B.P. Pal Memorial Award by His Excellency, the Governor of Haryana and Punjab states, Professor Kaptan Singh Solanki during the 12<sup>th</sup> Indian Science Congress, held at National Dairy Research Institute, Karnal from February 3-6, 2015. This is the highest award of National Academy of Agricultural Sciences (NAAS) and carries a gold medal, citation and cash prize.

## Dean, Postgraduate Studies

- Dr Neelam Grewal was nominated as 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.

## College of Agriculture

- Drs S.S. Kukal and H. S. Thind (Soil Sciences) were elected as Fellow (2014) of National Academy of Agricultural Sciences (NAAS), New Delhi.
- The rice team (Plant Breeding and Genetics) was conferred with "Golden Jubilee Best AICRIP Centre Award 2015" by ICAR.



Dr B.S. Dhillon, Vice-Chancellor, PAU receiving Dr B.P. Pal Memorial Award from the Governor of Haryana and Punjab states, Professor Kaptan Singh Solanki

- Drs S. S. Walla, R. S. Gill and C. S. Aulakh (Agronomy) received "Best AICRP Centre Award 2014" from ICAR-Institute of Farming Systems Research, Modipuram, Meerut.
- Dr Satnam Singh (Entomology) was awarded the prestigious Raman Post-Doctoral Fellowship by University Grants Commission, New Delhi to work in the Department of Entomology, University of Kentucky, USA for a period of one year.
- Dr G. S. Buttar (Agronomy) got "ICAR-CSSRI Award 2015" for excellence in soil and water management.
- Dr S.S. Kukal (Soil Sciences) bagged "Dr G.S. Khush Distinguished Professor Award 2013-16" at PAU.
- Dr Manmohanjit Singh (Soil Sciences) got "Sumer Memorial Award 2015" for transferring technology in soil and water conservation. He was awarded by The Soil Conservation Society of India, New Delhi.
- Dr (Mrs) R.K. Kalra (Extension Education) got "Recognition Award 2015" from Indian Society of Extension Education, IARI, New Delhi.
- Dr (Mrs) Manmeet Kaur (Extension Education) received "Presidential Appreciation Award 2015" from Society for Community, Mobilization and Sustainable Individual Development, IARI, New Delhi.
- Dr A.S. Dhatt (Vegetable Sciences) received "Appreciation Letter" from PAU for outstanding research in vegetable crops.
- Dr Kuldip Singh received "Appreciation Letter" from PAU for outstanding research in sugarcane agronomy.
- Dr Sanjeev K Chauhan (Forestry and Natural Resources) was the Coordinator of IUFRO-2014 Short Rotation Forestry Section, Vienna, Austria.
- Dr P.K. Chhuneja (Entomology) got "Best Presentation Award" during the International Symposium on "Conservation and Management of Pollinators for Sustainable Agriculture," organized by V. Sivaram Research Foundation, Bangalore.
- Drs Veena Khanna, Gaurav Kumar Taggar and Mr Akhil Malhotra (Plant Breeding and Genetics) got first prize for oral presentation at the International Conference on "Changing Scenario of Pest Problems in Agri-Horti Ecosystem and Their Management," held at Udaipur (Rajasthan) from November 27-29, 2014.
- Dr P.S. Shera (Entomology) got "Best Oral Presentation Award" during the "National Entomologists' Meet 2015," held at Indian Institute of Natural Resins and Gums, Ranchi.
- Drs Gaurav Kumar Taggar, Ravinder Singh and H. K. Cheema (Plant Breeding and Genetics) won "Best Oral Presentation Award" during the "4<sup>th</sup> Congress on Insect Science-(CIS-4)," held at PAU on April 16-17, 2015.

### College of Agricultural Engineering and Technology

- Dr Rohinish Khurana (Farm Machinery and Power Engineering) got "ISTE Best Teacher of the Chapter Award" from ISTE Section Faculty Convention (Punjab, Chandigarh, Himachal Pradesh, and Jammu & Kashmir) at Swami Vivekanand Institute of Engineering and Technology, Banur in September 2014.
- Dr Jaskaran Singh Mahal (Farm Machinery and Power Engineering) was conferred with "Guiding Best M. Tech Thesis Award" during the 44<sup>th</sup> Annual Convention of ISTE, held at Trivandrum, Kerala in November 2014.
- Dr Manjeet Singh (Farm Machinery and Power Engineering) was nominated as Executive Committee Member from India for the 6<sup>th</sup> Asian Conference on "Precision Agriculture," held at South China Agricultural University, China in November 2014.
- Dr G. S. Manes (Farm Machinery and Power Engineering) got "Commendation Award" from the Indian Society of Agricultural Engineers at 49<sup>th</sup> Annual Convention, held at PAU, Ludhiana in February 2015.
- Dr V. P. Sethi (Mechanical Engineering) was invited as "Guest Faculty" to deliver a seminar at the University of Guelph, Ontario, Canada on May 25, 2015.



## College of Home Science

- Dr J.K. Gulati (Human Development) was recognized as National Resource Person-2014 by Ministry of Human Resource Management and United Nations Population Fund. She was also selected as a member of the expert group (2014) of United Nations Population Fund for developing a proposal for assuring quality of life skills integrated self learning material.
- Dr Tejpreet Kang (Human Development) got "Professional Commitment Award 2014" from Academy for Instructional Planning (IAIP), Indore.

## NATIONAL AND INTERNATIONAL LINKAGES

### Memoranda of Understanding Signed

During the period under report, PAU signed six MoUs with various national and international organizations:

- Purdue University College of Agriculture, West Lafayette, Indiana, USA on August 5, 2014 for joint research and teaching activities.
- The Central Potato Research Institute, Bemlooe, Shimla (ICAR) on August 28, 2014 to promote breeder seed production of potato of notified varieties of CPRI.
- Massey University, New Zealand and Landcare Research New Zealand Limited on October 31, 2014 to strengthen existing relationship.
- Syngenta India Limited, Pune on December 9, 2014 to collaborate and support projects for educating the farmers in different fields to enhance productivity, quality and shelf life of the farm produce and other related research and development activities.
- Punjab Biotechnology Incubator (PBTI) Mohali, Punjab on March 12, 2015 for collaboration in education and research.
- Sardar Swaran Singh National Institute of Renewable Energy, Kapurthala (Pb) on June 8, 2015 for exchange of Ph.D. students and to support joint research activities in the areas of management, thermal conversion of biomass, biogas etc.

## Eminent Visitors

- Farm experts from Indian Agricultural Research Institute, New Delhi; CCS Haryana Agricultural University, Hisar; CSK Himachal Pradesh Krishi Vishwavidyalaya, Palampur; and Dr YS Parmar University of Forestry and Horticulture, Solan visited PAU to attend the meeting of Joint Technology Review and Dissemination Committee on August 21, 2014.
- Sh. Suresh Kumar, IAS and Additional Chief Secretary (Development) of Punjab visited PAU on September 4, 2014.
- Dr S.P. Kale, Padma Shri Awardee and Head, Nuclear Agriculture and Biotechnology Division, Babha Atomic Research Centre (BARC) visited PAU to attend the Diamond Jubilee celebrations of the Department of Atomic Energy, BARC on September 9, 2014.
- A 30-member delegation from Kenya and Malawi agriculture, and to apprise themselves of the research, teaching and extension programmes of the University on September 10, 2014.
- Dr Gurjeet Gill, a Weed Scientist from the University of Adelaide, Australia, visited PAU to deliver a special lecture on "Weed Adaptation to Management Practices" on October 1, 2014.
- Dr M.S. Sidhu, former research scholar from the University of Science and Technology, Republic of Korea, visited PAU to deliver his talk on "Implications of Nanotechnology in Agriculture" on October 7, 2014.
- Dr S.K. Chaudhari, Assistant Director General (Soil and Water Management), Indian Council of Agricultural Research, New Delhi visited PAU to deliver the 13<sup>th</sup> Dr R.S. Murthy Memorial lecture on "Soil, Water and Nutrient Management in India: Future Perspectives" on October 17, 2014.
- Dr Shiv O Prasher, Professor, Department of Bio-resource Engineering, Mc Gill University, Montreal (Canada) visited PAU to discuss potential areas for research collaboration and formulate strategies to address water issues on November 10, 2014.



Punjab Agricultural University, Ludhiana and Central Potato Research Institute, Shimla, signing MoU

- Dr K.G. Ragothama, Associate Director, International Programmes in Agriculture, Purdue University, USA visited PAU on November 13, 2014 to deliberate on the scope of strengthening collaboration between the two institutes. His visit was aimed at holding talks on the establishment of "PAU-Purdue University Joint Research Centre," which had been initiated with the agreement, signed between PAU and College of Agriculture, Purdue University in August 2014.
- Dr S. Ayyappan, Secretary, Department of Agricultural Research and Education, Government of India, and Director General, ICAR, New Delhi visited PAU from November 14-15, 2014 to chair the two-day XXIII meeting of ICAR Regional Committee V (comprising the states of Punjab, Haryana and Delhi). The meet was jointly organized by PAU and Central Soil Salinity Research Institute, Karnal. Dr KML Pathak, Deputy Director General (Animal Science), ICAR, and Dr D.K. Sharma, Director, Central Soil Salinity Research Institute, Karnal also attended the meet.
- Ms Ursula Holzhauser, Counsellor, Food and Agriculture, Embassy of Federal Republic of Germany, New Delhi visited PAU on November 25, 2014 and discussed the scope of bilateral cooperation. She was accompanied by two German delegates including Dr Hermann J. Schloder, Head of Division, Trade Promotion and Quality Policy, Federal Ministry of Food and Agriculture; and Ms Alina Gumpert, Director, Agri-business, German Asia-Pacific Business Association.
- Mr Sunda Ram Verma, an innovative farmer from village Dhabayawali, Danta (Sikar), Rajasthan, visited PAU to deliver his talk on the topic "Rainfed Agriculture and Forestry" on December 2, 2014.
- Dr Sudhir Kochhar, former National Coordinator, National Agricultural Innovation Project, ICAR; and Member, National Biodiversity Authority Expert Committee visited PAU to deliver a talk on "Intellectual Property Business in Agricultural Technologies and Knowledge Products, and Business in Plant Varieties and Equity in Germplasm" on January 15, 2015.
- A 13-member Wyoming LEAD group from United States Department of Agriculture, USA visited PAU to discuss the collaborative areas on January 15, 2015.
- A 30-member delegation from the University of Nebraska, Lincoln, USA visited PAU on January 16, 2015 to gain in-depth understanding of Punjab agriculture. The delegation was headed by Dr Terry Hejny, Director, Nebraska LEAD Programme, Nebraska Agricultural Leadership Council.
- Prof. Surinder Saggat, Principal Scientist and Portfolio Leader, Green House Gases and Carbon





**Mr Suresh Kumar, Additional Chief Secretary (Development), Punjab seeing the experimental areas at PAU**

Storage, Landcare Research New Zealand Limited, Lincoln, New Zealand visited PAU on February 6, 2015 to discuss the implementation of the tripartite agreement among Massey University, New Zealand; Landcare Research, New Zealand; and PAU, Ludhiana.

- A three-member delegation from Morocco (Africa) visited PAU on February 11, 2015 to discuss the scope of joint venture. The delegation was headed by Dr S.A. Patil, former Vice-Chancellor, University of Agricultural Sciences, Dharwad, Bangalore, and comprised members from OCP Foundation, Morocco - Nawfel Roudies, Director, Agricultural Development Programme; Imadeddine Rouini, Project Manager, Agricultural Development Programme; and Nabil El Alami, Audit and Control Director.
- An 18-member delegation, headed by Herrn Peter Bleser, Parliamentary State Secretary, (Vice-Minister), Ministry of Food and Agriculture,



**Delegation from Kenya and Malawi at PAU**

Federal Republic of Germany visited PAU on February 11, 2015 to forge partnership.

- Dr R.S. Paroda, Chairman, Trust for Advancement of Agricultural Sciences, and former Director General, ICAR, New Delhi visited PAU to deliver a guest lecture on "Challenges before Indian Agriculture - The Way Forward." The lecture was organized by Dr Gurdev Singh Khush Foundation for Advancement of Agricultural Sciences on February 20, 2015.
- Mr Carlo Carli SNF Floerger, Agro Division ZAC de Milieux, France visited PAU to deliver his talk on "Potential of Aquasorb (Soil conditioner) for Improving Water Productivity in Punjab Agriculture" on February 25, 2015.
- The "3rd Alumni Meet of PAU" and "52<sup>nd</sup> Annual Meet of the Alumni Association of the College of Agriculture" was held at PAU amidst the gathering of distinguished scientists from across India, USA and Canada. Dr D.R. Bhumbra, the oldest alumnus of PAU and COA, and former Vice-Chancellor, Haryana Agricultural University, Hissar presided over the meet on February 26, 2015.
- A delegation from Arkansas State University (ASU), USA visited PAU on February 27, 2015 to explore collaborative areas. The delegation was led by Dr Thilla Sivakumaran, Executive Director of Global Initiatives, ASU.
- A delegation of wheat researchers from United Kingdom visited PAU on March 19, 2015 to explore the possibility of developing a collaborative research project, funded by Biotechnology and Biological Sciences Research Council (BBSRC), UK. The visiting team comprised Dr Peter Robert Shewry, Distinguished Research Fellow, Department of Plant Biology and Crop Sciences, Rothamsted Research, Harpenden, UK and Dr Malcolm John Hawkesford, Deputy Head, Department of Plant Biology and Crop Sciences, Rothamsted Research, Harpenden, UK. The delegation also included Dr Simon Griffiths and Dr Alexandra Mary Allen from UK.
- A six-member delegation from Nepal visited PAU on March 29, 2015 to discuss Indian agriculture.



Dr S. Ayyappan, Secretary, Department of Agricultural Research and Education, Government of India, and Director General, ICAR, New Delhi lighting the lamp at PAU



Dr S.P. Kale, Head, Nuclear Agriculture and Biotechnology Division, BARC, speaking at Diamond Jubilee celebrations of the Department of Atomic Energy, BARC



PAU VC interacting with the German delegation



Wyoming LEAD group from United States Department of Agriculture, USA at PAU

- A 29-member delegation of Australian farmers, led by Dale Price, visited PAU on April 17, 2015 to discuss about Punjab's agriculture, research and extension programmes of the University, and Australia's farming.
- A three-member delegation from African country "Ghana" visited PAU on April 28, 2015 to explore potential collaborative areas. The delegation comprised Prof. Haruna Yakubu, Vice-Chancellor, University for Development Studies (UDS), Ghana; Dr ABT Zakariah, Registrar, UDS and Mr S.S. Bhattal, Director, Arima Group, Ghana.
- Dr S.K. Dash, Prof. and Head, Department of Agricultural Processing and Food Engineering, Orissa University of Agricultural and Technology, Bhubaneswar, visited PAU on June 10, 2015 to deliver his talk on "Packaging Plays a Vital Role in Extending Shelf Life of The Food Products and in Waste Reduction".

### Trainings and Visits Abroad College of Agriculture

- Dr R. Sikka (Soil Sciences) visited Chicago, USA to attend the "City Conference on Soil" from July 3-7, 2014.
- Drs Jagmeet Kaur and Sarvjeet Singh (Plant Breeding and Genetics) visited the University of Saskatchewan, Saskatoon, Canada to attend the "6<sup>th</sup> International Food Legume Research Conference (IFLRC VI)" and "7<sup>th</sup> International Conference on Legume Genetics and Genomics (ICLGG VII)" from July 7-11, 2014.
- Dr P. S. Sandhu (Plant Breeding and Genetics) visited Huazhong Agricultural University, Wuhan, China to attend the "15<sup>th</sup> International Sclerotinia Workshop" from August 20-24, 2014.
- Drs P.K. Chhuneja and Jaspal Singh (Entomology) visited Egerton University, Kenya to impart basic beekeeping training to scientists, extension workers, PG students and farmers of Kenya under "Trilateral Co-operation between India-Kenya-USA". They visited USA from October 13-17, 2014.



PAU Alumni from different countries posing for a group photo

- Dr S.S. Kukal (Soil Sciences) visited Thailand to attend the "SRP (UNEP) 4<sup>th</sup> Plenary Meeting and Stakeholder on Future of Rice – Partnership for Sustainability" on October 27 and 28, 2014. He also visited Bangkok to attend the "Sustainable Rice Platform Standard and Indicators Workshop" on February 16 and 17, 2015.
- Drs G. S. Mangat, G. Mahajan, J. S. Lore and P. S. Sarao (Plant Breeding and Genetics) visited Bangkok International Trade and Exhibition Centre (BITEC) to attend the "4<sup>th</sup> International Rice Congress" from October 27-31, 2014.
- Drs Jasbir Singh Chawla and Jawala Jindal (Plant Breeding and Genetics) visited Bangkok, Thailand to attend the "12th Asian Maize Workshop" from October 30 – November 1, 2014.
- Drs Jagdeep Singh and Harmanjeet Singh (Soil Science) visited Long Beach, California, USA to attend the annual meeting of ASA, CSSA and SSSA from November 3-6, 2014.
- Dr Manmeet Brar Bhullar (Entomology) visited ESA Portland, Oregon (USA) to attend the annual meeting of Acarological Society of America, organized in conjunction with 62nd meeting of Entomological Society of America from November 16-19, 2014.
- Dr Sarvejit Singh (Plant Breeding and Genetics) visited Bangladesh and West Bengal to attend the travelling workshop, organized by ICARDA, from February 9–18, 2015. Besides, he visited Abudhabi (UAE) to participate in the International Conference on "ICT for Sustainable Agriculture" from March 9–11, 2015. He also visited Ethiopia to attend the review meeting of "CRP on Grain Legumes" from March 28-30, 2015.
- Dr M. S. Dhaliwal (Vegetable Science) visited Pakistan to monitor the protected cultivation of vegetables trials under Agriculture Innovation Project (AIP) from March 4-8, 2015.
- Dr Renu Khanna (Plant Breeding and Genetics) visited HHRC, Changsha, China to attend the training programme on "Hybrid Rice Breeding Technology for South Asian Countries" from March 20– April 22, 2015.
- Dr R. S. Gill (Plant Breeding and Genetics) visited International Rice Research Institute, Philippines to attend HRDC Meeting from March 23-April 5, 2015.
- Dr A. S. Dhatt (Vegetable Science) visited Nigde University, Turkey to present the paper at the 7th International Symposium on "Edible Alliaceae" from May 21–25, 2015.

### College of Agricultural Engineering and Technology

- Dr Manjeet Singh (Farm Machinery and Power Engineering) visited International Society of Precision Agriculture, Sacramento, USA to attend the 12<sup>th</sup> International Conference on "Precision Agriculture" from July 20-23, 2014.



Delegation from Ghana at PAU

- Er. Rupinder Pal (Mechanical Engineering) visited PTC, Netherlands to attend advance training on "Cold Technology and Solar Energy" from September 1-26, 2014.
- Drs A.K. Jain (Soil and Water Engineering) and Derminder Singh (School of Electrical Engg. & Information Technology) visited Russian Trimiyyazev State Agrarian University, Moscow, Russia to attend UG Training/Workshop under student-exchange programme from June 19-30, 2015.
- Dr (Mrs) Bavita Asthir (Biochemistry) visited the University of Wuerzburg, Germany to deliver a lecture at the International DAAD Alumni Workshop on "Modelling Change" from June 29-July 6, 2015.

#### College of Home Science

#### College of Basic Sciences and Humanities

- Dr S. Kapoor (Microbiology) visited Egerton University, Kenya as a technical consultant for the development of mushroom production package. He visited Kenya from September 28 -October 5, 2014.
- Dr Variander Randhawa (Home Science Extension and Communication Management) visited Egerton University, Kenya as a part of trilateral programme for food security, managed by US Department of Agriculture and funded by US agency for international development. She visited Kenya from November 9-14, 2014.
- Dr Kiran Grover (Food & Nutrition) visited ADNEC, Abu Dhabi, UAE to participate in "Global Forum for Innovation in Agriculture" from March 9-11, 2015.

## IMPORTANT EVENTS ORGANISED

### College of Agriculture

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" ( Sept. 22- Oct.1 2014)	Jointly organized by University of Adelaide, PAU and CCSHAU, Hissar. Sponsored by ACIAR, Australia



Smt. Harsimrat Kaur Badal, Hon'ble Union Minister of Food Processing Industries speaking at the inauguration of the National Seminar on "Augmenting Processing and Shelf-Life of Perishable Food Products" at PAU



Dr B.S. Dhillon, PAU VC, lighting the lamp during the inauguration of 4th Congress on Insect Science

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. Sponsored by Union Ministry of Food Processing Industries
USAID Funded Agriculture Innovation Project (AIP) Planning (Oct. 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



Smt. Harsimrat Kaur Badal releasing a publication at the national seminar



S. Parminder Singh Dhindsa, Finance Minister of Punjab speaking at the inauguration of National Symposium on "Crop Improvement for Inclusive Sustainable Development"

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



Agriculture stalwarts posing for a group photo at the National Symposium on "Agriculture Diversification or Sustainable Livelihood and Environmental Security"

### College of Agricultural Engineering and Technology

In-house Training program T1 on Agricultural Engineering for 2 batches of second year students of B.Tech (Agri. Engg.) (July 13-27, 2014)	Training Unit, COAE&T
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)	



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/ADDs/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

### College of Basic Sciences and Humanities

2 <sup>nd</sup> National Seminar on "Sustainable Agricultural Development" (March 3, 2015)	Society of Economics and Development
3 <sup>rd</sup> 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

### College of Home Science

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 Fevicyl Colours/Craft Items" (May 4-6, 2015)	Department of Family Resource Management, PAU

### M.S. Randhawa Library

Two training sessions on the use of online databases "Business Source Elite and EBSCONetLibrary" (November 28, 2014)	University Library
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### PAU Science Club

The following events were organized by PAU Science Club from July 2014 to June 2015:

- Lecture on "Commercial Production Technologies of Biological Control Agents" delivered by Dr Pradyumn Kumar, Principal Scientist (Entomology), Directorate of Maize Research, New Delhi (August 19, 2014)
- Orientation of Fresh Masters' students (October 7, 2014)

- Talk on "Celiac Disease: A Link Between Physician and Wheat Breeders" by Dr Ajit Sood, Head, Department of Gastroenterology, DMC&H, Ludhiana November 26, 2014)
- Lecture on "Remembering A Nobel Laureate and His Legacy" by Dr I.S. Dua, Professor Emeritus, Panjab University, Chandigarh (December 10, 2014)



Dr G.S. Kalkat, Chairman, Punjab State Farmers' Commission, being honoured by PAU VC during 49<sup>th</sup> Convention of ISAE





## FINANCES

The Board of Management in its 265th meeting held on March 27, 2014 had approved the budget estimates of the Punjab Agricultural University for the year 2014-15 amounting to Rs 523.07 crore in respect of 404 schemes in operation. The actual grants received during the financial year 2014-15 were Rs 414.28 crore.

Sources	Grant Received (2014-15) (Rs in Crore)	Allocation (%)
<b>State Govt.</b> Non Plan, Plan and Rural Development Fund	323.71	78.14
<b>ICAR Funding</b> All India Coordinated Research Project, Krishi Vigyan Kendra and others	56.10	13.55
<b>Central Govt. Funding</b> Centrally Sponsored Scheme (Govt. of India), University Grants Commission and Rashtriya Krishi Vikas Yojna	18.45	4.45
<b>Foreign Contributions</b>	2.00	0.48
<b>Other Funding</b> Misc./UT/Sir Ratan Tata Trust/Navaj Bhal Ratan Tata Trust/National Horticulture Mission Projects	14.02	3.38
<b>Total</b>	<b>414.28</b>	

The Board of Management in its 270th meeting held on March 30, 2015 approved the Budget Estimates of the Punjab Agricultural University for the year 2015-16 amounting to Rs 53531.65 lac in respect of 408 schemes in operation. The details of these schemes, budget allocation for research, teaching, extension and for the administrative and miscellaneous activities are as under:-

Sr. No.	Schemes	Total no. of schemes (2014-15)	Budget Estimate (2014-15) (Rs in Lakh)	Total no. of schemes (2015-16)	Budget Estimate 2015-16 (Rs in Lakh)
1	State Schemes				
i)	Non Plan Agriculture Schemes	13	21713.28	12	20046.09
ii)	Plan Agriculture Schemes	118	18936.61	119	21740.94
iii)	Rural Development Fund Schemes	-	-	-	-
2	Rashtriya Krishi Vikas Yojana (RKVY)	1	19.25	1	20.25
3	ICAR Schemes (Including AICRP/KVK/ Adhoc and Central Assistance)	84	8299.77	88	8599.32
4	UGC Scheme	51	139.41	46	119.72
5	Centrally Sponsored Schemes	63	1479.92	68	1234.20
6	<b>Other Schemes</b> (Including National Horticultural Mission/Rattan Tata Trust/Misc. Schemes/ Misc. (Foreign Contribution Schemes)	66	1297.29	63	1318.14
7	Self-Financing Schemes	5	376.88	5	399.41
8	Revolving Fund Schemes	3	44.35	6	53.58
	<b>Total</b>	<b>404</b>	<b>52306.76</b>	<b>408</b>	<b>53531.65</b>

### Allocation of funds for various activities during 2015-16

Budget Allocation	Amount (Rs in Lakhs)	Allocation (%)
Research	26219.66	48.98
Teaching	13078.51	24.43
Extension	8001.05	14.95
General Administration & Others	6232.43	11.64
<b>Total</b>	<b>53531.65</b>	

The University raised money through tuition fee and other services. An amount of Rs. 65.42 crore was raised as per following details:

Department	Amount (Rs)
College of Agriculture	9,98,84,332
College of Agricultural Engineering & Technology	2,67,81,933
College of Basic Sciences and Humanities	4,39,20,339
College of Home Science	1,81,25,221
Directorate of Extension Education	7,24,50,304
Directorate of Research	23,12,52,885
Other Departments (Comptroller, Estate Officer, Registrar, Library etc.)	16,18,13,946
<b>Total</b>	<b>65,42,28,950</b>

### ESTATE ORGANISATION

Estate Organization looks after construction and maintenance of University buildings. Several important projects were completed. (Annexure I)

### FACULTY PARTICIPATION IN NATIONAL & INTERNATIONAL EVENTS

University faculty participated in various national and international seminars, conferences, symposia, workshops, etc. Details are given in Annexure II.

### NEW EQUIPMENTS ACQUIRED

#### College of Agriculture

Instrument/equipment	Cost (Rs. In lakh)	Utility
Nikon SMZ-25 Microscope	8.89	Purchased under DBT project to study Cerambycid beetles
BOD Incubators (2)	4.14	For rearing of insects and culturing of the pathogens and mass multiplication of pathogens and biocontrol agents
UV visible Spectrophotometer	1.70	Enzyme activity study
Thermal Cycler	4.55	For the amplification of selective DNA segments <i>in vitro</i> .
Vertical Electrophoresis Unit with power supply	2.50	For resolving amplified products of DNA
Laminar Air Flow	2.50	For surface sterilization of maize borer rearing diet



Instrument/equipment	Cost (Rs. in lakh)	Utility
Rice Grain Analyser	1.98	To estimate the physical dimensions of rice grains
MAC-LAB WILLY Grinder	1.22	For fine grinding of forage samples for further biochemical analysis
Deep freezer	2.44	For detection of soil borne inoculums and for keeping the chemicals, different media, cultures and bioagents
Vertical Autoclave	1.25	For sterilization of the soil, media and apparatus
Soil Compaction Meter (Penetro Meter)	2.29	For measuring the compactness of the soil
Distillation Apparatus (Distillation water unit)	1.15	For water distillation to be used in quality analysis of forage samples
Gas Chromatography-Agilent	45.00	Helps in determining fatty acid profile of various oilseed crops
Power Weeder	1.50	Weed control in nursery and orchard
Trinocular Microscope	3.00	For observing minute insects and mites
<b>Total</b>	<b>84.11</b>	

### College of Agricultural Engineering and Technology

Electrophoresis Apparatus)	1.50	Analysis of protein quality.
Tractor drawn Combine Harvester	7.25	Harvesting of chickpea trial
Test Van	6.96	For field testing equipment's
Paddy Transplanter	2.36	Transplanting of paddy trial
Tractor Operated Straw Chopper Double Machine	1.99	Paddy Straw management trial
Hydraulic Mould Board Two Bottom	1.90	Ploughing
Cutter Bar for maize	1.80	Harvesting of maize crop
Speed Measuring Device	1.40	For measured tractor speed & slip
Axial Flow Paddy Feeding	1.35	Paddy threshing
Spectrometer	1.35	Material testing component of machine
Dust Monitor	1.16	Dust calculation for wheat straw
Cyberoam	4.00	User based Internet Access
Pot based Hybrid Hydroponics System	4.98	As teaching & research facility in new technological advancements
Bench type Modified Aeroponics System	3.50	As teaching & research facility in new technological advancements
5kWp Solar Power PV system	6.25	For uninterrupted power supply to Hydroponics and Aeroponics Technologies
<b>Total</b>	<b>47.75</b>	

### College of Basic Sciences and Humanities

Gel Documentation System	8.40	Molecular work on Proteins & DNA
High Speed Centrifuge	6.00	Proteins & DNA purification

Water Purification System	4.95	Biochemical / molecular research
Chlorophyll Fluorometer	4.09	Crop physiology research
Thermo Cycler	8.00	Molecular work on Proteins & DNA
Laminar Air Flow Horizontal-2	2.99	Microbiology standard work
Refrigerated Centrifuge-Microprocessor based	4.00	For extraction of biomolecules
UV-Vis Spectrophotometer	3.30	Enzyme assay/Microbial growth
Orbital Shaking Incubator 275litrs	3.45	Culture growth
Microscopes Monocular-19	1.64	Identification of bacteria
Microscopes Binocular-10	1.72	Microbial identification
Microscope-Dark field and bright field-2	7.63	Microbial identification in detail
Thermal Cycler-PCR	4.95	Molecular characterization
<b>Total</b>	<b>61.12</b>	

## NEW LABORATORIES AND INFRASTRUCTURE CREATED AND UPDATED

### College of Agriculture

- The Department of Plant Breeding and Genetics has developed a laboratory infrastructure for the USAID Heat Tolerance Project.
- A Biocontrol Museum and a Training Hall-cum-Lac Museum have been established in the State-of-Art Laboratories (Biocontrol) at Entomological Research Farm, PAU, Ludhiana.
- Naturally Ventilated Green House and Implement Shed have been set-up for the Department of Fruit Science.

### College of Agricultural Engineering and Technology

- A PG lecture-cum-committee room with LED projector facility has been established in the Department of Mechanical Engineering for quality interactive teaching.

- Solid Works software in CAD Lab at par with industrial standards has been installed and upgraded for quality teaching and research.
- Audio-visual aid system in Drawing Hall for effective class room interactive teaching has been installed.

### College of Basic Sciences and Humanities

- Computer Labs and FIST (Funds for Infrastructure Development in Science and Technology) Labs have been established in the Departments of Biochemistry and Microbiology.

### Controller of Examinations

- To keep check on the use of mobile phones or other electronic devices for unfair means in the examination centres, jammers have been installed. CCTV cameras have also been installed in the Examination Hall, College of Agriculture for surveillance of the tests. The entire proceedings are recorded in the office of Controller of Examinations.



## M. S. RANDHAWA LIBRARY

Mohinder Singh Randhawa Library caters to the informational needs of the academia of Punjab Agricultural University (PAU) by keeping pace with digital technologies. It plays a vital role in supporting research, study, teaching and extension activities of the University. It renders automated services to its users in order to facilitate expeditious, exhaustive, easy and efficient access of the literature. The library made rapid progress and worked effectively during the period under report:-

- The library registered 2,305 members which include PAU students and staff. In addition to this, 12,926 books were issued to the Library members during this period.
- During this period, the library procured 1,680 books, 305 theses and 334 Compact Discs (CDs). At present, library is subscribing to 91 Indian and 44 foreign journals, 28 online journals and 12 online databases including 51 e-books. Thus, the total collection of library as on 30-06-2015 stands 3,94,947.
- Library digitized two handwritten documents of Dr M. S. Randhawa and made the same accessible to its users through the Library web page.
- Library is subscribing to 12 online databases namely Consortium for e-Resources in

Agriculture (CeRA) which provides access to online journals, Krishiprabha (online theses), Mylibrary (e-books), CRCnetBASE (e-books), EBSCO NetLibrary (e-books), ISO standards on Food Products (online standards), Business Source Elite (Bibliographic database & full text journals on Business Management), Commodities Database (Statistical information on agricultural commodities), e-quest (online database of PAU Ph.D theses), CAB Abstracts (Abstracting database on Agricultural Sciences), Food Science & Technology Abstracts (Abstracting database on Food Science & Technology) and Indiatat.com (statistical information).

- Library web page provides access to complete information about resources, rules & regulations, services, e-resources, list of print journals, circulars and new additions to library, which are updated on monthly basis. The Library web page also provides access to all the e- resources except Indiatat.com.
- **Library Usage:** Books-16,68,882; Theses-3,85,393; Bound periodicals-2,68,034; Current periodicals-1,66,115; Reference books-1,28,808; Textbooks-9,7649; Abstracts & Indexes-6,7456; Newspapers-1,6187; Rare books-531



## IMPACT

### RESEARCH AND EXTENSION

- The university has recommended technology for direct seeded rice (DSR) in 2010. It results in saving of 10-15% water as compared to puddled rice. The area under DSR has increased from 1.15 lakh ha in 2014 to 1.60 lakh ha in 2015.
- The PAU has developed and released short duration and high yielding rice varieties namely PR 121, PR 122 and PR 124 during 2013-2015. Among these, PR 121 is emerging as the most popular variety as it occupied 17% area in 2015 against 9% in 2014. Considerable area was also under PR 124, a short duration high yielding variety.
- In sugarcane also, PAU developed very high yielding variety CoPb91, which was released in 2014. Very good feed back about the performance of this variety has been received from the farmers and sugarmills of the state.
- PBW 660 variety of wheat is less susceptible to stripe rust and leaf rust and adoption of this variety will help in reducing the disease inoculum load since most of the rainfed area lies in the rust prone submontane regions. Moreover, the chapatti making quality of this variety is also very good.
- Considering the great awareness among masses about heath, area under gobhi sarson variety GSC 7 is likely to increase due to its higher yield and better oil quality (00). GSC 7 is likely to help crop diversification. PAU has supplied seed of this variety in small packings at a very reasonable price to promote its cultivation.
- Development and release of new high yielding and disease resistant varieties/hybrids of vegetable crops such as chilli hybrid CH-27, tomato variety Punjab Varkha Bahar-4 and muskmelon hybrid MH-27 in 2014-15 will lead to increased area under vegetables cultivation and reduce farmers' dependence on private sector hybrids.
- The release of early maturing variety of citrus namely Daisy-Tangerine will help to solve the monoculture problem of kinnow. The fruit will be available in the market in November onwards whereas kinnow starts arriving in the market after 15<sup>th</sup> December. The farmers will be benefitted from its long duration and will get better price for their produce.
- As the seeds in kinnow cause bitterness in juice, the release of two low seeded Kinnow varieties will improve the processing quality of the fruit and enhance the export potential.
- The alternative resource conservation cropping system of maize/summer groundnut-kharif onion-onion will help in crop diversification.
- Wheat area under recommended varieties has increased from about 83 % in 2013-14 to 92% in 2014-15.
- A total number of 2673 Tensiometers and 918 Leaf Colour Charts (LCCs) were sold/provided to the farmers for guiding them to schedule judiciously the irrigation and nitrogenous fertilizer in various crops. Use of Tensiometer saved 5-6% irrigation water without any yield loss in rice. Use of LCC in paddy saved nitrogen upto 10 to 15%.
- For the management of paddy straw, use of balers is being promoted in the state. These



bales are being used by the farmers as fodder and also sold to power plant at Moga and Khokhar Khurd (Mansa) at the rate Rs 120/- per quintal. The area where bales were made from rice straw has increased from 25 acres in 2011-12 to 5000 acres in 2014.

- After acquiring training in raising mat type nursery of paddy, 230 farmers have adopted it and area of 10,000 acres has been sown with mat nursery in the state. Some farmers have started custom-hiring out of mechanical rice transplanting in which mat-type nursery is also supplied to the farmers. Similarly, 640 Happy Seeders are being used for sowing of wheat in the state. More number of farmers are adopting Happy Seeder technology in combine harvested rice fields and thus, reducing environmental pollution and loss of micro and macro-nutrients caused due to burning of paddy straw.
- Laser land leveler has proved to be a water-wise technology and 7200 laser land levelers are working in the state. The leveled area is regularly increasing (36.5 lakh acre). Laser leveling of fields has resulted in saving of water upto 15%.

## EDUCATION

The recognition of PAU in the international arena has been enhanced through the followings:

- Award of Monsanto Beachell Borlaug International Scholarship to 4 Ph.D scholars.
- Six UG and 17 PG students from Afghanistan, Somalia, Maldives, Liberia, Nigeria, Ethiopia, Tanzania, Nepal, Egypt, Rawanda and Kenya were admitted to various academic programmes of the University.
- Five well-known international scientists were put on the Advisory Committees of Ph.D students to improve the quality of Ph.D research.
- Two students of B.Tech. Food Technology (Hons.) programme successfully completed 2+2 years dual degree Bakery Science and Management programme with Kansas State University (KSU), USA under the MoU. One student from the department was offered Summer Internship in the Department of Grain Science and Industry



Students in a jubilant mood after receiving degrees, certificates and medals during convocation at PAU

at KSU and another student has been selected to join the dual degree programme in Food Technology, Bakery Science and Management at KSU.

- In its endeavor to improve the quality of education and develop competitive human resource in agriculture, PAU consolidated its position at the national level by getting following awards/fellowships:
- Ms Jagreeti Gupta has been awarded Prime Minister's Fellowship (Rs 6 lakh/annum) for doctoral research in the discipline of floriculture and landscaping.
- A total of 19 students of PAU cleared UGC/ICAR/CSIR-NET/ARS-NET examination.
- Patent applications from the research work of five PG students were filed for seeking IP protection while three technologies based on the PG research work were commercialized.
- The University Guiding and Placement Cell facilitated the campus placement of 124 students of PAU in various public and private organizations.

## TRAININGS

- The adoption rate of new technologies and subsidiary occupations after acquiring training varied from 15% to 45%. The adoption rate was 15% in Happy Seeder, 20% in mushroom cultivation, 15% in beekeeping, 45% in preparation of decorative articles and 40% in fabric painting.

- After acquiring trainings from PAU, farmers have started various enterprises, which have resulted in raising their income as well as helped in generating employment in rural areas. Bee-keepers are earning on an average Rs 30,000/- per colony per year. The mushroom growers are earning Rs 1.2 lakh in case of new units and Rs 3.0 lakh per year in case of old units. Similarly in dairy farming, farmers have been able to increase their income. The farmers are also getting good income from goat and pig farming, and some new units of goat farming have been established in Mansa district.
- The number of net/poly-houses is 1120 for vegetable production under protected conditions. The vegetable growers are earning on an average of Rs 1.5 lakhs from 4000 sq. meter of polynet house area by producing capsicum, cucumber and tomato during off-season.
- The trainees of turmeric processing are getting Rs 4000/- per month from medium scale processed turmeric powder. By processing aloe vera, fruits and soya, farmers are getting Rs 20,000/- to Rs 25,000/- per unit.
- Self-help groups are being formed and supported by KVKs. They are involved in processing of honey, turmeric, soybean, natural vinegar as well as making jam, *murabba*, candy, beverages, sauces, purees, *papad*, *warian*, *sevian* etc. Seven new small agro-processing units were established during this period with the total units reaching to 272 in the state.
- The farm women have also increased their income levels in different enterprises after acquiring skills in stitching, embroidery, handicrafts etc. through KVK training. They are earning Rs 3000/- to Rs 6000/- per month from *phulkari* embroidery, handicraft and preparation of souvenirs; Rs 3500/- to Rs 7000/- from garment making and enrichment; Rs 350/- to Rs 400/- per article from embroidery and fabric painting; and Rs 150/- per suit for stitching.





# ADMINISTRATION

## BOARD OF MANAGEMENT

Sr. No.	Name and Designation	From	To
<b>Honorary Chairman</b>			
	Sh. Shivraj V. Patil, Hon'ble Governor, Punjab & Chancellor	01.07.2014	21.01.2015
	Sh. Kaptan Singh Solanki, Hon'ble Governor, Punjab & Haryana & Chancellor	22.01.2015	30.06.2015
<b>Working Chairman</b>			
	Dr. B. S. Dhillon, Vice Chancellor	01.07.2014	30.06.2015
<b>Members</b>			
1.	Sh. Sarvesh Kaushal, IAS, Chief Secretary to Govt. of Punjab Chandigarh.	01.07.2014	30.06.2015
2.	Sh. Suresh Kumar, IAS, Addl. Chief Secretary to Govt. of Punjab Department of Agriculture, Chandigarh.	01.07.2014	30.06.2015
3.	Dr (Mrs.) Vini Mahajan, IAS, Principal Secretary to Govt. of Punjab Department of Finance, Chandigarh.	01.07.2014	30.06.2015
4.	Dr K. K. Singh, Assistant Director General (PE), ICAR, New Delhi.	01.07.2014	06.07.2014
	Dr R.K. Gupta, Director, Central Institute of Post Harvest Engineering & Technology (CIPHET), PAU Campus, Ludhiana.	01.09.2014	30.06.2015
5.	Dr Mangal Singh Sandhu, Director of Agriculture, Punjab, Chandigarh.	01.07.2014	30.06.2015
6.	Dr G. S. Nanida, H. No.1142, Sector 71, Mohali-160 071.	01.07.2014	16.05.2015
		21.5.2015	30.06.2015
7.	Dr J. S. Kolar, 35-B, Kitchlu Nagar, Ludhiana.	01.07.2014	30.06.2015
8.	S. Kulwant Singh Ahluwalia, Village-Chhauni Kalan, Distt. Hoshiarpur.	01.07.2014	30.06.2015
9.	Sh. Hardev Singh Riar, Flat No.314, Punjab Mandi Board Colony Sector 66, Mohali.	01.07.2014	30.06.2015
10.	Sh. Jang Bahadur Singh Sangha, VPO-Quadran Wali Distt. Jalandhar	01.07.2014	16.05.2015
	Dr A.R. Sharma, Chairman & Managing Director, Ricela Group of Companies, Ricela Health Foods Ltd., Dhuri, Distt. Sangrur	21.05.2015	30.06.2015
11.	Smt. Karamjit Kaur Danewalia, W/o S. Jasbir Singh Danewalia VPO: Danewalia Satkoshi, Tehsil-Abohar, Distt. Fazilka.	01.07.2014	30.06.2015
<b>Secretary</b>			
	Dr P. K. Khanna, Registrar	01.07.2014	30.06.2015

## ACADEMIC COUNCIL

Designation	Name	From	To
Vice Chancellor	Dr B.S. Dhillon	01.07.2014	30.06.2015
Dean, Postgraduate Studies	Dr Gursharan Singh	01.07.2014	25.02.2015
	Dr (Mrs) Neelam Grewal	26.02.2015	30.06.2015
Dean, College of Agriculture	Dr Harvinder Singh Dhaliwal	01.07.2014	30.06.2015
Dean, College of Agril. Engg. & Tech.	Dr PPS. Lubana	01.07.2014	28.07.2014
	Dr Jaskaran Singh Mahal	28.07.2014	30.06.2015
Dean, College of Basic Sciences & Humanities	Dr Rajinder Singh Sidhu	01.07.2014	13.01.2015
	Dr M. S. Sidhu	14.01.2015*	30.03.2015
	Dr (Mrs) Gurinder Kaur Sangha	30.03.2015	30.06.2015
Dean, College of Home Science	Dr (Mrs) Jaswinder Kaur Sangha	01.07.2014	28.02.2015
	Dr (Mrs) Neelam Grewal	01.03.2015*	06.04.2015
	Dr (Mrs) Jatinder Kistwana	07.04.2015	30.06.2015
Director of Research	Dr S. S. Gosal	01.07.2014	30.09.2014
	Dr Ramesh Kumar	01.10.2014*	28.10.2014
	Dr Balwinder Singh	28.10.2014	30.06.2015
Director of Extension Education	Dr Harvinder Singh Dhaliwal	01.07.2014*	28.10.2014
	Dr Rajinder Singh Sidhu	28.10.2014	30.06.2015
Head, Department of Chemistry	Dr (Mrs) K. K. Chahal	01.07.2014	07.11.2014
Head, Department of Botany	Dr (Mrs) S. K. Thind	08.11.2014	30.06.2015
Head, Department of Family Resource Management	Dr (Mrs) Muninder Sidhu	01.07.2014	30.6.2015
Head, Department of Agronomy	Dr G. S. Butter	01.07.2014	22.11.2014
Head, Department of Plant Pathology	Dr Pushpinder Paul Singh	02.12.2014	30.04.2015
Head, Department of Vegetable Science	Dr M. S. Dhaliwal	01.05.2015	30.06.2015
Head, Department of Civil Engineering	Dr Jaspal Singh	01.07.2014	23.09.2014
Head, Department of Soil & Water Engg.	Dr A. K. Jain	13.10.2014	07.11.2014
Head, Department of Farm Machinery & Power Engineering	Dr Gursahib Singh Manes	01.12.2014	30.06.2015
Registrar, Secretary	Dr P. K. Khanna	01.07.2014	30.06.2015

\*Additional Charge



## OFFICERS OF THE UNIVERSITY

Designation	Name	From	To
Vice Chancellor	Dr B.S. Dhillon	01.07.2014	30.06.2015
Registrar	Dr P.K. Khanna	01.07.2014	30.06.2015
Director of Research	Dr S. S.Gosal	01.07.2014	30.09.2014
	Dr Ramesh Kumar	01.10.2014*	28.10.2014
	Dr Balwinder Singh	28.10.2014	30.06.2015
Director of Extri. Education	Dr Harvinder Singh Dhaliwal	01.07.2014	28.10.2014
	Dr Rajinder Singh Sidhu	28.10.2014	30.06.2015
Dean, Postgraduate Studies	Dr Gursharan Singh	01.07.2014	22.11.2014
	Dr Gursharan Singh	23.11.2014*	25.02.2015
	Dr (Mrs) Neelam Grewal	26.02.2015	30.06.2015
Dean, College of Agriculture	Dr Harvinder Singh Dhaliwal	01.07.2014	30.06.2015
Dean, College of Agril. Engg. & Tech.	Dr P.P.S. Lubana	01.07.2014*	28.07.2014
	Dr Jaskaran Singh Mahal	28.07.2014	30.06.2015
Dean, College of Basic Sciences & Humanities	Dr Rajinder Singh Sidhu (2nd term)	01.07.2014	28.10.2014 (joined as DEE)
	Dr Rajinder Singh Sidhu	29.10.2014*	13.01.2015
	Dr M.S. Sidhu	14.01.2015*	30.03.2015
	Dr (Mrs) Gurinder Kaur Sangha	30.03.2015	30.06.2015
Dean, College of Home Science	Dr (Mrs) Jasvinder Kaur Sangha	01.07.2014	28.02.2015
	Dr (Mrs) Neelam Grewal	01.03.2015*	06.04.2015
	Dr (Mrs) Jatinder Kishitwaria	07.04.2015	30.06.2015
Director Students' Welfare	Dr (Mrs) Ravinder Kaur Dhaliwal	01.07.2014	30.06.2015
Librarian	Dr Jarnail Singh	01.07.2014*	28.02.2015
	Dr PPS Lubana	02.03.2015*	30.06.2015
Estate Officer	Dr Jaskaran Singh Mahal	01.07.2014*	13.01.2015
	Dr V.S.Hans	14.01.2015*	30.06.2015
Comptroller	Dr (Mrs) Jasvinder Kaur Sangha	01.07.2014*	25.08.2014
	Dr Ramesh Kumar	25.08.2014*	03.11.2014
	Dr Sandeep Kapur	03.11.2014*	30.06.2015
Chief Engineer	Dr Jaspal Singh	01.07.2014*	30.06.2015

\* Additional Charge

## IMPORTANT DECISIONS OF THE BOARD OF MANAGEMENT

During the period under report, the Board of Management held five meetings (267<sup>th</sup> to 271<sup>st</sup>). The important decisions taken by the Board are as under:

### A. Amendment in statutes

- The Board of Management approved the amendment in the existing Clause 1.2(iv) of the Statutes regarding Pension and Provident Funds (Para-A). B-2/268
- The Board of Management approved the amendment in the Schedule Part-III of Chapter V of PAU Act and Statutes regarding appointment of employees other than teaching posts falling under Group 'D' and 'C'. C-6/268

### B. Concession to Staff

- The Board of Management approved "Half Pay Leave, Commuted Leave and Leave not Due" to the teachers of PAU Model High School, Kaoni (Muktsar) as per Rule 8.119 (a) of Punjab Civil Services Rules Volume-1, Part-1 into alongwith all conditions. C-2/268

### C. Other Decisions

- The Board of Management approved the creation of four posts of the Farm Managers in the pay band of Rs 9,300-34,800+Rs 4,200/- grade pay. B-3/267
- The Board approved the creation and inclusion of new Revolving Fund Scheme entitled, "Bench Space Laboratory Facilities and Technical Assistance for Carrying Out Microbiological Procedures on Payment Basis, RF-4 (PC-3100)" in the University budget for the year 2014-15. B-1/268
- Sh. Kulwant Singh Ahluwalia was re-nominated as non-official member of the Finance Committee for a period of one year w.e.f. 01.12.2014. C-1/268
- The Board approved the creation and inclusion of the Revolving Fund Scheme entitled, "Sale of Seedlings of Vegetable Crops, RF-5 (PC-3101)" in the University Budget for the year 2014-15. B-1/269

- The Board approved the creation and inclusion of the Revolving Fund Scheme entitled, "Promoting and Popularizing PAU Appliances Based on Utilization for Solar Energy, RF-6 (PC-3102)" in the University Budget for the year 2014-15. B-2/269
- Audited accounts of the University for the 2012-13 were approved by the Board. B-4/269
- Annual Report of the Punjab Agricultural University for the year 2013-2014 was approved. C-1/269
- Budget Estimates of the Punjab Agricultural University for the year 2015-16 amounting to Rs 53531.65 lakh were approved by the Board of Management. B-1/270
- The Board approved enhancement in fee structure for the year 2015-16 @ 10% including self-financing programmes. B-2/270
- The Board of Management approved the conferment of degree of Doctor of Science (*honoris causa*) upon Dr K.S. Gill, former Vice-Chancellor, PAU; Dr S.S. Parihar, former Head, Department of Soils, PAU and Dr S.K. Vasal, former Distinguished Maize Scientist, CIMMYT (World Food Prize Awardee) at the time of Annual Convocation of the University. C-2/270

## IMPORTANT DECISIONS OF THE ACADEMIC COUNCIL

During the period under report, eleven meetings (354<sup>th</sup> to 364<sup>th</sup>) of the Academic Council were held. The important decisions taken by the Academic Council during this period are as under:-

- Approved the admission process management system (APMS) portal for the academic session 2015-16, both online and offline system for applying for admission in various programmes of the University. C-1/359<sup>th</sup>
- Approved the academic costumes for the degree of B.Sc. Biotechnology (Hons.) and B.Tech. Food Technology (Hons.) for conferring the degrees at the Convocation. C-5/360<sup>th</sup>



- Approved the academic costumes for the degree of B.Sc. Nutrition & Dietetics (Hons.), B.Sc. Fashion Designing (Hons.) and B.Sc. Interior Designing (Hons.) for conferring the degrees at the Convocation. C-6/360<sup>th</sup>
- Approved the inclusion of a column for transgender under general category in the application form for entrance test to various programmes of the University as per judgement of the Hon'ble Supreme Court. 11/361<sup>st</sup>
- Approved the admission of candidates to M.Sc. programme in the discipline of Horticulture (Fruit Science) and Horticulture (Vegetable Science) for Postgraduate Institute for Horticulture Research & Education (PGIHRE), Amritsar from

the academic session 2015-16 with transit camp at PAU, Ludhiana. 2/363<sup>rd</sup>

- Approved the establishment of Skill Development Centre at PAU, Ludhiana. 14/364<sup>th</sup>
- Approved the starting of MCA 2-year programme from the academic session 2015-16. 17/364<sup>th</sup>

## PUBLICATIONS

The University scientists published 576 publications which included research papers, books, book chapters, manuals, bulletins, popular articles etc. Details are given in ANNEXURE III.



## ANNEXURE I

Important projects undertaken by the Estate Organization

Projects	Cost ( Rs in Lakh )
Construction of Bio Control Lab for the Deptt. of Horticulture at PAU, Ludhiana	44.88
Construction of Office-cum-Lab Building & Training Hostel at KVK, Budhsinghwala, Moga	36.13
Construction of Processing Hall and Seed Store at USF, Nabha	26.23
Construction of Experimental Learning Field Lab Processing room, class room at Entomology Farm at PAU	21.89
Construction of remaining Boundary Wall at Research Station, Bathinda	20.67
Renovation of Regional Research Buildings/Labs, Erection of Main Entrance Gate & Construction of Chowkidar Hut at RRS, Gurdaspur	20.21
Construction of proposed Ramp for the College of Agriculture at PAU, Ludhiana	19.04
Construction of one Screen House for the Department of Forestry and Natural Resources at PAU	15.79
Renovation of Leaf Analysis lab for Department of Horticulture at PAU, Ludhiana	13.41
Construction of Staff Quarters i.e. 2 No. 30 sqm & 1 No. 100 sqm at KVK, Kheri	13.00
Repair and Renovation of Guest House, Residential Quarters & Office Building, Construction of Main Entrance Gate, and two Tubewell Chamber at FRS, Gangian	12.72
Repair & Renovation of College of Agriculture at PAU, Ludhiana	12.08
<b>Total</b>	<b>256.05</b>



## ANNEXURE II

Details of faculty participation in national and international seminars, conferences, workshops, trainings, symposia etc.

### COLLEGE OF AGRICULTURE

Name of teacher(s)	Programme/organizing agency	Date and Venue
<b>Agronomy</b>		
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	November 18-20, 2014 PAU, Ludhiana
Drs Krishan Kumar Vashist, S. S. Walia, C. S. Aulakh, Simerjeet Kaur, Tarundeep Kaur, & Amandeep Singh Brar	12 <sup>th</sup> Agricultural Science Congress	February 3-5, 2015 National Dairy Research Institute (NDRI), Karnal
<b>Entomology</b>		
Drs P. S. Shera & Rabinder Kaur	"Launch-cum-Orientation Workshop of Network Project on Conservation of Lac Insect Genetic Resources" by ICAR	August 27-28, 2014 Institute of Natural Resins and Gums, Ranchi
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	September 24-26, 2014 NASC Complex, New Delhi
Dr K. S. Sangha	National Seminar on "Augmenting Processing and Shelf Life of Perishable Food Products" by National Productivity Council, New Delhi	September 26, 2014 PAU, Ludhiana
	National Meeting on "New/Safer Molecules and Biocontrol Technologies for Integrated Pest Management"	February 23, 2015 National Bureau of Agricultural Insect Resources, Bangalore
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	November 14-15, 2014, Central Agricultural University (CAU), Arunachal Pradesh
Drs Neelam Joshi & Rabinder Kaur	International Conference on "Changing Scenario of Pest Problems in Agri-horti Ecosystem and their Management"	November 27-28, 2014 Rajasthan College of Agriculture, MPUAT, Udaipur

Name of teacher(s)	Programme/organizing agency	Date and Venue
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	January 28-30, 2015 Indian Agricultural Research Institute, New Delhi
Drs K. S. Sangha & P. S. Shera	National Entomologists' Meet	February 5-7, 2015 Indian Institute of Natural Resins and Gums, Ranchi
Drs K. S. Sangha & Rabinder Kaur	ICAR's Annual Review Meeting of Network Project on Conservation of Lac Insect Genetic Resources	March 10, 2015 Kerala Forest Research Institute (FRI), Thrissur
30 faculty members	"4 <sup>th</sup> Congress on Insect Science" by INSAIS, ICAR & PAU, Ludhiana	April 16-17, 2015 PAU, Ludhiana
Drs Balwinder Singh, Gagan Jyot & Kousik Mandal	9 <sup>th</sup> Annual Workshop on "Monitoring of Pesticide Residues at National Level"	May 28, 2015 Kerala Agricultural University, Vellayani
	23 <sup>rd</sup> Annual Workshop on "All India Network Project on Pesticide Residues"	May 29, 2015 Kerala Agricultural University, Vellayani
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	June 2-3, 2015 Tamil Nadu Agricultural University (TNAU), Coimbatore
<b>Electron Microscopy and Nanoscience Lab (EMNL)</b>		
Dr Anu Kalia	National Symposium on "Crop Improvement for Inclusive Sustainable Development"	November 7-9, 2014 PAU, Ludhiana
	8 <sup>th</sup> International Conference on "Mushroom Biology and Mushroom Products" by NAAS	November 19-22 2014, New Delhi
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	February 25-27, 2015 Panjab University, Chandigarh
	4 <sup>th</sup> National Conference on "Advanced Materials and Radiation Physics" by Department of Physics, SLIET, Longowal	March 13-14, 2015 Longowal
<b>Extension Education</b>		
Drs R. K. Dhaliwal, R. K. Kalra, Manmeet Kaur, Dharminder Singh, V. K. Rampal, Lavleesh Garg & Pankaj Kumar	7 <sup>th</sup> National Seminar on "Sustainable Rural Livelihood: Technological and Institutional Perspective"	January 8-10, 2015 Sher-e-Kashmir University of Agricultural Sciences & Technology, Jammu, Chatha





Name of teacher(s)	Programme/organizing agency	Date and Venue
<b>Fruit Science</b>		
Dr Sandeep Singh	International Horticultural Congress by ISHS, Belgium	August 17-22, 2014 Brisbane, Australia
	ICAR's Group Meeting of Scientists Working in AICRP (Citrus)	September 2-3, 2014 National Research Centre for Citrus, Nagpur
	North East Agri- Fair	November 13-15, 2014 CAU, Arunachal Pradesh
	ICAR's Group Discussion of Scientists Working in AICRP on Fruits	February 26 - March 1, 2015 MPUAT, Udaipur
	Round Table on Conogethes Punctiferalis and Allied Species (Series 1) by IHR, Bengaluru	May 22, 2015 PAU, Ludhiana
Dr N. K. Arora	Sixth Indian Horticulture Congress- 2014	November 5-9, 2014 Coimbatore
Drs Anita Arora, Gagandeep Kaur & M. S. Gill	National Symposium on "Crop Improvement for Inclusive Sustainable Development"	November 7-9, 2015 PAU, Ludhiana
Dr Monika Gupta	12 <sup>th</sup> Agricultural Science Congress	February 3-6, 2015 NDRI, Karnal
Drs H. S. Rattanpal & Sandeep Singh	"International Conference on Citriculture" by Bahauddin Zakariya University, Multan, Pakistan	February 11-13, 2015 Multan, Pakistan
<b>Plant Pathology</b>		
Mr Parminder Singh	"7 <sup>th</sup> National Seed Congress"	September 25-27, 2014 National Seed Research and Training Centre, Varanasi
Drs Amarjit Singh, Sandeep Jain & Daljit Buttar	National Symposium on "Crop Improvement for Inclusive Sustainable Development" by Crop Improvement Society of India, PAU, Ludhiana along with Indian Society of Genetics and Plant Breeding, Indian Society of Plant Genetic Resources	November 7-9, 2014 PAU, Ludhiana
Drs G. S. Rattan, 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	November 18-20, 2014 Citrus Research Station, Dr YSR University of Horticulture, Tirupati
Dr P. S. Sekhon	"4 <sup>th</sup> India International Potato Expo 2015" by Indian Chamber of Commerce and FAO	January 15-16, 2015 Chandigarh
<b>Plant Breeding and Genetics</b>		
Drs Virender Sardana, P. S. Sandhu, Pushp Sharma & Sarwan Kumar	21 <sup>st</sup> Annual Group Meet of Rapeseed-Mustard Research Workers	August 20-22, 2014 Bidhan Chandra Krishi Viswavidyalaya, Nadia

Name of teacher(s)	Programme/organizing agency	Date and Venue
All members of wheat research team	53 <sup>rd</sup> All India Coordinated Wheat and Barley Improvement Project Workshop	August 22-25, 2014 Jawaharlal Nehru Krishi Vishwavidyalaya (JNKVV), Jabalpur
	International Seminar on "Enhancing Wheat and Barley Production with Special Emphasis on Nutritional Security" by JNKVV, Jabalpur and DWR	August 24, 2014 JNKVV, Jabalpur
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 – September 1, 2014 Rajasthan Agricultural Research Institute, Durgapura,
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	September 10-14, 2014 Kathmandu, Nepal
Dr Guriqbal Singh	National Conference on "Pulses: Challenges and Opportunities under Changing Climate Scenario" by Indian Society of Pulses Research and Development	September 29 - October 1, 2014 JNKVV, Jabalpur
Dr V. S. Sohu	2014 Generation Challenge Program (GCP) General Research Meeting by CIMMYT, Mexico	October 7-10, 2014 Rayong, Thailand
Dr Jayesh Singh	International Symposium on "New Dimensions in Agrometeorology for Sustainable Agriculture" by Association of Agro-meteorologists, Anand, India	October 16 – 18, 2014 G.B. Pant University of Agriculture & Technology (GBPUAT), Pantnagar
46 faculty members and all members of wheat research team	National Symposium on "Crop Improvement for Inclusive Sustainable Development"	November 7-9, 2014 PAU, Ludhiana
All Pulses Scientists and three faculty members	National Symposium on "Agricultural Diversification for Sustainable Livelihood and Environmental Security"	November 18 – 20, 2014 PAU, Ludhiana
Dr Daman Jeet Kaur	National Symposium on "Plant Health for Sustainability in the Field and Horticultural Crop" by Indian Society of Plant Pathologists	November 18-20, 2014 CRS, Dr YSR Horticultural University, Tirupati
Drs T. S. Bains and Ravinder Singh	ICAR's Annual Group Meet of AICRP on Summer Pulses	November 21 – 23, 2014 Research Complex, Goa
Dr Beant Singh	"Interactive Workshop on Wheat and Barley Aphids and their Management"	November 24, 2014 Indian Institute of Wheat & Barley Research, Karnal
15 faculty members	12 <sup>th</sup> Agricultural Science Congress	February 3-6, 2015 NDRI, Karnal
Dr Dharminder Pathak	5 <sup>th</sup> International Conference on "Next Generation Genomics and Integrated Breeding for Crop Improvement"	February 18-20, 2015, International Crops Research Institute for Semi-Arid Tropics (ICRISAT), Hyderabad



Name of teacher(s)	Programme/organizing agency	Date and Venue
	Training Workshop on "Monitoring of Confined Field Trials of Regulated GE Plants" by Ministry of Environment, Forest and Climate Change, New Delhi	May 25-26, 2015 NASC Complex, New Delhi
Dr Gurpreet Kaur	2 <sup>nd</sup> National Seminar on "Sustainable Agricultural Development" by Society of Economic Development	March 3, 2015 PAU, Ludhiana
Dr S. S. Kandhola	ICAR's Annual Group Meet of All India Coordinated Research Network on Potential crops	April 10-11, 2015 Orissa University of Agriculture & Technology (OUAT), Bhubaneswar
Drs G. S. Mangat, Navjot Sidhu, J. S. Lore, P. S. Sarao & G. Mahajan	50 <sup>th</sup> Golden Jubilee Rice Research Group Meeting by ICAR	April 11-15, 2015 Directorate of Rice Research, Hyderabad
Drs Gaurav Kumar Taggar, Ravinder Singh, H. K. Cheema & Beant Singh	4 <sup>th</sup> Congress on Insect Science (CIS-4)	April 16-17, 2015 PAU, Ludhiana
Drs S. K. Dhillon, Pankaj Sharma & Sukhpreet Singh	Annual Group Meeting of Sunflower	April 16-18, 2015 OUAT, Bhubaneswar
Drs B. S. Gill, Poonam Sharma & Navneet Aggarwal	ICAR's Annual Group Meet of AICRP on Soybean	May 9 - 11, 2015 Amravati
Drs Jagmeet Kaur, Veena Khanna, Sarvjeet Singh, T. S Bains, Guriqbal Singh, Inderjit Singh, Ravinder Singh & Asmita Siran	ICAR's Annual Group Meet of AICRP on Pigeonpea and MULLaRP	May 22 - 24, 2015 Birsra Agricultural University, Ranchi
Dr G. Mahajan	Annual Meet of NAAS	June 4, 2015 NASC Complex, New Delhi
<b>School of Climate Change and Agricultural Meteorology</b>		
Dr L.K. Dhaliwal	DST's Sixth Meeting of Programme Advisory Committee on Atmospheric Sciences	July, 30-31, 2014 CSIR-National Institute of Oceanography, Goa
Drs L.K. Dhaliwal & Sarabjot K. Sandhu	International Symposium on "New Dimensions in Agriculture for Sustainable Agriculture" by Association of Agro-meteorologists	October 16-18, 2014 GBPUAT, Pantnagar
Drs L.K. Dhaliwal, P.K. Kingra & Som Pal Singh	National Symposium on "Agriculture Diversification for Sustainable Livelihood and Environmental Security"	November 18-20, 2014 PAU, Ludhiana
Drs L.K. Dhaliwal & Som Pal Singh	12 <sup>th</sup> Agricultural Science Congress on Sustainable Livelihood Security for Small Farmers	February 3-6 2015, NDRI, Karnal
	"PSCT Workshop cum-Interactive Meeting" by Punjab State Council for Science & Technology (PSCT), Chandigarh	March 17, 2015 PSCT, Chandigarh
Drs Som Pal Singh & K.K. Gill	"TROPMET 2015" by IMD and Panjab University, Chandigarh	February 15-18, 2015 Chandigarh

Name of teacher(s)	Programme/organizing agency	Date and Venue
<b>Soil Sciences</b>		
Drs S. S. Kukal, M.J. Singh & M.S. Kahlon	"Symposium on NRM and Sustainable Hill Farming"	July 23- 24, 2014 SKUAST, Jammu
Dr H.S. Thind	IFAD-IRRI Traveling Seminar and Workshop	August 29 -September 6, 2014, PAU, Ludhiana
10 faculty members	79 <sup>th</sup> Annual Convention of Indian Society of Soil Science	November 24-27, 2014, ANGRAU, Hyderabad
<b>Vegetable Sciences</b>		
Dr Neena Chawla	National Symposium on "Nutritionally Sensitive and Environmentally Sustainable Agriculture for India's Food and National Security; Challenges and Opportunities"	August 23, 2014 National Academy of Agricultural Research Management, Hyderabad
Drs M. S. Dhaliwal S. K. Jindal & Abhishek Sharma	"Asian Solanaceous Round Table- 2014" by Asia & Pacific Seed Association (APSA)	September 9-10, 2014 Hotel The Lalit Ashok, Bengaluru
Drs S. P. Sharma R. K. Dhali & Hira Singh	National Seminar on "Augmenting Processing and Shelf Life of Perishable Food Products" by National Productivity Council, New Delhi	September 26, 2014 PAU, Ludhiana
Dr M. S. Dhaliwal	Agriculture Innovation Project (AIP) Planning Meet by AVRDC- PAU	October 8-10, 2014 PAU, Ludhiana
	"6 <sup>th</sup> Indian Horticulture Congress" by Horticultural Society of India	November 6- 9, 2014 TNAU, Coimbatore
	"4 <sup>th</sup> India International Potato Expo" by Indian Chamber of Commerce	January 15-16, 2015 Chandigarh
Drs V. K. Vashisht & S. P. Sharma	National Symposium on "Emerging Problems" by Central Potato Research institute (CPRI), Shimla	November 1-2, 2014 CPRI, Shimla
Drs Mamta Pathak & V. K. Vashisht	National Symposium on "Crop Improvement for Inclusive Sustainable Development" by CISI, ISGPR, ISGPR, ICAR, MTAI & PAU	November 7-9, 2014 PAU, Ludhiana
Dr R.K. Dhali	Brain Storming Session on "Crop Improvement, Production Technology, Seed Production and Processing Of Garlic"	November 29, 2014 National Horticultural Research & Development Foundation, Nasik
Drs Neena Chawla & Mamta Pathak	"XII Agricultural Science Congress" by ICAR, New Delhi and NDRI, Karnal	February 3-6, 2015 NDRI, Karnal
Dr S. K. Jindal	"49 <sup>th</sup> Annual Convention of ISAE" and Symposium on "Engineering Solutions for Sustainable Agriculture and Food Processing by Indian Society of Agricultural Engineers"	February 23-25, 2015 PAU, Ludhiana
Dr Sandeep Kaur	"4 <sup>th</sup> Congress on Insect Science (CIS-4) - Entomology for Sustainable Agriculture"	April 16-17, 2015 PAU, Ludhiana
Dr Rajinder Singh	National Symposium on "Modern Agro-technologies for Nutritional Security and Health"	April 21-23, 2015 Dr YS Parmar, University of Horticulture and Forestry, Solan



Name of teacher(s)	Programme/organizing agency	Date and Venue
Drs Kulbir Singh, T. S. Dhillon, Rajinder Singh, Abhishek Sharma, Sandeep Kaur & Neena Chawla	XXXIII <sup>rd</sup> Group Meeting of AICRP(VC)	May 19-24, 2015 Indian Institute of Vegetable Research, Varanasi

## COLLEGE OF AGRICULTURAL ENGINEERING AND TECHNOLOGY

Name of teacher(s)	Programme/organizing agency	Date and Venue
Drs Rajan Aggarwal, Satish K. Gupta & Er. Aseem Verma	"Atomic Energy for Sustainable Agriculture and Happiness"	September 9, 2014 PAU, Ludhiana
Drs A.K. Singh, Satish K. Gupta, A.K. Jain & Er. Aseem Verma	National Seminar on "Augmenting Processing and Shelf Life of Perishable Food Products"	September 26, 2014 PAU, Ludhiana
Drs Rajan Aggarwal, Satish K. Gupta & Vishal Bector	"FICCI India Innovation Growth Programme"	December 10, 2014 Park Plaza, Ludhiana
60 faculty members from COAE&T	49 <sup>th</sup> Annual Convention of ISAE and International Symposium on "Engineering Solutions for Sustainable Agriculture and Food Processing"	February 23-25, 2015 PAU, Ludhiana
Er. Aseem Verma & Drs J. P. Singh, Samanpreet Kaur, Arun Kaushal, Sunil Garg, Nilesh Biwalkar, Rajan Aggarwal & A.K. Jain	Seminar on "Geospatial Technology in Natural Resource Management" by Punjab Remote Sensing Centre	March 17-18, 2015 Ludhiana

### Civil Engineering

Er. Manpreet Kaur	National Workshop on "Application of GIS in Transportation Systems" by Department of Civil Engineering, PEC University of Technology, Chandigarh, under TEQIP-II Sponsored	August 22, 2014 Chandigarh
	Training Programme on "Limit State Design of Steel Structures based on IS:800-2007" by Department of Civil Engineering, National Institute of Technical Teachers Training and Research, Chandigarh	October 29-31, 2014 Chandigarh
	International Workshop on "Emerging Trends in Dynamics and Earthquake Engineering" by Department of Civil Engineering, IIT Delhi	December 20-21, 2014 New Delhi
Er. Satinder Kaur Khattria	UGC sponsored "General Orientation Programme" by UGC Academic Staff College, Panjab University, Chandigarh	November 25 - December 22, 2014 Chandigarh
Er. Satinder Kaur Khattria & Er. Manpreet Kaur	Refresher Course on "Recent Advances in Civil and Structural Engineering" by UGC Academic Staff College, Department of Civil Engineering, Jadavpur University, Kolkata	January 2-22, 2015 Kolkata

### Farm Machinery and Power Engineering

Dr Manjeet Singh	12 <sup>th</sup> International Conference on Precision Agriculture by International Society of Precision Agriculture (ISPA), Sacramento, USA	July 20-23, 2014 USA
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Name of teacher(s)	Programme/organizing agency	Date and Venue
Er. Aseem Verma	Seminar on "Intellectual Property Business in Agricultural Technologies and Knowledge Products"	January 15, 2015 PAU, Ludhiana
Drs Gursahib Singh Manes, Baldev Dogra & Anoop Kumar Dixit	30 <sup>th</sup> Workshop of AICRP on FIM	February 4-6, 2015 TNAU, Coimbatore
<b>Mechanical Engineering</b>		
Dr V. P. Sethi	National Conference on "Farm Mechanization, Post-Harvest Technology and Controlled Environment Smart Farming (AgriCon-2014)" by Confederation of Indian Industries	December 19-20, 2014 Hilton, Chennai
Dr V. P. Sethi	International Conference, Training and Expo - 2015 on "Soilless Gardening, India" by Hydroponic and Greenhouse Association of India	February 14-15, 2015 EPI Centre, Gurgaon
	International Conference on "Recent Advances in Bio-Energy Research (ICRABR-2015)" S. Swarn Singh National Institute of Renewable Energy, Kapurthala	March 14-17, 2015 Kapurthala
Er. Rupinder Pal Singh	Innovative Research in "Mechanical, Electrical, Electronics, Civil, Computer Science and Information Technology" by Krishi Sanskriti,	May 16-17, 2105 JNU, New Delhi
<b>Processing and Food Engineering</b>		
Dr M. S. Alam & Er. Rohit Sharma	"30 <sup>th</sup> Annual Workshop of AICRP on Post-harvest Technology"	January 6-9, 2015 UAS, Bangalore
<b>School of Electrical Engineering and Information Technology</b>		
Er. Harpreet Kaur	TEQIP-II sponsored Faculty Development Program on "Recent Computing Paradigms" by Department of Computer Science & Engineering, Guru Nanak Dev Engineering College, Ludhiana	July 7- 11, 2014 PAU, Ludhiana
Er. Lokesh Jain	"Chandigarh Science Congress" by Chandigarh Administration & Panjab University	February 25-27, 2015 Chandigarh
<b>Soil and Water Engineering</b>		
Dr Rajan Aggarwal	"Annual Workshop of NICRA"	July 3-5, 2014 New Delhi
	National Symposium on "Agriculture Diversification for Sustainable Livelihood and Environmental Security"	November 18-20, 2014 PAU, Ludhiana
	National Conference on "Groundwater Management and Assessment in Deccan Basaltic Terrain"	January 3- 4, 2015 M.S.P. Mandal's Deogiri College, Aurangabad



Name of teacher(s)	Programme/organizing agency	Date and Venue
	"Urban Waste Water Management for Safe Use of Agriculture"	March 9-10, 2015 Indian Institute of Waste Management (IIWS), Bhubaneswar
	Workshop on "Managing Water Cycle including Rain Water Storage for Sustained Water Productivity in Plains" under the sub-programme "Revival of Village Ponds"	May 27- 28, 2015 PAU, Ludhiana
All faculty from the Department of SWE	Attended "USAID funded Agriculture Innovation Project Planning Meet" organized by AVRDC, Hyderabad.	October 8-10, 2014 PAU, Ludhiana
Dr K.B. Singh	"79 <sup>th</sup> Annual Convention of Indian Society of Soil Science" by PJT State Agricultural University and ANGRAU, Hyderabad	November 24-27, 2014 Hyderabad
Drs J. P. Singh & Arun Kaushal	Workshop on "Environment and Water Conservation"	January 28, 2015 PAU, Ludhiana
Drs Angrej Singh, Sanjay Satpute & Rajan Aggarwal	"12 <sup>th</sup> Agricultural Science Congress- Sustainable Livelihood Security of Small Holder Farmers"	February 3-6, 2015 NDRI, Karnal

## COLLEGE OF BASIC SCIENCES AND HUMANITIES

Name of teacher(s)	Programme/organizing agency	Date and Venue
<b>Agricultural Journalism, Languages &amp; Culture</b>		
Ms Sumedha Bhandari	National Seminar on "Challenges before Indian Education System and Solutions and Redraft of National Education Policy Commission"	August 3, 2014 Shiksha Sanskriti Uthan Nyas, Punjab
	"11 <sup>th</sup> International Business Conference" by Multani Mal Modi College, Patiala	November 7- 8, 2014 Patiala
Dr Ashoo Toor	"National Seminar on Literature in the Emerging Contexts of Technology and Culture"	February 25- 26, 2015 Punjabi University, Patiala
	"International Seminar on Literature in the Emerging Contexts of Technology and Culture"	March 25-27, 2015 Punjabi University, Patiala
Dr Sarabjeet Singh	"All India Media Educators Conference"	April 2-4, 2015 Jaipur University, Jaipur
Dr Sheetal Thapar	National Seminar on "Social Computing Phenomenon and its Implications"	April 18, 2015 GGNIMT, Ludhiana
Drs Jagdish Kaur, Sheetal Thapar, Sarabjeet Singh, Ashoo Toor & Ms Sumedha Bhandari	3 <sup>rd</sup> All India Conference on "Linguistics and Folklore (Theme: Emerging Trends in Linguistics and Folklore)" in association with Punjabi Linguistics Punjabi Association, Patiala	May 28- 29, 2015 PAU, Ludhiana
Dr Jagdish Kaur	World Punjabi Conference-2015 by PUBPA+KALM Foundation, Brampton (Canada)	June 14, 2015 Canada
	2 <sup>nd</sup> Canadian Punjabi Conference-2015 by Punjabi Cultural Heritage, Canada, Punjabi Haiku Forum	June 21, 2015 Canada

Name of teacher(s)	Programme/organizing agency	Date and Venue
<b>Botany</b>		
Drs Jagmeet Kaur, Nirmaljit Kaur & Navita Ghai	"Current Trends in Plant Sciences with Special Reference to Phycology and Mycology"	October 28-29, 2014 Panjab University, Chandigarh
Drs Seema Bedi & Nirmaljit Kaur	National Symposium on "Crop Improvement for Inclusive Sustainable Development"	November 7-9, 2014 PAU, Ludhiana
Drs Nirmaljit Kaur & Shalini Jhanji	"Sustainable Solutions for Access to Safe Water: Promoting Innovation and Collaboration"	January 22-23, 2015 PAU, Ludhiana
Drs S. K. Thind & Nirmaljit Kaur	"12 <sup>th</sup> Agricultural Science Congress"	February 3-6, 2015 NDRI, Karnal
Dr S. K. Thind	"XIII International Conference on Agricultural and Food Engineering"	March 9-10, 2015 Miami, USA
<b>Chemistry</b>		
Dr K. K. Chahal	National Symposium on "Agrochemicals for Food and Environment Safety"	January 28-30, 2015 IARI, New Delhi
Drs K.K. Chahal & Anita Garg	"18 <sup>th</sup> Punjab Science Congress"	February 7-9, 2015 Desh Bhagat University, Mandi Gobindgarh
Dr Manpreet Kaur	National Conference on "Advanced Materials and Radiation Physics" by SLIET	March 13-14, 2015 Longowal, Sangrur
<b>Math, Stat. &amp; Physics</b>		
Dr Rajiv Kumar	"XXI DAE BRNS High Energy Physics Symposium" by DAE-IIT Guwahati	December 8-12, 2014 Guwahati
	"3 <sup>rd</sup> Belle Analysis Workshop 2015" by IIT, Madras	March 9-17, 2015 Madras
Dr Gurjeet Singh	National Conference on "Recent Trends and Developments in Statistics (NCRTDS)" by Department of Statistics, M.D. University, Rohtak.	February 21-23, 2015 M.D. University, Rohtak
Dr Amrit Kaur Mahal	National Seminar on "Sustainable Agricultural Development" by Society of Economics & Development	March 3, 2015 PAU, Ludhiana
<b>Microbiology</b>		
Dr Priya Katyal	"Afro-Asian Congress on Microbes for Human and Environment Health"	September 29 - October 1, 2014 Amity University, Noida
	Workshop on "Anaerobic Bioprocesses for Energy and Environment"	December 16-26, 2014 GNDU Amritsar
Dr G.S. Kocher	"National Conference on Microbiology"	October 2-4, 2014 RR College, Kolhapur
Dr Seema Garcha	"International Conference on Emerging Trends in Biotechnology and Xith Convention of BRSI" by Biotechnology Research Society of India BRSI and JNU, New Delhi	November 6-9, 2014 New Delhi





Name of teacher(s)	Programme/organizing agency	Date and Venue
	"Annual Convention of BRSI"	December 4-7, 2014 JNU, New Delhi
Drs P.P. Sahota, H.S. Sodhi, Priya Katyal, S.K. Gosal & M. Gangwar	National Symposium on "Crop Improvement for Inclusive Sustainable Development"	November 7-9, 2014 PAU, Ludhiana
Drs H.S. Sodhi & S. Kapoor	"8 <sup>th</sup> International Conference on Mushroom Biology and Mushroom Products" by MSI, Solan	November 19-22, 2014 NASC, New Delhi
Dr M. Gangwar	"International Science Congress"	December 8-9, 2014 Pacific University, Udaipur
Drs Priya Katyal & Seema Garcha	"5 <sup>th</sup> Agriculture Science Congress"	February 5-8, 2015 NDRI, Karnal
Dr S.K. Gosal	"18 <sup>th</sup> Punjab Science Congress"	February 7-9, 2015 Desh Bhagat University, Gobindgarh
Dr H.S. Sodhi	"XVIIth Annual Workshop of AICRP Mushrooms" by DMR and ICAR	June 29-30, 2015 Directorate of Mushroom Research, Solan

#### School of Business Studies

Drs Gagandeep Banga & Khushdeep Dharmi	International Conference on "Corporate Social Responsibility"	January 31, 2015 Punjab University Regional Centre, Ludhiana
Drs Pratibha Goyal & Sukhmani	National Seminar on "Sustainable Agricultural Development" by Society of Economics & Development	March 3, 2015 PAU, Ludhiana

#### Zoology

Dr D.K. Kocher	"7 <sup>th</sup> National Conference on Recent Advances in Chemical, Biological and Environmental Sciences"	January 30-31, 2015 M. M. Modi College, Patiala
	"4 <sup>th</sup> Insect Science Congress"	April 16-17, 2015 PAU, Ludhiana
Drs Tejdeep Kaur, Manoj Kumar, Rajwinder Singh & Navdeep Kaur	"18 <sup>th</sup> Punjab Science Congress" by Punjab Academy of Sciences	February 7-9, 2015 Desh Bhagat University, Mandi Gobindgarh
Drs Tejdeep Kaur & Manoj Kumar	"Geospatial Technology in Natural Resource Management" by Indian Society of Remote Sensing, Ludhiana	March 17-18, 2015 Ludhiana

#### COLLEGE OF HOME SCIENCE

Name of teacher(s)	Programme/organizing agency	Date and Venue
Twenty two faculty members	46 <sup>th</sup> National Conference of Nutrition Society of India on "Nutritional Approaches for Combating Non-Communicable Diseases" by DMC & Hospital, Ludhiana and NSI Hyderabad	November 6-8, 2014 DMC & Hospital, Ludhiana

Name of teacher(s)	Programme/organizing agency	Date and Venue
Drs Vandana Gandotra & Surinderjit Kaur	18 <sup>th</sup> Punjab Science Congress	February 7-9, 2015 Desh Bhagat College, Gobindgarh
Drs Ritu Gupta, Sharanbir Kaur, Sumeet Grewal & Surbhi Mahajan	ICAR's Refresher Course on "Computer Applications"	May 27 - June 16, 2015 CCSHAU, Hisar
<b>Apparel and Textile Science</b>		
Drs Sandeep Bains & Devinder Kaur	ICAR's Short Course on "Application of Electrospun Nano Fibres in Crop Health and Post-Harvesting Technology"	September 15 - 24, 2014 Central Institute for Research on Cotton Technology, Matunga, Mumbai.
Drs Sumeet Grewal & Surbhi Mahajan	National Conference by Department of Fashion and Textile Technology, International College for Girls, The IIS University, Jaipur	September 19- 20, 2014 The IIS University, Jaipur.
	International Conference on "Technical Textiles and Non Wovens"	November 6-8, 2014 Indian Institute of Technology, Delhi
Dr Sandeep Bains	Commonwealth Parliamentary (CPA) Workshop for Chairpersons on "Parliamentary Agriculture Committee for the India, Asia and South East Asia Regions" by Institute of the University of Greenwich and Govt. of Punjab	October 29 -31, 2014 Chandigarh
Drs Sandeep Bains & Sumeet Grewal	International Conference on "Applications of Nano - Materials in Textiles Enhancing health, Wellbeing and Sustainability - Opportunities, Challenges and Future Directions"	April 23 - 25, 2015 University of Baroda, Vadodra
<b>Family Resource Management</b>		
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, 2014 Bangalore
Drs Narinderjit Kaur & Harpinder Kaur	National Training on "Advanced Instrumentation in Ergonomics for Occupational Fitness and Capacity"	June 2 -5, 2015 National Institute of Occupational Health (ICMR), Ahmedabad
<b>Food and Nutrition</b>		
Drs Sonika Sharma & Harpreet Kaur	Summer School on "Food Quality and Safety: Recent Advances in Evaluation Techniques" by ICAR, New Delhi	August 5- 25, 2014 CIPHET, Ludhiana
Nine Faculty Members	National Seminar on "Augmenting Processing and Shelf Life of Perishable Food Products"	September 26, 2014 PAU, Ludhiana
Drs Anita Kochhar, Jaswinder Brar & Navjot Kaur	International Conference on "Innovative Bakery Products"	December 12-13, 2014 Taj Hotel, New Delhi



Name of teacher(s)	Programme/organizing agency	Date and Venue
Drs Anita Kochhar & Sonika Sharma	Silver Jubilee Seminar on "Present Status and Future Strategies for Processing and Value Addition of Agril. Commodities"	December 19- 20, 2014 CIPHET, Ludhiana
Drs Balwinder Sadana & Sonika Sharma	47 <sup>th</sup> Annual National Conference of Indian Dietetics Association	December 20- 21, 2014 AIIMS, New Delhi
<b>Home Science Extension and Communication Management</b>		
Drs Ritu Mittal & Preeti Sharma	Sensitization Workshop on "Societal Fellowship Scheme of DST, GOI for Women Empowerment" by Punjab State Council for Science and Technology, Chandigarh	February 4, 2015 Panjab University, Chandigarh
Dr Preeti Sharma	Training on "Technology Impact Analysis and New Methods In Extension Education" by ICAR-NAARM, Hyderabad	February 17-21, 2015 PAU, Ludhiana
<b>Human Development</b>		
Dr Tejpreet Kang	National Conference on "Threats to Human Rights : The Intervention Strategies by Global Society" by Indian Psychometrics and Educational Research Association, Patna	September 21- 22, 2014 Harprasad Institute of Behavioral Studies, Agra
	International Conference on "Agriculture, Food Engineering and Environmental Sciences- Sustainable Approaches" by Krishi Sanskriti	May 9-10 2015 Jawaharlal Nehru University, New Delhi
Drs Tejpreet Kang, Seema Sharma, Sarita Saini & Deepika Vig	3 <sup>rd</sup> International Conference on "Psychology and Allied Sciences" by Indian Association of Health, Research and Welfare & Amity Institute of Psychology and Allied Sciences, Amity University, Noida	September 25-27, 2014 Amity University, Noida

### M S Randhawa Library

Name of teacher(s)	Programme/organizing agency	Date and Venue
Dr Yogita Sharma	Workshop on "E-books and Discovery Solutions" by EBSCO Information Services India Pvt. Ltd., New Delhi	August 6, 2014 Chandigarh
	Bilingual International Conference on "Information Technology Yesterday, Today and Tomorrow" by DESIDOC, DRDO, Delhi	February 19-21, 2015 Patel Chest Institute, Delhi
	60 <sup>th</sup> ILA International Conference on "Embedded Librarianship and Technological Changes of Digital Age"	April 8-10, 2015 A C Joshi Library, Panjab University, Chandigarh
Mr Sanjeev Kumar,	Regional Training and Awareness Programme on "Jgate@CeRA" by ICAR-DKMA, New Delhi and Informatics India Pvt. Ltd., Bangalore	September 29, 2014 NASC, Pusa, New Delhi
	Bilingual International Conference on "Information Technology Yesterday, Today and Tomorrow" by DESIDOC, DRDO, Delhi	February 19-21, 2015 Patel Chest Institute, Delhi

Mr Sanjeev Kumar and Dr Yogita Sharma	National Seminar on "Impact of ICT on Social Science"	January 23- 24, 2015 GNDU, Amritsar
Ms Suniti Bala	International Conference on "Digital Literacy"	February 5- 6, 2015 Bhutta College of Education, Bhutta
	Workshop on "Indian Agricultural Research Journal and TEEAL: A Way Forward" by DKMA, ICAR, New Delhi	May 4, 2015 NASC Complex, PUSA, New Delhi
Mr Amit Kumar	International CALIBER 2015 Conference on "Innovative Librarianship: Adapting to Digital Realities" by HPU, Shimla, IAS, Shimla and INFLIBNET Centre, Ahmedabad	March 12-14, 2015 IIAS, Shimla



## ANNEXURE III

### LIST OF PUBLICATIONS

#### College of Agriculture

##### Research Paper in Indian and Foreign Journals

- Aggarwal N, Singh A, Singh S P and Kang J S (2015). Heat utilization vis-à-vis crop performance of mechanically transplanted rice (*Oryza sativa* L.) as affected by tillage systems and nitrogen levels. *J Agromet*. **17**: 84-89. (NAAS rating 6.16)
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## NOTES

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