From Director's Desk . . .

This newsletter highlights salient research achievements, training programmes and workshops organized and other significant activities performed at the institute during the period under report.

A quantitative assessment of harvest and post-harvest losses for 45 major agricultural crops / commodities in 120 districts of the country was made using stratified multistage random sampling design. A comparison of losses between 2013-14 vis-à-vis 2005-2007 was made for various food grains, oilseeds, fruits and vegetables.

Development of resistance to chemical antibiotics in cattle is unsolved till date. Anti Microbial Peptides (AMPs) are considered as alternative to chemical antibiotics. Different machine learning techniques such as Artificial Neural Networks (ANNs) and Support Vector Machines (SVMs) have been applied to predict AMPs in cattle. SVMs with different kernels have exhibited high accuracy of prediction and thus were implemented on a web server for classification/prediction of novel AMPs of cattle. The developed server is made available in public domain for ready use by the application scientists.

Phenomics is another emerging area where the institute scientists in collaboration with ICAR-IARI and IIT-Delhi have developed a phenome data management system with several analysis modules meant for estimation of physical and biochemical traits of rice under moisture deficit and low temperature stress tolerance. A non-destructive approach involving regression methodology has been developed for estimation of leaf area and chlorophyll content of rice seedlings under pot culture conditions through image analysis. An online software "Leaf Area Estimator" has been developed and deployed on the production server for ready use by the experimental biologists.

Two international trainings, one for officials of Ministry for Agriculture, Irrigation and Livestock, Afghanistan and the other for officials of African-Asian Rural Development Organization (AARDO), two CAFT trainings and two trainings for technical personnel of ICAR were organized at the Institute. Besides, four national workshops have also been organized.

Scientists of the institute have received various awards and recognitions. During the period, four new projects were initiated. The staff of the institute has participated in the Swachchta Mission organized by ICAR as a part of Swachh Bharat Abhiyan, a national campaign by the Government of India.

Scientists of the Institute have published 30 research papers in National/ International Journals of repute, published 4 book chapters and delivered 18 invited lectures in various training programmes organized outside the institute. Scientists have participated in different conferences/ symposia/ workshops, etc. and presented several invited talks, oral / poster papers and organized different sessions in various capacities.

It is hoped that the contents of this document would be informative and useful to scientists in NARS. Any suggestions for improving the contents of the newsletter further would be highly appreciated.

(UC Sud)

RESEARCH ACHIEVEMENTS

- **Assessment of quantitative harvest and post harvest losses of major crops/commodities in India:** A national level study was undertaken by ICAR-CIPHET, Ludhiana and ICAR-IASRI to make a quantitative assessment of harvest and post harvest losses for 45 agricultural produces in the country. In this study, a previously developed methodology for conducting large scale survey for estimation of quantitative harvest and post harvest losses of major crops/commodities in the country was applied. The sampling design used for selection of respondents was stratified multistage random sampling. A large scale field data collection was carried out in 120 districts considered under the study. An updated version of enquiry-based and observation-based data entry software was developed. Subsequently, data entry operation was carried out and further cross checked, scrutinized and randomly validated. Finally, data of 107 districts covering harvesting, collection, sorting/grading, threshing, winnowing, drying, packaging and transportation as well as storage loss at household, warehouse/cold stores, wholesaler, retailer and processing unit level were analyzed by developing codes in Statistical Analysis System (SAS) software. The estimates of percentage loss of different crops and commodities at National level as well as Agro-climatic zones level were obtained along with their percentage standard error. The estimates of operation-wise percentage loss as well as over all percentage loss were found reliable. The average range of losses altogether for food grains, oilseeds and fruits and vegetables were found to be 4.65% to 15.88%, which indicate that overall losses have gone down by about 2% as compared to previous study in 2005-2007 despite tremendous increase of production in last 10 years. Statistical testing for differences between losses during 2013-14 *vis-à-vis* 2005-2007 reveals that the losses during 2013-2014 have been reduced significantly for wheat, mustard, groundnut, mango, guava, mushroom, tapioca, arecanut, black pepper and coriander. Whereas, the estimated losses were significantly increased during 2013-14 for maize, sorghum, chickpea, soybean, sunflower, citrus, sapota, cauliflower, cashew, marine fish, meat and poultry meat.

- **Antimicrobial peptides prediction server for cattle**: Study of Antimicrobial peptides (AMPs) is gaining extensive attention worldwide as these are natural alternatives to chemical antibiotics. Presently, development of resistance to chemical antibiotics in cattle is unsolved and hence needs immediate attention. Machine learning techniques have capabilities to analyse large biological data for understanding the underlying complex biological phenomena and hence techniques such as Artificial Neural Network

(ANN) and Support Vector Machine (SVM) were applied in this study to predict the AMPs in cattle. It was found that performance of SVM based models for *in silico* prediction/identification of AMPs of cattle is superior to ANN. A total of 99 AMPs related to cattle collected from various databases and published literature were taken in the present investigation. N-terminus residues, C-terminus residues and full sequences were used for model development and identification/prediction of AMPs in cattle. It was found that best SVM models for C-terminus residues, N-terminus residues and full sequence were with kernels Radial Basis Function (RBF), Sigmoid and RBF with accuracy as 95%, 99% and 97%, respectively. These SVM models were implemented on web server for classification/prediction of novel AMPs of cattle (http://webapp.cabgrid.res.in/amp/). This computational server can accelerate novel AMP discovery from whole genome proteins of a given cattle species for bulk discovery with very high accuracy.

- **Phenomics of moisture deficit and low temperature stress tolerance in rice**: Phenomics is an emerging area, which deals with the measurement of phenomes (the physical and biochemical traits of organisms). The Institute is involved in a research study in this area in collaboration with ICAR-IARI and IIT-Delhi. The institute has created a phenome database and developed multimedia data management system. The system has advanced facilities such as uploading of multiple images in the form of zip file, selecting multiple files, selecting a portion of the image and uploading cropped images online.
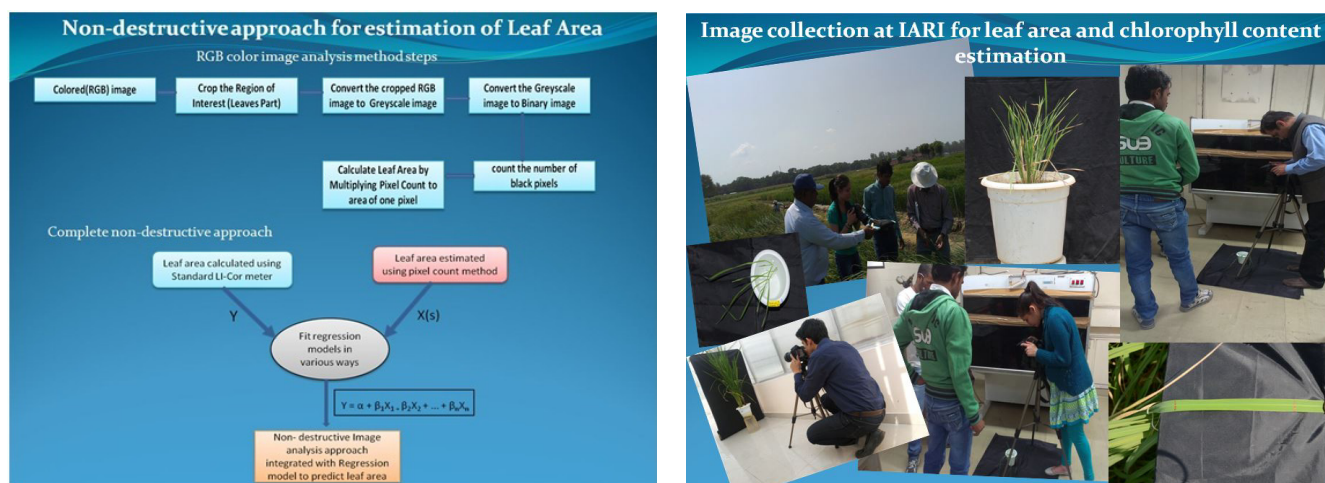
Figure : Procedure for estimation of leaf area using image analysis

Other important key features of the system are: (i) Generic - for data capturing (ii) Data sharing based on roles and privileges and (iii) Modular – (a) the system at present has the facility to capture numeric, alphanumeric and image data that can be further extended to genomic data. (b) the system contains analysis modules for estimation of leaf area and chlorophyll content. For estimation of leaf area and chlorophyll content of rice seedlings under pot culture conditions through image analysis, an approach involving regression methodology was developed. Also, online software "Leaf Area Estimator" has been developed and deployed on the production server for ready use by the application scientists.

AWARDS AND RECOGNITIONS

- During 68th Annual Conference of the Indian Society of Agricultural Statistics organized at ICAR-IASRI, New Delhi from January 29-31, 2015 the following awards were given:
  i) Dr. Hukum Chandra, National Fellow has been awarded Professor P.V. Sukhatme Gold Medal Award for his outstanding contribution in the field of Agricultural Statistics
  ii) Dr. Arpan Bhowmik received an *appreciation letter* from Indian Society of Agricultural Statistics for being selected as one of the presenter under Dr. GR Seth Memorial Young Scientist Award category during 67th Annual Conference of Indian Society of Agricultural Statistics organized by Department of Farm engineering, Institute of Agricultural Sciences during 18-20 December, 2013 at Banaras Hindu University, Varanasi. The appreciation letter was received in 68th annual conference of Indian Society Agricultural Statistics organized during 29-31 January, 2015 at IASRI, New Delhi
- Dr. Sudeep has been nominated as best teacher for the academic year 2014-15 from Division of Computer Applications and received an appreciation letter from Dean PG School, IARI for the said nomination.
- Dr. Anil Rai has become member of Editorial Board of Indian Journal of Agricultural Sciences in ICAR since March 04, 2015.

Best paper Award

- International Symposium on New Perspectives in Modern Biotechnology organized by Society for Applied Biotechnology, at Puducherry from 23 - 25 March 2015.
  - Tandon G, Jaiswal S, Iquebal MA, Singh S, Kumar S, Rai A and Kumar D (2015). In silico study of interaction of EDS1 and PAD4 proteins in tomato using molecular dynamics approach. (In Proteomics Session)
  - Kaur S, Iquebal MA, Jaiswal S, Singh S, Rai A, Kumar D(2015) In silico prediction and functional characterization of genes related to abiotic and biotic stresses in chickpea (Cicer arietinum). (In Genomics Session)
- 68th Annual Conference of the Indian Society of Agricultural Statistics organized at ICAR-IASRI, New Delhi during January 29-31, 2015.
  - Jain, Rajni, Alam, A.K.M. Samimul and Arora, Alka (2013). WBSTFP: Software for TFP Computation in Agriculture. *J. Ind. Soc Agril. Statist.*, **67(3)**, 381-391.

NEW PROJECTS INITIATED

- Impact assessment of agricultural research and development. **(AGENIASRICOP201500100038)** Funded by ICAR, **NIAP, New Delhi.** (Association of IASRI w.e.f. 12.01.2015)
- A optimal block designs for comparing test treatments with control treatment(s)-an algorithmic approach. **(AGENIASRISIL201500200039)** w.e.f.18.02.2015.
- Pilot study for developing state level estimates of crop area and production on the basis of sample sizes Recommended by Professor Vaidyanathan Committee Report. Funded by Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Ministry of Agriculture, GOI, New Delhi. **(AGENIASRISOL201500300040)** w.e.f. 16.02.2015.
- ICAR Network Project on Transgenics in Crops (NPTC), ICAR-NRCPB Delhi. **(AGENIASRICOP201500400041)** (Association of IASRI w.e.f. 27.01.2015).

HUMAN RESOURCE DEVELOPMENT
Training Programmes/ Workshops Organised

S.No.	Title	Venue	Date	Sponsored by	No. of Participants
		Training Programmes			
1.	International training programme on Importance of Statistical and Experimental Designs, Data Analysis and Biometrical Techniques in Agriculture Research Coordinator: Dr. Rajender Parsad Co-Cordinator: Dr. Eldho Varghese Dr. Sukanta Dash	IASRI, New Delhi	17 November, 2014 to 07 February, 2015	Ministry of Agriculture, Irrigation and Livestock (MAIL), Afghanistan.	16
2.	Advanced Statistical Techniques in Horticulture Science Research under CAFT Course Director: Dr. Sukanta Dash Course Co-Director: Dr. Susheel Kumar sarkar	IASRI, New Delhi	02-22 January 2015	Education Division, ICAR	15
3.	Recent Advances in Statistical Genetics under CAFT Course Director: Dr. AK Paul Course Co-Director: Dr. RK Paul	IASRI, New Delhi	03-23 February 2015	Education Division, ICAR	26
4.	International training programme on Applications of Remote Sensing and GIS in Agricultural Surveys Coordinator: Dr. Prachi Misra Sahoo Co-Cordinator: Dr. Tauqueer Ahmad	IASRI, New Delhi	12 February to 04 March 2015	African-Asian Rural Development Organization (AARDO)	10
5.	Office Automation using Oracle ERP for Technical Personnes of ICAR Coordinator: Dr. Sudeep Co-Cordinator: Dr. Anshu Bhardwaj	IASRI, New Delhi	09-13 March 2015	ICAR	22
6.	Office Automation using Oracle ERP for Technical Personnes of ICAR Coordinator: Dr. Alka Arora Co-Cordinator: Dr. N Srinivasa Rao	IASRI, New Delhi	16-20 March 2015	ICAR	22
		Workshops			
7.	Workshop on NISAGENET for Appraisal cum Validation of Data	AC&RI Madurai, TNAU, Tamil Nadu	08-09 January 2015	Education Division, ICAR	23
		Mahatma PhuleKrishi Vidyapeeth, Rahuri, Maharashtra	09-10 March 2015		25
8.	Launch Workshop of Research Projects on i. Pilot study for Developing State Level Estimates of Crop Area and Production on the basis of Sample Sizes Recommended by Professor Vaidyanathan Committee Report ii. Research on Improving Methods for Estimating Crop Area, yield and Production under Mixed, Repeated and Continuous Cropping iii. Study to Test the Developed Alternative Methodology for Estimation of Area and Production of Horticultural Crops	IASRI, New Delhi	23-24 March 2015	FAO, DES DAC	95
9.	Workshop on Synthesizing Statistical and Agricultural Sciences for Harnessing and Enhancing Quality of Agricultural Research	IASRI, New Delhi	25 March 2015	National Professor Project	27

PANORAMA OF ACTIVITIES

Conference Organised

- 68th Annual Conference of the Indian Society of Agricultural Statistics organized at ICAR-IASRI, New Delhi during January 29-31, 2015.

  The scientists and Technical Officers were involved in organizing the Conference. Dr. UC Sud, Director of the Institute was the Secretary and organizing secretary of ISAS. Inauguration programme was organized on January 29, 2015 under the Chairmanship of Dr. TCA Anant, Chief Statistician of India and Chief Guest Dr. JK Ghosh, Former Director, Indian Statistical Institute, Kolkata. During the Conference a Workshop on "Methodology for Estimating Crop Area and Yield under Mixed and Continuous Cropping" was organized on January 29, 2015.

The following scientists of the Institute have participated in the Conference in various capacities.

Name of Scientist	Organized/Acted as	Name of Session
Dr. AK Choubey	Chairman	Technical session of contributed papers in Informatics.
Dr. Anil Rai	Chairman	Advances in Agricultural Informatics
Dr. LM Bhar	Joint Organizing Secretary and Convener	Emerging issues in Design and Analysis of Experiment
Dr. Rajender Parsad	Convener	Mountain/Hill Agriculture.
Dr. Seema Jaggi	Convener	Women Empowerment in Agriculture.
Dr. Prachi Misra Sahoo	Judge	Student paper session "Sampling Techniques".
Sh. SD Wahi	Chairman	Contributory paper session "Statistical Genetics/Bioinformatics"
Dr. N Srinivasa Rao	Evaluator	Statistical modeling & application.
Dr. Ankur Biswas	Rapporteur	Contributed papers Session on Sampling Techniques.
Dr. Kaustav Aditya	Rapporteur Judge	New Challenges in Survey Sampling. Sampling Techniques.
Dr. Arpan Bhowmik	Evaluator	Evaluating the performance of students presentation for the session Design of Experiments/Statistical Genetics/Informatics.
Dr. Eldho Varghese	Rapporteur	Emerging Issues in Design and Analysis of Experiments.
Dr. MA Iquebal	Rapporteur	Contributed Paper Session "Statistical Genetics/ Bioinformatics"
Dr. SK Sarkar	Rapporteur	Contributed Paper Session on Design of Experiments chaired by Prof. Pulkesh Maiti.
Dr. DC Mishra	Rapporteur Judge	Session Mountain/ Hill Agriculture. student session.
Dr. Sarika	Rapporteur	Women Empowerment in Agriculture.
Sh. Bishal Gurung	Rapporteur	Statistical Applications.
Sh. KK Chaturvedi	Rapporteur	"Advances in Agricultural Informatics" Panel of Judges to evaluate the students paper in student session "Statistical Modelling and Applications"

- Swachchata Mission was organized on January 01, 2015 by IASRI/ICAR as a part of **Swachh Bharat Abhiyan,** a national campaign by the Government of India. Director, Scientists, Technical, Administrative, Supporting staff and Students of the Institute participated in the Mission.

- The 16th meeting of **Research Advisory Committee (RAC)** of the Institute was held on January 21, 2015 under the chairmanship of Prof. Bimal K. Roy, Director, ISI, Kolkata. The meeting was attended by Dr. G. Venkateshwarlu, ADG, Education Division, ICAR, Dr. Bal BPS Goel and Dr. SD Sharma, Former Directors of IASRI, Dr. UC Sud, Director, IASRI as members of the RAC of the Institute, Dr. Seema Jaggi, Principal Scientist and Incharge, PME Cell, IASRI as Member Secretary of RAC. Dr. VKGupta, National Professor, ICAR, Dr. Prajneshu, Emeritus Scientist and Former Head, Statistical Genetics, IASRI, All Heads of Divisions at IASRI and Sh. SD Wahi also attended the meeting as special invitees.

- The **53rd Convocation of Post Graduate School IARI** was held during 16-20 February 2015. A total of 18 students in the disciplines of Agricultural Statistics, Computer Application and Bioinformatics have been awarded with Ph.D. / M.Sc. degrees. The discipline-wise number of students who got degrees are as
  - 5 Ph.D and 6 M.Sc. (Agricultural Statistics)
  - 2 M.Sc. (Computer Application)
  - 5 M.Sc. (Bioinformatics)

- Steering committee meeting of **"Network Project for Agricultural Bioinformatics and Computational Biology"** was held during March 12-14, 2015 at IASRI New Delhi. This meeting was Chaired by Dr. Arvind Kumar, DDG (Education), ICAR. DDG (Fishries), ADG's of different SMD's of ICAR were present in the meeting. Various projects submitted under the network project were discussed in the meeting.

- 82nd meeting of the **Institute Research Committee (IRC)** was organized during March 19-20, 2015 under the chairmanship of Dr. U.C. Sud, Director, IASRI. 5 new research projects (2 Institute funded and 3 outside funded) were approved and progress of 45 on-going research projects (24 Institute funded, 06 in collaboration with other Institute and 15 outside funded) were reviewed and 05 research projects were declared as complete during the meeting. Dr. Seema Jaggi, Principal Scientist & Incharge, PME Cell as the Member Secretary of IRC presented the significant research and other activities for the period October 2014 to March 2015.

- Launch Workshop of three externally funded projects was organized at IASRI during 23-24 March, 2015, in which officials from the nine different states, Former directors/Joint Director/Principal Scientists of the Institute, ICAR officials, officials from DES, DAC, MoA, Govt. of India, NSSO officials, Heads of Division of the Institute and Scientists of the Division participated. The Director General, ICAR was the Chief Guest at the Inaugural Session of the workshop. The Principal Adviser and Economic and Statistical Adviser, Ministry of Agriculture, Govt. of India and DDG (Edn.) were the Guests of Honor for this session. Following are the externally funded projects.

  i)   Pilot study for developing state level estimates of crop area and production on the basis of sample sizes recommended by Professor Vaidyanathan Committee Report (funded by DAC, Ministry of Agriculture)

  ii) Research on improving methods for estimating crop area, yield and production under mixed, repeated and continuous cropping (Sponsored by Global Strategy to improve agricultural and rural statistics hosted by the FAO of United Nations)

  iii) Study to test the developed alternative methodology for estimation of area and production of Horticultural crops (IASRI component of CHAMAN programme under MIDH, funded by DAC, Ministry of Agriculture)

Seminars Delivered

Seminars in different areas of Agricultural Statistics, Computer Application and Bioinformatics were delivered by the Scientists and Students of the Institute. The seminars include presentations on salient findings of the completed research projects and new project proposal by the scientists, thesis/ ORW/course seminars of students of M.Sc. and Ph.D. (Agricultural Statistics), M.Sc. (Computer Application) and M.Sc. (Bioinformatics).

The Details of Seminars Delivered

Category	Type of seminar	Number
Scientist	Project Completion	02
	Project Proposal	01
Student	Course	20
	ORW	02
	Thesis	02
	Open	01
Total		**28**

PUBLICATIONS
Research Papers

- Ahammed, Shabeer, Saha, TP, Ajoy, Gajbhiye, VT, Gupta, Suman, Manjaiah, KM, Varghese, Eldho (2015). Exploitation of Nano-Bentonite, Nano-Halloysite and Organically Modified Nano-Montmorillonite as an Adsorbent and Coagulation Aid for the Removal of Multi-Pesticides from Water: A Sorption Modelling Approach, *Water, Air, & Soil Pollution*, **226(3)**, DOI: 10.1007/s11270-015-2331-8.

- Alam, NM, Batra, PK, Parsad, Rajender and Lal, Krishan (2014). Multifactor mixture experiments: Construction and analysis. *Int. J. Agril. Statist. Sci.*, **10**(Supplement 1), 1-7.

- Behera, SK, Paul, AK, Wahi, SD, Iqbal, MA, Das, Samarendra, Paul, Ranjit, Alam, Wasi and Kumar, Anil (2014). Estimation of heritability of mastitis disease using moment estimators. *Int. J. Agril. Statist. Sci.,* **10**(Supplement 1), 243-247.

- Bhardwaj, SP (2014). A Study on Trading in Seed Spices (Cumin) in Gujarat State. *Ind. J. Agril. Marketing,* **28(3)**, 143-52.

- Bhatia, Kavita, Asrey, Ram, Varghese, Eldho, Singh, Surender and Kanaujia, Pankaj (2014). Suitability of commercially important Indian pomegranate (Punica granatum L.) cultivars for minimal processing, *Ind. J. Agril. Sci.*, **85 (1)**, 73–80.

- Chandrika, KSV, Singh, Poorna, Sarkar, Anupama, Jyoti, Dhruba, Rathore, Abhishek, Kumar, Anil, (2014). pH-sensitive cross-linked guar gum-based superabsorbent hydrogels: Swelling response in simulated environments and water retention behavior in plant growth media. *J. Appl. Polym. Sci.,* DOI: 10.1002/APP.41060

- Choudhary, Vipin Kumar, Thakur, Bhawesh Kumar, Kumar, Anil, Panwar, Sanjeev, (2013). An implementation of preprocessing concept on web log data files for web usage mining. *Asian Academic Res. J. Multidisciplinary*, **16**, 447-462.

- Das, Litan, Nain, MS, Singh, Rashmi, Burman, R Roy, and Kumar, Anil (2015). Effectiveness of backward and forward linkage in fruit cultivation: A study of NERAMAC (North Eastern Regional Agricultural Marketing Corporation Limited). *Ind. J. Extn. Edu.,* **51 (1&2)**, 70-74.

- Jaggi, Seema, Varghese, Cini, Varghese, Eldho and Sharma, Anu (2015). Web generation of experimental designs balanced for indirect effects of treatments (WEB-DBIE), *Computers and Electronics in Agricl.*, **111**, 62–68.

- Kumar, Arvind, Varghese, Cini, Varghese, Eldho and Jaggi, Seema (2015). On the construction of designs with three-way blocking, *Model Assisted Statistics and Applications*, **10**, 43-52.

- Kumar, Ashok, Bhardwaj SP and Singh, KN (2015). Impact of Public Investment in Irrigation Projects on Food Grain Productivity. *J. Soc. Sci.*, **42(1,2)**, 175-181.

- Kumar, Naveen, Mukherjee, Irani, Varghese, Eldho (2015). Adsorption–desorption of tricyclazole: effect of soil types and organic matter, *Environmental Monitoring and Assessment*, DOI: 10.1007/s10661-015-4280-5.

- Kumar, V, Singh, A, Mithra, SVA, Krishnamurthy, SL, Parida, SK, Jain, S, Tiwari, KK, Kumar, P, Rao, AR, Sharma, SK, Khurana, JP, Singh, NK and Mohapatra, T (2015). Genome-wide association mapping of salinity tolerance in rice (Oryza sativa). DNA Research, DOI: 10.1093/dnares/dsu046, 1-13.

- Maibam, A, Tyagi, A, Satheesh, V, Mahato, AK, Jain, N, Raje, RS, Rao, AR, Gaikwad, K, Singh, NK (2015). Genome-wide identification and characterization of heat shock factor genes from pigeonpea (Cajanus cajan). *Molecular Plant Breeding*, **6(7)**, 1-11. DOI: 10.5376/mpb.2015.06.0007.

- Meena, RK, Singh YV, Lata, Kumar, A, and Bana, RS (2014). Effect of plant –growth-promoting rhizobacteria inoculation on plant growth, productivity and economics of Basmati rice. *Egyptian J. Bio.,* **16**, 44-50.

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- Paul, RK, Gurung, B and Paul, AK (2015). Modeling and forecasting of retail price of Arhar Dal in Karnal, Haryana. *Ind. J. Agril. Sci.*, **85(1),** 69-72.

- Rajurkar, GB, Patel, Neelam, Rajput, TBS and Varghese, Cini (2015). Effect of deficit irrigation on growth and yield of drip irrigated cabbage. *Ind. J. Agril. Sci.*, **85(2)**, 189–193.

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- Sadhu, Sandip Kumar, V., Ramasubramanian, Rai, Anil and Kumar, Adarsh (2014) Decision tree based models for classification in agricultural ergonomics. *J. Soc. Statist., Compu. Appln.*, **12 (1&2)**, (New Series), 21-33.

- Sahu, S, Sharma, JP, Burman, RR, Singh, P, Kumbhare, NV, Varghese, Eldho (2014). Factors Contributing to Success and Sustainability of Farms Produce Promotion Society (FAPRO). *J. Community Mobilization and Sustainable Development*, **9(2)**, 210-213

- Sahu, TK, Rao, AR, Meher, PK, Sahoo, BC, Gupta, S and Rai, A (2015). Computational prediction of MHC class I epitopes for most common viral diseases in cattle (Bos taurus). *Ind. J. Biochem. Biophy.*, **52**, 34-44.

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- Singh, Madan, Burman, RR, Sharma, JP, Sangeetha, V and Iquebal, MA (2014). Structural and functional mechanism of mobile based agro advisory services and socio-economic profile of the member farmers. *J. Community Mobilization and Sustainable Development*, **9(2)**, 192-199.

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Book Chapter

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Training Mannual/ e-mannual

- Paul, AK and Paul, RK. Recent Advances in Statistical Genetics.

- Parsad, Rajender, Mandal, BN, Dhandapani, A, Dash, Sukanta, Vargese, Eldho and Mishra, DC (2015). Reference Manual: R and R Studio.

Online Macro

- Arpan Bhowmik, Eldho Varghese, Seema Jaggi and Cini Varghese. SAS macro for generation of symmetric factorial with minimally changed run sequences. Available at http://www.iasri.res.in/sscnars/sftsmcrs.aspx

Project Report Published

- Sukanta Dash, Rajender Parsad, VK Gupta (2014). Row-column designs for factorial experiments in two rows. IASRI, New Delhi. I.A.S.R.I./P.R.-11/2014

INVITED LECTURES DELIVERED

Dr. UC Sud

- Delivered a lecture in One-week Capacity Development Programme for the Scientists of Narional Agricultural Researc System organised by ICAR-NIAP, New Delhi during March 19-25, 2015.
  - (i) Agricultural statistical system in India.

Dr. Rajender Parsad

- Delivered four lectures in a training Worskhop on Experimental Techniques and Data Analysis in Agriculture organized by CIMMYT, India at NASC complex, DPS Marg, Pusa, New Delhi during February 12-14, 2015.
  - (i) Basic statistical concepts and tests of significance;
  - (ii) Design of experiments (single factor, multiple factor, multi-location, on-station and on-farm);
  - (iii) Combined analysis of data across sites, years. On-station vs on-farm experiment, unequal replication
  - (iv) Site regression biplot.

Dr. Dinesh Kumar

- Delivered a lecture in National Training Programme on "Recent Trends on Bioinformatics and its Application in Agriculture" held at ICAR-NAARM, Hyderabad during January 02-13, 2015.
  - (i) Global status of agricultural bioinformatics and challenges for India.

- Delivered two lectures in National Training Programme on "Advanced Tools for Analysis of Phenomic and Genomic Data organized by Dairy Cattle Breeding Division at ICAR-National Dairy Research Institute, Karnal - 132 001 (Haryana) during March 05-25, 2015.
  - (i) Global Status of Domestic Animal Bioinformatics: Where do we stand? and
  - (ii) IPR issues related to indigenous domestic animal germplasm.

Dr. Anil Rai

- Delivered a lecture in one week capacity building program for scientists of NARES at ICAR-NIAP, New Delhi on March 23, 2015.
    - (i) Bioinformatics in Agriculture.

Dr. MA Iquebal

- Delivered two lectures in National Training Programme on "Advanced Tools for Analysis of Phenomic and Genomic Data organized by Dairy Cattle Breeding Division at ICAR-National Dairy Research Institute, Karnal - 132 001 (Haryana) during March 05-25, 2015.
    - (i) Genome assembly (Theory and Practical) and
    - (ii) Genome annotation (Theory).

Dr. Sarika

- Delivered three lectures in National Training Programme on "Advanced Tools for Analysis of Phenomic and Genomic Data organized by Dairy Cattle Breeding Division at ICAR-National Dairy Research Institute, Karnal - 132 001 (Haryana) during March 05-25, 2015.
    - (i) DNA signature based SNP and STR marker analysis (Theory and Practical),
    - (ii) Genome annotation (Practical) and
    - (iii) Metagenomics of Rumen microbes (Theory and Practical).

Dr. Susheel Kumar Sarkar

- Delivered two lectures in 2nd ICSSR Training Program on Research Methodology Course in Social Sciences for Ph.D. Students during 13-24 March, 2015 at Department of Geography, Jamia Millia Islamia (Central University), New Delhi.
    - (i) Testing of Hypothesis and
    - (ii) Non-Parametric methods.

Dr. AR Rao

- Delivered two lectures in ICAR sponsored short course on "Recent Advances in Molecular Markers and Population Genomics held during March 19, 2015 at NBFGR, Lucknow in one week capacity building program for scientists of NARES at NCAP, New Delhi.
Statistical Genomics
    - (i) Application of Random Forest in Genome Wide Association Studies and
    - (ii) Splicing, SNPs and Population Genomics.

PAPERS PRESENTED

i) 102nd Indian Science Congress organized at University of Mumbai, Mumbai during January 03-07, 2015
Session on Agricultural Statistics for the welfare of society (Dr. UC Sud was Convener).

- Sud, UC. Calibration approach based estimator of population total for successive sampling in presence of auxiliary. **(Invited talk)**

Session on Agriculture and Forestry Sciences

- Rao, AR*, Sarkar, Rupam Kumar, Meher, Prabina Kumar and Wahi, SD. An approach to the development of a core set of germ plasm using mixture of qualitative and quantitative data. **(Invited talk)**
- Varghese, Cini*, Varghese, Eldho, Jaggi, Seema and Bhowmik, Arpan. Experimental designs for open-pollination in polycross trials. **(Poster presentation)**

Session on Information and Communication Science & Technology (including Computer Science)

- Islam, SN. ICT in Agriculture: Foundation for a new revolution. **(Invited talk)**

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Session on "Mathematical Sciences (including Statistics).

– Rao, AR*, Sarkar, Rupam Kumar, Varghese, Cini, and Meher Prabina Kumar. Incomplete block designs for next generation sequencing experiments. (Oral paper presentation)

ii) Symposium "Accelerating Biology 2015: Catalyzing Evolution" held at C-DAC, Pune during January 20-22, 2015.

– Kumar, Dinesh. NGS data and its applications in agriculture. (Invited talk)

iii) International Consultation Meeting of Fish Genomics for Development of Roadmap for Fish Molecular Breeding Programe in India, at ICAR-CIFA, Bhubaneshwar on January 23, 2015.

– Kumar, Dinesh. Bioinformatics in genomic analysis. (Invited talk).

iv) 68th Annual Conference of the Indian Society of Agricultural Statistics organized at ICAR-IASRI, New Delhi during January 29-31, 2015.

a. **Invited Papers**

Session on Mountain/ Hill Agriculture.

– Ahmad, Tauqueer*, Sud, UC and Sahoo, Prachi Misra. Methodological issues relating to estimation of area and production of horticultural crops.

– Ajit*, Dhyani, SK, Newaj, Ram and Handa, AK. Simulation of carbon sequestered under tree based systems in hilly district of Himachal Pradesh.

– Sahoo, Prachi Misra*, Rai, Anil, Ahmad, Tauqueer. Generation of agricultural statistics in North Eastern hilly regions using remote sensing and GIS.

Session on Women Empowerment in Agriculture.

– Arora, Alka*, Sudeep, Choubey, AK, Alam, AKM Samimul, Dahia, Rama. Women participation scenario in agricultural education and research.

Session on Emerging Issues in Design and Analysis of Experiments.

– Bhar, Lalmohan* and Ojha, Sankalpa. Influence measures in blocked designs of experiments with correlated errors.

– Varghese, Cini*, Varghese, Eldho, Jaggi, Seema and Bhowmik, Arpan. WebPD: An online software for the generation of polycross designs.

Session on New Challenges in Survey Sampling.

– Lal, SB*, Sharma, Anu, Chandra, Hukum and Rai, Anil. Sample selection software for survey data.

Session on Advances in Agricultural Informatics.

– Choubey, AK*, Arora, Alka, Sudeep, Dahiya, Shashi, Islam, SN, Bhardwaj, Anshu. E-governance through Enterprise Resource Planning System in ICAR.

– Rao, AR. Agricultural Bioinformatics - A potential avenue for research and development in Indian Agriculture.

Session on Statistical Modelling for Biological and Economic Phenomena.

– Ghosh, Himadri*. Some fuzzy time-series models and their application to agriculture.

– Gurung, Bishal*. Stochastic volatility models and their application.

b. **Workshop on Methodology for Estimating Crop Area and Yield under Mixed and Continuous Cropping**

– Aditya, Kaustav* and Singh, Man. Methods for estimation of crop area in different countries.

– Ahmad, Tauqueer* and Sahoo, Prachi, Misra. Methods for estimation of crop yield in different countries.

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- Biswas, Ankur* and Chandra, Hukum. Use of global positioning system in crop area estimation.
- Sud, UC* and Gupta, VK. Study on improving methods for estimating crop area, yield and production under mixed, repeated and continuous cropping – An overview.

c. Contributed papers

Session on Design of Experiments.

- Bhowmik, Arpan*, Varghese, Eldho, Jaggi Seema and Varghese Cini. 2^k Factorial Experiment with Minimum Level Changes
- Dash, Sukanta*, Parsad, Rajender and Gupta,VK. Efficient row-column designs for mixed level factorial experiments based on baseline parameterization.
- Mandal, BN*, Gupta, VK and Parsad, Rajender. Balanced treatment incomplete block designs through integer programming.
- Pradhan, Upendra Kumar* and Lal, Krishan. Analysis of mixture experiments for optimum response.
- Varghese, Eldho* and Varghese, Cini. Type III complete diallel cross experiments under row-column setup with specific combining abilities.

Session on Sampling Techniques.

- Aditya, Kaustav*. Higher order calibration estimators under two stage sampling design.
- Biswas, Ankur*, Rai, Anil and Ahmad, Tauqueer. Spatial bootstrap variance estimation technique in presence of missing observations.
- Chandra, Hukum, Maheshwar, Shikha*, Aditya, Kaustav and Panna, Nupur. Micro level crop yield estimation - An application of small area estimation technique.
- Gupta, AK*, Sud, UC, Tyagi, KK, Chandra, H, Ahmad, T, Sahoo, PM, Aditya, Kaustav, Biswas, Ankur and Singh, Man. Seed, feed and wastage ratios of major food crops in Uttar Pradesh.
- Yadav, Satish Kumar, Wahi, SD* and Sud, UC. Calibration estimator in presence of quadratic relationship between study and auxiliary variable.

Session on Statistical Modelling.

- Gurung, Bishal*, Singh, KN and Paul, Ranjit Kumar. An alternative approach to capture cyclical and volatile phenomena in time-series data.
- Kumar, Anil*, Chaturvedi, Ajit, Chaudhary, Alka, Panwar, Sanjeev and Arya, Prawin. Development of class of 'Accelerated' sequential procedures and associated second-order approximations under reliability model.
- Mandal, Baidya Nath*. A Jacobi-Armijo for Lasso and its extensions.
- Panwar, Sanjeev*, Singh, KN, Kumar, Anil and Rathore, Abhishek. Performance evaluation of different crop yield forecasting approaches using weather indices.

Session on Informatics.

- Ahuja, Sangeeta*. Kernel density based Bayesian cluster ensemble.
- Arora, Alka*, Sudeep and Alam, AKM Samimul. Decision support system for effective management of ICAR sponsored training programs.
- Islam, SN*. Expert system shell for agricultural crops (ShellAg).
- Kumar, Mukesh*, Choubey, AK, Arora, Alka, Dahiya, Shashi, Bhardwaj, Anshu, Rao, NS, Sudeep, Islam, SN and Ahuja, Sangeeta. e-Human resources management system: purposes and uses.
- Kumar, Sumit*, Nath, Kamalika and Gupta, AK. Data entry software in MS Access 2007.
- Rao, N Srinivasa*, Kumar, Mukesh and Choubey, AK (2015). Designing of results framework document management system in ICAR: An initiative.

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− Singh, KN*, Bhardwaj, SP, Panotra, Narinder and Sahoo, Prachi Misra. Use of Geographic Information System (GIS) and Remote Sensing (RS) technology to get economic benefit by optimization of resource use in agriculture.

Session on Statistical Application.

− Bhardwaj, SP*. Study of price volatility in pulse crops – A case study of masoor grain.

− Pal, Soumen* and Mazumdar, Debasis. Long term trend analysis of temperature over India.

− Paul, Ranjit Kumar*, Gurung, Bishal and Paul, Amrit Kumar. Dual long memory in agricultural commodity prices.

− Alam, Wasi* and Sinha, Kanchan. Comparative study on recent versions of exponential distributions.

− Sahoo, Prachi Misra*, Rai, Anil, Ahmad, Tauqueer, Raju, BMK and Osman, M. Development of Rainfed Areas Prioritization Index (RAPI) for characterization of Rainfed areas in India.

− Arya, Prawin*, Singh, DR, Kumar, Anil and Singh, KN. An econometric study for emergence of ground water markets and its determinants in Hanumangarh district of Rajasthan.

Session on Statistical Genetics/ Bioinformatics.

− Das, Samarendra*, Meher, Prabina Kumar and Rao, AR. Reverse engineering and analysis of gene regulatory networks for salinity stress response in rice.

− Farooqi, Samir*, Sanjukta, RK, Mishra, DC, Singh, DP, Rai, Anil, Chaturvedi, KK Sharma, Naveen and Prabha, Ratna. Comparative genome analysis of halophilic and non-halophilic bacteria using codon usage bias based tools.

− Grover, Monendra*, Mishra, Dwijesh C and Srivastava, Sudhir. Quantum computation and biological stress.

− Kaur, Sukhdeep, Iquebal, MA, Sarika, Tandon, Gitanjali, Rai, Anil and Kumar, Dinesh. Salinity stress responsive candidate gene selection for introgression: A meta-analysis.

− Meher, Prabina Kumar* and Rao, AR. Evaluating the performance of machine learning classifiers for the prediction of donor splice sites in rice genomes.

− Mishra, Dwijesh Chandra*, Rajan, Veena, Srivastava, Sudhir, Kumar, Sanjeev and Rai, Anil. Support vector machine (SVM) based prediction model for protein-protein interaction using protein 3D structure and physicochemical properties.

− Paul, AK*, Paul, Ranjit Kumar, Prabhakaran, VT, Singh, Inder and Dhandapani, A. Comparison of different parametric and non-parametric stability measures for non-normal data.

− Shukla, Shantanu, Iquebal, MA, Sarika, Angadi, UB, Rai, Anil and Kumar, Dinesh. The onion genomic resource: A genomics and bioinformatics driven resources for extemporizing onion functional analysis and breeding.

− Srivastava, Sudhir, Mishra, DC, Lal, SB and Angadi, UB. A tool for protein structure comparison using elastic shape analysis.

d. **Contributed papers (Students)**

Session on Design of Experiments.

− Chetan*, Laxmi, Ratna Raj and Parsad, Rajender. Construction of design for mixture-of-mixture experiments under restricted region using central composite designs.

− Dasgupta, Pratyush*, Bhar, Lalmohan and Gupta, VK. Robustness of BIB designs for multi-response experiments against the loss of observations as per efficiency criterion.

− Datta, Anindita*, Jaggi, Seema, Varghese, Cini and Varghese, Eldho. Generalized row-column designs with factorial treatment structure.

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- Gopinath, Pratheesh P*, Parsad, Rajender, Gupta, VK and Mandal, BN. Two dimensional balanced sampling plan excluding adjacent units.
- Harun, Mohd.*, Varghese, Cini, Varghese, Eldho and Jaggi, Seema. Designs for breeding trials involving three-way crosses. (Mohd. Harun was awarded with an appreciation letter from the society for best presentation by students.)
- Roy, Himadri Shekhar*, Bhar, LM and Gupta, VK. A study on outliers in factorial experiments.

Session on Sampling Techniques.

- Guha, Saurav*, Chandra, Hukum, Sud, UC, Aditya, Kaustav and Lal, SB. Estimation of finite population total for outlier contaminated survey data.
- Islam, Sadikul*, Sud, UC, Ahmad, Tauqueer, Wahi, SD and Sudeep. An application of calibration approach for estimation of finite population ratio under two-phase sampling design.
- Kumar, Pankaj*, Kumar, Anil and Tikkiwal, GC. Measures of poverty using small area estimation in India.
- Moury, Pramod Kumar*, Ahmad, Tauqueer, Sud, UC, Sahoo, Prachi Misra and Lal, SB. Estimation of crop yield at tehsil level using double sampling regression approach under stratified two stage sampling design framework.

Session on Statistical Modelling and Applications.

- Banerjee, Rahul*, Gurung, Bishal, Singh, KN and Panwar, Sanjeev. Dynamics of area substitution of edible oilseeds in India.
- Lall, Shwetank*, Ghosh, Himadri and Prajneshu. Comparison of compound tweedie distribution and modified gamma distribution for rainfall modelling.
- Lama, Achal*, Jha, Girish K and Paul, Ranjit, Kumar. Forecasting agricultural commodity price volatility using GARCH model with structural break.

Session on Statistical Genetics/ Bioinformatics.

- Choudhary, Ram Kumar*, Rao, AR and Wahi, SD. Detection and testing of biennial rhythm in Mango.
- Deb, Chandan Kumar* and Sudeep. Classification tree based problem identification: Module for Agridaksh.
- Naha, Sanchita*, Sudeep, Malhotra, PK, Arora, Alka and Wahi, SD. Agent based crop variety selection recommender system.

- 101th Batch of FOCARS of 239 ARS probationers at ICAR-NAARM, Hyderabad on February 05, 2015.
  - Kumar, Dinesh. Applications of bioinformatics in increasing agri-productivity. (Invited talk)
- Workshop on Application of Bioinformatics in Life Sciences held during February18-20, 2015 at a) School of Biotechnology, Faculty of Science, BHU, Varanasi
  - Kumar, Dinesh. Digital biology and its applications in agriculture. (Invited talk)
    b) Department of Microbiology, Institute of Medical Sciences, BHU, Varanasi.
  - Kumar, Dinesh. Prediction of antimicrobial peptides by machine learning approach. (Invited talk)
- 17th Annual Conference on Statistics and Informatics for Smart Decisions in Managing Resources: Issues and Challenges held at BIMTECH, Bhubaneswar, Odisha during February 23-25, 2015.
  - Dash, Sukanta. Efficient row column designs for factorial experiments in two rows with orthogonal parameterization. (Invited talk)
  - Mandal, BN. An integer linear programming approach to construction of balanced treatment incomplete block designs. (Invited talk)

- − Sarkar, Ananta*, Sarkar, Susheel Kumar and Bhar, LM. Design of experiments: Need of the day. (Invited talk)
- − Bhar, LM. Cook-statistic in blocked design of experiments with correlated errors. (In the technical session of Experimental Designs). (Invited talk)
- − Paul, RK. Application of long memory time series models in agriculture. (In the technical session of Statistical Modeling). (Invited talk)
- − Das, Samarendra. Gene selection using support vector machines and MRMR filter for time-series gene expression data.
- − Gurung, Bishal. State space models for forecasting price volatility. (In the session "Challenges in Socio Economic Analysis") (Invited speaker)
- − Gurung, Bishal. Combining models to improve forecasting of price volatility. (Contributory paper)
- − Ahuja, Sangeeta. Robust performance ensemble in agroforestry research.
- − Arora, Alka. Rough set based approach for cluster analysis. (Invited Paper) in the session "Data Mining".
- 9th INDIACom; 2nd 2015 international conference on Computing for Sustainable Global Development at Bharti Vidyapeeth's Institute of Computer Applications and Management (BVICAM), New Delhi during March 11-13, 2015.
  - − Sarkar, Susheel Kumar* and Khanduri, Om Prakash. Information system of agricultural field experimentation in India.
- Workshop on Harnessing and Enhancing Quality of Agricultural Research organized by National Professor Unit at IASRI, New Delhi on March 25, 2015.
  - − Jaggi, Seema. Experimental designs for indirect effects of treatments and online software. (Invited talk)
  - − Parsad, Rajender. Applications of designs for factorial experiments in NARES and design resources server. (Invited talk)
  - − Varghese, Cini. Experimental designs for polycross trials. (Invited talk)

Participation

Krishi Vigyan Mela

The institute participated in the PUSA Krishi Vigyan Mela 2015 organised by IARI, New Delhi from March 10-12, 2015 and elevated a stall to exhibit its significant research findings and software. The stall attracted a huge number of visitors including farmers, students and entrepreneurs. Through live demonstrations and posters, the developed technologies were explained to the visitors. The Institute received "Best Stall Award" in the mela.

Conferences / Workshops / Trainings/ Seminars / Symposia etc.

- National level workshop on revision on methodology of Integrated Sample Survey on 05 January 2015 at Vigyan Bhawan, New Delhi. (Dr. UC Sud)
- Annual Workshop of AICRP-PHT during Session on Harvest and Post-Harvest Losses held at UAS Bangalore on January 08, 2015. (Dr. Anil Rai)

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* Presenter of paper

- Roundtable Technical Session with Dr. Stephan Brobst, CTO, Teradata Inc. on January 08, 2015. (Sh. KK Chaturvedi)
- 7th Agricultural Summit, "AGRI@8% - Challenges and Way out" on January 15, 2015 at Hotel Sanghrilla, New Delhi. (Dr Sanjeev Panwar and Sh. Bishal Gurung).
- One day workshop on Assessment of Harvest and Post-Harvest Losses of Major Crops and Commodities held on 23 January 2015 at IIT, Chennai. (Dr. UC Sud)
- 12th Agricultural Science Congress held on February 03-06, 2015 at National Dairy Research Institute, Karnal Commemorating the Silver Jubilee of National Academy of Agricultural Sciences.(Dr. UC Sud, Sh. SD Wahi, Dr. AR Rao and Dr. Sangeeta Ahuja)
- Workshop on IPv6 implementation in Departments of GOI at DoT on February 11, 2015. (Dr. Mukesh Kumar and Dr. Sudeep)
- 396th Academic Council Meeting of PG School IARI on February 19, 2015. (Dr. Seema Jaggi)
- Workshop on PME indicators and implementation strategy organized by NAAS, NAARM and IFPRI at NASC Complex, New Delhi on February 23, 2015. (Dr. Seema Jaggi)
- 17th Annual Conference on Statistics and Informatics for Smart Decisions in Managing Resources: Issues and Challenges held at BIMTECH, Bhubaneswar, Odisha during February 23-25, 2015. (Dr. LM Bhar, Dr. RK Paul, Dr. Alka Arora, Sh. Samarendra Das, Dr. Kanchan Sinha and Dr. Bishal Gurung)
- Workshop on Training Needs Assessment for HRD Nodal Officers of ICAR held at NAARM, Hyderabad on February 26, 2015. (Dr. Seema Jaggi)
- One day workshop on Synthesizing Statistical and Agricultural Sciences for Harnessing and Enhancing Quality of Agricultural Research organized by National Professor Unit at IASRI, New Delhi March 25 2015. (Dr. LM Bhar, Dr. Seema Jaggi, Dr. Rajender Parsad, Dr. Cini Varghese, Dr. Susheel Kumar Sarkar, Dr. BN Mandal, Dr. Eldho Varghese, Dr. Suksnta Dash, Dr. Arpan Bhowmik, Dr. UK Pradhan and Mr. Kader Ali Sarkar)
- Workshop on impact assessment of agricultural research and development on 17th March, 2015 at National Institute of Agricultural Economics and Policy Research (NIAP), New Delhi. (Dr. RK Paul)

Meetings

- Meeting on soil testing under the chairmanship of Additional Secretary, DAC, Ministry of Agriculture at Krishi Bhawan on January 14 (Dr. UC Sud), January 21 and January 28, 2015 and February 04, 2015. (Dr. Mukesh Kumar)
- Meeting with the Officials of FAO was held on January 20, 2015 through Skype regarding comments received and other related issues of the project such as Work plan for the field testing countries, Timelines for the submission of revised first Technical Report, second Technical Report and Expert Committee meeting etc. (Dr. UC Sud and Dr Tauqueer Ahmad)
- Meeting with Rajasthan State officials held at Rajasthan Bhawan, New Delhi on February 03, 2015 under the Chairmanship of Chairperson, Rajasthan Revenue Board in which issues relating to Crop Estimation Survey, Methodology for estimation of area under production of horticultural crops, Seed Feed and Wastage project etc. were discussed. (Dr. AK Gupta, Dr. Tauqueer Ahmad)
- Meeting with Sh. Sudhir Bhargava, Member, Governing Body, ICAR on February 04, 2015 in which the discussion regarding the field crop varieties released was held. (Dr. AK Gupta and Sh. DP Sharma)
- Meeting to discuss the issues related to development of protocols for evaluation of performance of varieties and development of IT platform for registration of varieties under the seed bill held on February 11, 2015 at ICAR (HQ) under the chairmanship of Additional Secretary, Department of Agriculture and Cooperation. (Dr. UC Sud and Dr. Alka Arora)

- Meeting with DG (ICAR) to review the progress of MIS/FMS and Unified Communication to be held at ICAR (HQ) on February 13, 2015. (Dr. UC Sud, Dr. AK Choubey, Dr. Alka Arora and Dr. Sudeep)
- 51st meeting of the School Board of the School of Sciences of Indira Gandhi National Open University on February 16, 2015. (Dr. Rajender Parsad)
- 86th Annual General meeting of ICAR on 18 February 2015 at NASC Complex, New Delhi. (Dr. UC Sud)
- 7th meeting of the Technical Committee on FASAL held on February 18, 2015 at Krishi Bhawan, New Delhi. (Dr. KN Singh)
- Meeting with World Bank representative held at IASRI on February 20, 2015 in which various issues relating to CAPI: survey solution software were discussed. (Dr. UC Sud and Dr. Tauqueer Ahmad)
- Expert Committee meeting on Agricultural Extension under National Agricultural Science Fund, ICAR held on February 20, 2015 at Krishi Anusandhan Bhawan-I, Pusa, New Delhi. (Dr. KN Singh)
- Meeting for presentation of Draft report on Harvest and Post-Harvest losses under the Chairmanship of Honorable Union Minister of Food Processing Industries in the Conference room of Panchshil Bawan, New Delhi on February 27, 2015. (Dr. Anil Rai)
- Inaugural Function of IARI Pusa Krishi Vigyan Mela on 10 March 2015. (Dr. UC Sud)
- Training Programmes Approval Committee in the Ministry of Statistics and Programme Implementation at Sardar Patel Bhawan, New Delhi on 10 March 2015. (Dr. UC Sud)
- Meeting on committee to examining the methodological issues in fixing minimum support prices on 11 March 2015 at ICAR Krishi Bhawan, New Delhi. (Dr. UC Sud)
- Meeting of the Apex Project Monitoring Committee (APMC) on 23 March 2015 at ICAR, KAB-II, Pusa, New Delhi. (Dr. UC Sud)
- Delivered a lecture in a one week capacity development programme for the scientists of National Agricultural Research System entitled Agricultural Statistical System in India on 25 March 2015 at NIAP, New Delhi. (Dr. UC Sud)
- Review meeting of Annual Action Plan 2015-16 for Mission for Integrated Development of Horticulture (MIDH) on 26 march 2015 at Krishi Bhawan, New Delhi. (Dr. UC Sud)
- Bureau of Indian Standards MSD3 meeting on 30 March 2015 at Manak Bhawan, New Delhi. (Dr. UC Sud)

CONSULTANCY /ADVISORY SERVICES PROVIDED

- Dr. Arpan Bhowmik advised Mr. Roshan Kumar, Technical Assistant, Central University of Punjab, Bhatinda who is currently doing his Ph.D. with Dr. Elumalai at Presidency College, Madras on the use of clustered analysis for grouping different microbial strian based on various physiochemical characters.
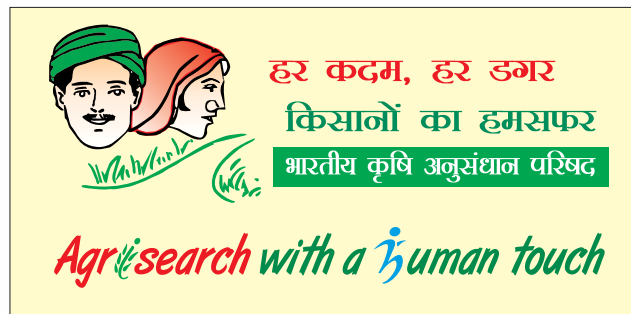
PERSONNEL

Congratulations on your Promotion

Name	Designation	Effective Date
Smt. Santra Devi	SSS	22.12.2013
Sh. Vijay Singh	SSS	04.01.2014
Sh. Budh Ram	SSS	26.03.2014
Sh. Shyam Swaroop	SSS	26.03.2014
Sh. Raghubir Singh	SSS	28.03.2014
Sh. Bhoop Singh	SSS	05.09.2014
Smt. Suman Popli (Under MACP-II)		

Transfer

Name	From/To	Effective Date
Ms. Megha Chopra, Assistant	From CIFT, Cochin to IASRI, New Delhi	12.01.2015
Dr. Sanjeev Panwar, Scientist	From IASRI, New Delhi To ICAR (HQ),New Delhi	05.03.2015

Wish you Happy Retired Life

Name	Designation	Effective Date
Sh. VH Gupta	Scientist	31.01.2015
Sh. AR Paul	Artist	28.02.2015
Smt. Usha Rani	Coder	28.02.2015
Sh. Hayat Singh	Assistant	28.02.2015
Sh. Rajnath	SSS	28.02.2015
Sh. Vijender Pal	SSS	18.03.2015(VRS)
Sh. Panna Lal Gupta	Assistant Chief Technical Officer	31.03.2015
Sh. Vikram Singh	PS	31.03.2015

हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

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