From Director’s desk

This Newsletter highlights salient features on training programs conducted, workshops organized and other significant activities performed at the Institute during the period under report.

A universal tool, PolyMorphPredict for polymorphic microsatellite marker discovery from whole genome and transcriptome data was developed which is freely available and can be accessed at http://webtom.cabgrid.res.in/polypred/. This tool can accelerate the in silico microsatellite polymorphism discovery in re-sequencing projects of any species of plant and animal for their diversity estimation along with variety/breed identification, population structure, MAS, QTL and gene discovery, traceability, parentage testing, fungal diagnostics and genome finishing.

Quantitative proteomic analysis revealed novel stress-associated active proteins (SAAPs) and pathways involved in modulating tolerance of wheat under terminal heat. 3600 proteins to be upregulated and 5825 proteins to be downregulated in both the wheat cultivars under heat stress have been identified. The identified SAAPs can be used for targeted protein-based precision wheat-breeding program for the development of ‘climate-smart’ wheat.

Suitable sampling methodologies for estimation of quantitative harvest and post-harvest losses of Capture fisheries (Marine and Inland) and Culture fisheries (Inland and Marine) have been developed which will provide reliable estimates of quantitative harvest and post-harvest losses of fish at different stages/channels of supply chain i.e. from production to consumption at maritime zone/province/State level and national level. Separate sampling design, sample size and estimation procedure have been proposed for “on-site” and “off-site” assessment of losses. It is expected that this methodology will be adopted by the developing countries in near future with FAO support for estimation of post-harvest losses of fish. The developed methodology will be helpful for FAO in achieving Sustainable Development Goals (SDG) 12.3 which seeks to halve food waste at the retail and consumer levels and decreasing post-harvest losses as an internationally agreed methodology is not yet developed and data are largely unavailable.

Two Mobile Apps viz. “IVRI-Vaccination Guide” and “IVRI-Pig Ration” App have been designed and developed in collaboration with ICAR-IVRI, Izatnagar. Six training programmes were
organized at the Institute in this quarter. During the period under report, the Institute has received one copyright on Resources Server. One scientist visited Tanzania to attend workshop on Small Area Estimation Techniques and its Applications held at Eastern Africa Statistical Training Centre, Dar Es. Salaam, Tanzania during 03-07 December, 2018 and Myanmar, to attend Expert Meeting on Improvement of Crop Statistics under Global Strategy to improve Agricultural and Rural Statistics organized by FAO of United Nations in Myanmar during 17-21 December, 2018.

Scientists of the Institute have provided Consultancy/Advisory services and participated in different Conference/Symposia/Workshop etc. in various capacities and also delivered invited lectures. It is hoped that the contents of the document would be informative and useful. Any suggestion for improving the contents of the newsletter further would be highly appreciated.

(Lal Mohan Bhar)
HONOURS/ AWARDS


- Dr. Cini Varghese, Dr. Seema Jaggi and Dr. Rajender Parsad paper received the Best Paper Award 2014-15 among the papers in the field of Design of Experiments published in Journal of the Indian Society of Agricultural Statistics during the 72nd Annual Conference of the Indian Society of Agricultural Statistics held at ICAR-Central Institute of Agricultural Engineering, Nabi Bagh, Bhopal, MP from 13-15 December, 2018:

- Dr. Sukanta Dash honored with Bharat Vikas Award in the occasion of National Seminar on Intellectuals Social Responsibility on 1st December 2018 at Bhubaneswar, Odisha for loyalty, diligence and outstanding performance in the field of Artificial neural Network and Multivariate Statistics.

- Dr. Samarendra Das, Dr. A.K. Paul, Sh. S.D.Wahi and Dr. Rohan Kumar Raman are awarded the Prize for their paper entitled A Comparative Study of Various Classification Techniques in Multivariate Skew-Normal Data Published in the Journal of the Indian Society of Agricultural Statistics, Volume 69, No.3, December, 2015. Paper has been adjudged the best among the papers in the field of Statistical Theory and Methodology and published in the Journal during the years 2014-2015. This was awarded by ICAR-CIAE, Bhopal on 13 Dec., 2018.

- Dr. A.K.Paul, Dr. Ranjit Kumar Paul, Dr. VT.Prabhakaran, Sh. Inder Singh and Dr. A Dhandapani are awarded the Prize for their paper entitled Performance of parametric and Non Parametric Stability Measures published in the Journal of the Indian Society of Agricultural Statistics, Volume 69,No3, December 2015. Paper has been adjudged the best among the papers in the field of Statistical Genetics and Genomics and published in the Journal during the years 2014-2015. This was awarded by ICAR-CIAE, Bhopal dated the Dec. 13,2018.

- Dr. Bishal Gurung, Dr. Prajneshu and Dr. Himadri Ghosh are awarded the Prize for their paper entitled Stochastic Volatility Model Fitting using Particle Filter: An Application Published in the Journal of the Indian Society of Agricultural Statistics, Volume 68, No.3, December 2014. Paper has been adjudged the best among the papers in the field of Applied Statistics and published in the Journal during the years 2014-2015. This was awarded by ICAR-CIAE, Bhopal dated the Dec. 13, 2018.

**RECOGNITIONS**

1. Hukum Chandra acted as Resource Person in the training programme on "Survey Research Methodology for Researchers and Faculty" during 08-10 October, 2018 at ICMR-NIMS, New Delhi.
2. Hukum Chandra acted as Expert Member, Advisory Committee on “Assessment of Zero Budget Natural Farming in Andhra Pradesh”, Centre for Economic and Social Studies, Hyderabad and Govt of Andhra Pradesh, 2018. Committee constituted by Govt of Andhra Pradesh.
3. Hukum Chandra acted as the Chairman of selection committee conducted interview of one Office Assistant on 17 October, 2018 at ICAR-IASRI, New Delhi.
4. Tauqueer Ahmad acted as Chairman, Selection Committee by the Director of the Institute for conducting Walk-in interview for the post of one RA/SRF and one YP-II under Crop Insurance project held on 24 October 2018 at ICAR-IASRI, New Delhi.
5. Prachi Misra Sahoo was nominated as Member, Selection Committee by the Director of the Institute for conducting Walk-in interview for the post of one RA/SRF and one YP-II under Crop Insurance project held on 24 October 2018 at ICAR-IASRI, New Delhi.
7. Hukum Chandra acted as Expert Member, Madras Institute of Development Studies and Department of Economics and Statistics, Govt. of Tamil Nadu, Chennai.
8. Hukum Chandra acted as Expert Member, Departmental Promotion Committee (DPC) constituted by ASRB for the assessments of the Scientists in the discipline of Agricultural Statistics at ICAR-CIFRI, Barrackpore, West Bengal on 15 November, 2018.
9. Rajender Parsad acted as External Expert for carrying out the Academic Audit for the session 2017-18 of the Department of Statistics, M.D. University, Rohtak. Meeting was held on 20 November, 2018.
11. Rajender Parsad acted as Member, Executive Council, National Academy of Agricultural Sciences till December 2019.


15. Arpan Bhowmik acted as an External Expert of a three members assessment committee for upgradation of Ms. Shruti Khus, Ph.D. Scholar, Department of Agricultural Extension, ICAR-IARI from JRF to SRF under BSR Scheme.

16. Arpan Bhowmik Rapporteur for Technical Session V on Unit Level Data in the Third National Workshop of Officer Incharge, Data Management (ICAR Research Data Repository for Knowledge Management) KRISHI during 4-5 December, 2018 organized by KRISHI project team at NASC and ICAR-IASRI, New Delhi.

17. Sukanta Dash acted as a Rapporteur for Technical Session III on Unit Level Data in the Third National Workshop of Officer In-charge, Data Management (ICAR Research Data Repository for Knowledge Management) KRISHI during 4-5 December, 2018 organized by KRISHI project team at NASC and ICAR-IASRI, New Delhi.


24. Tauqueer Ahmad was appointed as an External Examiner by Kashmir University, Srinagar for conducted Survey project viva-voce of M.Sc. final year students of Kashmir University, Srinagar, Jammu & Kashmir during 21-24 December, 2018.

26. Tauqueer Ahmad acted as as member, Technical Advisory Committee (TAC) for participating in meeting for Crop Insurance to be held on 27 December, 2018 at Krishi Bhawan, New Delhi.

27. Hukum Chandra received Fellow of Indian Society of Agricultural Statistics (FISAS), 2018 onwards.

28. Hukum Chandra was Resource Person in the workshop on “Small Area Estimation Techniques and its Applications” held at Eastern Africa Statistical Training Centre, Dar Es Salaam, Tanzania, during 03-07 December, 2018.

29. Hukum Chandra was Convener in the invited technical session on “Recent Advances in Analysis of Complex Survey Data”, in the 72nd Annual Conference of Indian Society of Agricultural Statistics at Bhopal, Madhya Pradesh during 13-15 December, 2018.


31. Hukum Chandra was invited Speaker in the International Conference on Emerging Innovation in Statistics and Operation Research 2018 held at Rohtak (Haryana) during 27-30 December, 2018.


VISITS ABROAD


NEW PROJECTS/ SCHEMES/ PROGRAMMES/ CENSUS/ SAMPLE SURVEYS/ EVALUATION STUDIES INITIATED AND COMPLETED

1. New Project proposal seminar was delivered by Md. Samir Farooqi on “Methodology for Trait Specific Genes Identification”.

2. Mohamad Sameer Farooqi, Prepared and submitted the RPP 1 of new project proposal on “Methodology for Trait Specific Genes Identification”.

3. Ramasubramanian V. presented a new institute project proposal entitled “Enhanced Classification And Regression Tree (CART) models for forecasting in agriculture” on 10 Dec., 2018 in DRC meeting.

4. Harish Kumar H V presented new project proposal titled “Institutional credit to agriculture in India: Surplus or Scarce?” at DRC meeting held on 10.12.2018.

**HUMAN RESOURCE DEVELOPMENT**

*Training programs organized*

<table>
<thead>
<tr>
<th>S.N.</th>
<th>TITLE</th>
<th>VENUE</th>
<th>PERIOD</th>
<th>NUMBER OF PARTICIPANTS</th>
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<tbody>
<tr>
<td>1.</td>
<td>Handling Large Scale Data and Data Analysis using R</td>
<td>ICAR-IASRI, New Delhi</td>
<td>08.10.2018 to 13.10.2018</td>
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<tr>
<td></td>
<td><em>Course Director</em> Dr. Hukum Chandra</td>
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<td><em>Co-Course Director</em> Dr. Pradip Basak</td>
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<td>2.</td>
<td>Advanced Sampling Techniques with Practical Examples from NSSO &amp; Health Surveys</td>
<td>ICAR-IASRI, New Delhi</td>
<td>29.10.2018 to 03.11.2018</td>
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<td></td>
<td><em>Course Director</em> Dr. Hukum Chandra</td>
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<td></td>
<td><em>Co-Course Director</em> Deepak Singh</td>
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<td>3.</td>
<td>Training programme on ICAR-ERP</td>
<td>ICAR-IASRI, New Delhi</td>
<td>08.10.2018 to 12.10.2018</td>
<td>23</td>
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<tr>
<td></td>
<td><em>Course co ordinators</em> Dr. Anshu Bharadwaj Dr. Alka Arora</td>
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<td></td>
<td><em>Course co ordinator</em> Dr. K.K. Chaturvedi</td>
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<td></td>
<td><em>Co course co ordinator</em> Mohammad Samir Farooqi</td>
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</tbody>
</table>
5. **Design of Experiments and Data Analysis**  
   **Course coordinators**  
   Dr. Seema Jaggi  
   Dr. Rajender Parsad  
   Dr. Anindita Datta  
   **ICAR-IASRI, New Delhi**  
   12.11.2018 To 11.02.2019  
   --

6. **Advances in Experimental Designs and Analysis**  
   **Course coordinator**  
   Dr. BN Mandal  
   **Co course coordinators**  
   Dr. Sukanta Dash  
   Dr. Anil Kumar  
   **ICAR-IASRI, New Delhi**  
   06.12.2018 To 26.12.2018  
   --

* Information not available

**CONFERENCES/ WORKSHOPS/ SYMPOSIA/ MEETINGS ETC. ORGANIZED**


2. Organized 72nd national conference of Indian Society of Agricultural Statistics during 13-15 December, 2018 at ICAR-CIAE, Bhopal (Dr. A.K. Paul as co organizing Secretary)

3. Organized the Workshop at KVK, Hazaribagh (Jharkhand) during 13-14 December, 2018. (Sh. S.N. Islam)

4. Organized a group meeting for 25 KVKs at ATARI, Kanpur during 17 December, 2018. (Sh. S.N. Islam)

**PUBLICATIONS**

**Research Papers**


Popular Articles

27. सुमीत सोव, सोली वर्णा, मो. हरभज, सीमा जगुरी एवं मो. हरभज एवं देवेन्द्र कुमार (2018) संयोजी परीक्षणों में परीक्षण उत्पादों की दो विवाह <= उपचार से तुलना देता संयोजित अभिकल्पनाएं / भारतीय कृषि अनुसंधान पत्रिका, 33(3): 218-220.

28. अर्जिलाल झा, सोली वर्णा, सीमा जगुरी, मो. हरभज एवं देवेन्द्र कुमार (2018) तीन प्रतिकृतियों वाली असमान यूनिट आकारों में समानयत आधिक संयोजित अपर्ण यूनिट (2) अभिकल्पनाओं की बाई श्रंखला / भारतीय कृषि अनुसंधान पत्रिका, 33(3): 161-164.

29. अर्षण भौगतिक, सीमा जगुरी, एल्ली वर्णा, सुशील कुमार यादव, मोहनदास हरभज, सोली वर्णा, अभिन्दिता दला एवं उदयवीर सिंह। विविधता के दो स्तंभों के अंतर्गत पद्धू परीक्षणों के लिए प्रकृति गृहु अभिकल्पनाएँ / भारतीय कृषि अनुसंधान पत्रिका / 33(3): 200-202 /


Reference Manual /Manual/ E-manual/Pamphlet


**Project Reports**


**LECTURES DELIVERED**

**Outside**

1. Delivered lecture on the topic of "Emerging areas- Small Area Statistics" in a training programme on "Survey Research Methodology for Researchers and Faculty" at ICMR-NIMS, New Delhi on 10 October, 2018.(Hukum Chandra)

2. Delivered an invited lecture on Estimation of Population Parameters-point estimate, interval estimate, confidence interval to the participants of the training programme entitled Survey Research Methodology for Researchers and Faculty organized jointly by ICMR-National Institute of Medical Statistics, New Delhi and Institute of Applied Statistics and Development Studies, Lucknow at ICMR-NIMS, New Delhi during October 08-10, 2018 (lecture was delivered on October 09, 2018) (Rajender Parsad).

3. Conducted an invited lecture and practical session on “Use of Phenomics resource databases and open access softwares for plant phenotyping” on 29 Oct 2018 in ICAR-short course on “Phenomics, the next generation phenotyping, for trait dissection and crop improvement” organized by ICAR-IARI, new Delhi.(Sanjeev Kumar)

4. Delivered invited lecture on “Time series analysis using R software” in 21 days Training Workshop entitled “Advances in Simulation Modelling and Climate Change Research towards Knowledge Based Agriculture” under ICAR-HRM Programme held during 13 November-03 December, 2018 at CESCRA, IARI and New Delhi. (Wasi Alam)

5. Delivered invited lecture on “Statistical tools for phenome data processing and data mining” in a Short Course for faculty training on phenomics from October 22-31, 2018: at ICAR-IARI, New Delhi.(Anil Rai)
6. Delivered a lecture regarding Country Experience on Master Sampling Frame: India, on 21 November, 2018 during Regional Training for SAARC Countries on Master Sampling Frames for Agricultural Statistics in Kathmandu. (Kaustav Aditya)

7. Delivered an invited lecture on Significance of Factorial Experiments and Web Resources in Agricultural Research at Department of Mathematics, IIT, Mumabi on November 26, 2018. (Rajender Parsad)


9. Delivered an invited lecture on Experimental Design and Data Management to the participants of the training programme on Breeding approaches for enhancing genetic gains in Grain Legumes and Dryland Cereals organized by Bioversity International-India officer during 10-14 December, 2018 at NASC Complex, New Delhi. (Rajender Parsad).


11. Delivered invited four lectures on 1. Genome annotation, 2. Signature development, 3. Antimicrobial peptide prediction in fishes, 4. Genomic data and IP issues and conducted practical sessions CAFT programme on Gene Mining Approaches and In Silico Functional Analyses during December 3-23, 2018 at ICAR-Central Institute of Fisheries Education, Mumbai. (Dinesh Kumar)

12. Delivered invited four lectures on Whole Genome Assembly , RAD data and marker discovery, Antimicrobial peptide prediction in fishes and Genomic data and IP issues and conducted practical sessions on following topics CAFT programme on Gene Mining Approaches and In Silico Functional Analyses during December 3-23, 2018 at ICAR-Central Institute of Fisheries Education, Mumbai. (MA Iquebal)

13. Delivered a lecture on “New techniques for use in operational crop yield forecasting” in IMD and Acharya N.G. Ranga Agricultural University, Andhra Pradesh on 6th December, 2018 at Regional Agricultural Research Station, Tirupati, Andhra Pradesh (K. N. Singh)

**PAPERS PRESENTED**

**Conferences**

*National Workshop on Sustainability of Indian Agriculture: Socio-Economic Perspective organized at NASC Complex by ICAR-NIAP, New Delhi on November 27, 2018.*
- Methodology for constructing composite index for sustainable agriculture (Rajender Parsad and B.M.K. Raju.)

*Twenty-Seventh International Conference of Forum for Interdisciplinary Mathematics (FIM) in conjunction on Interdisciplinary Mathematics, Statistics and Computational Techniques organized by Department of Statistics, University of Jammu, Jammu during November 02-04, 2018.*

- Significance of Factorial Experiments and Web Resources in Agricultural Research" (Rajender Parsad).


- Incomplete Split Plot Designs: Construction and Analysis. (B.N. Mandal)
- Response Surface Designs with Minimum Level Changes. (Arpan Bhowmik)
- Block Designs for Incomplete Factorial Treatment Structure with Two Factors (Rajender Parsad)
- On the construction of Balanced Latin Hypercube Designs (H. K. Nandi)

*V Biennial Workshop of AICRP on IFS on December 21, 2018.*

- Progress on statistical analysis techniques for on-station experiments of cropping and farming system. (Susheel Kumar Sarkar)
- An algorithmic approach to construct D-optimal saturated designs for logistic model (Seema Jaggi)
- Modelling and forecasting of price of rice in India using long memory time series model (R.K. Paul)
- Modelling and Forecasting of Non-parametric Time-series with Correlated Errors using Simple Data Driven Bandwidth Choice (Soumen Pal)
- Modelling and forecasting of price of rice in India using long memory time series model (R.K. Paul)
- Calibration Estimation of Finite Population Regression Coefficient under Two-stage Sampling Design Using Single Auxiliary Variable (Basak, P.)
- Small Area Prediction of Counts Under a Spatial Non-Stationary Generalized Linear Mixed Model. (Basak, P.)
• Estimation of Regression Coefficient using Calibration Approach with Multi Auxiliary Variables (Kumari V.)


• Mating plans for breeding programmes using generalized row-column designs. (Anindita Datta)
• Cost-efficient response surface designs. (Eldho Varghese)
• Affine resolvable partially balanced incomplete block designs. (Cini Varghese)
• Expression quantitative trait loci analysis in Barley. (Himadri Shekher Roy)
• Measuring nucleotide association: a statistical approach. (P.K. Meher)
• Wavelet based hybrid time series models and their applications. (R.K. Paul)
• Computational approaches to understand host pathogen interactions in foot-and-mouth disease (FMD) of cattle. (A. R. Rao)
• Application of Data Mining Techniques in Bioinformatics. (D.C. Misra)
• Big Data Handling in Agriculture: HPC, Hadoop or Spark. (K.K. Chaturvedi)
• Apache Spark for Bioinformatics Applications. (S.B. Lal)
• Development of computational tool for microsatellite DNA marker. (Sarika)
• Computational approach for breed and variety identification using molecular markers (M.A. Iquebal)
• The pattern and determinants of short term labour migration in India. (Anuja A R)
• Land Use Transformation Across Rural-urban Gradient of Bengaluru North - An Application of Markov Chain Analysis. (Harish Kumar H V)
• Diffusion modeling of tractor density in Indian State of Punjab. (Ravindra Singh Shekhawat)
• Comparative study between ARIMAX and Bayesian ARIMAX model. (Achal Lama)
Impact of RKVY Expenditure on State Plan Agricultural Expenditure: A Co-integration Analysis. (Rajesh T)

A hybrid wavelet based ANN-WNN model for forecasting Indian monsoon rainfall. (Mrinmoy Ray)

E-governance of Krishi Kalyan Abhiyan using KVK Portal. (Alka Arora)

IVRI-Pashu Prajanan App: A Tool for Knowledge Dissemination on Animal Reproduction. (Mukesh Kumar)

Data Sharing across Applications using Web API: Case Study of Mobile App and Web Portal. (Soumen Pal)

Application of AI in developing expert system on wheat crop management. (Sh. S. N. Islam)

Estimation of crop yield at district level from reduced sample size of villages out of population. (Aditya, K)

Small Domain Inference Combining Data from Two Independent Surveys. (Islam, S)

Improved Estimation of Finite Population Mean involving two auxiliary variables in two phase sampling with subsampling the nonresponder. (Chandra, H)

Outlier(s) imputation of survey data using calibration approach. (Kumar, R)

Estimation of Population Ratio using Calibration Approach. (Kumar, R)

Calibration Approach Based Estimation of Regression Coefficient using Auxiliary Data. (Kumari, V)

Technical Session

V Biennial Workshop of AICRP on IFS organized at University of Agricultural Sciences, GKVK campus, Bengaluru during 20-22 December, 2018.

Progress on statistical analysis techniques for on-farm nutrient response and farming system experiments (OFR 1, 2 &3) (Dr. Cini Varghese)

Invited Talk


Technology forecasting for envisioning Bt technology scenario in Indian agriculture
(Ramasubramanian V.)

- Learning Analytics for Academic Performance Evaluation" in the session on "Advanced Statistics
  (Shashi Dahiya)

**PARTICIPATION**

*International Conference/ Workshop/Symposium etc.*

- International Conference of Asia Pacific Federation for Information Technology in Agriculture (AFITA) and World Congress on Computers in Agriculture (WCCA) on Research Frontiers in Precision Agriculture held at IIT Mumbai during 24th to 26th October, 2018.
  (Mukesh Kumar, Anshu Bharadwaj and Mr. S.N. Islam)

  (Rajender Parsad)

- Tenth International Triennial Calcutta Symposium on Probability and Statistics (Celebrating the Birth Centenary of Prof. H. K. Nandi) organized jointly by The Calcutta Statistical Association and the Department of Statistics, Calcutta University during December 27-30, 2018 at the Department of Statistics, Calcutta University, Kolkata, India.
  (Seema Jaggi, Rajender Parsad, B.N. Mandal, Sukanta Dash, Arpan Bhowmik, R.K. Pau, Mrinmoy Rao, Pradip Basak)

  (Hukum Chandra)

**Conference/ Workshop/ Seminar/ Symposia/Training/Foundation Course/ Annual Day/ Lectures etc.**

- Hukum Chandra participated in a training programme on "Survey Research Methodology for Researchers and Faculty" at ICMR-NIMS, New Delhi during 08-10 October, 2018.

- Seema Jaggi and Rajender Parsad participated in Agri-Startup and Entrepreneurship Conclave on Unleashing Potentials in Agriculture for Young Agripreneurs (UPAYA) organized by Indian Council of Agricultural research at NASC Complex, New Delhi during October 16-17, 2018.
- Dinesh Kumar attended launch workshop on October 3, 2018 under research project Molecular markers for improving reproduction of cattle and buffalo funded by Bill and Melinda Gates foundation.
- Sarika attended launch workshop on October 3, 2018 under research project Molecular markers for improving reproduction of cattle and buffalo funded by Bill and Melinda Gates foundation.
- Mir Asif Iquebal attended launch workshop on October 3, 2018 under research project Molecular markers for improving reproduction of cattle and buffalo funded by Bill and Melinda Gates foundation.
- Rajender Prashad participated in National Workshop on Sustainability of Indian Agriculture: Socio-Economic Perspective organized at NASC Complex by ICAR-NIAP, New Delhi on November 27, 2018.
- Wasi Alam attended 21 days Training Workshop on “Advances in Simulation Modelling and Climate Change Research towards Knowledge Based Agriculture” under ICAR-HRM Programme held during 13th November– 3rd December, 2018 at CESCRA, IARI and New Delhi.
- U.B. Angadi as resource person attended workshop on feed resource mapping at ILRI, ICRISAT, Hyderabad, on 16 to 18th November 2018.
- K. N. Singh participated at 9th ARM on FASAL project jointly organised by IMD and Acharya N.G. Ranga Agricultural University, Andhra Pradesh on 6th December, 2018 at Regional Agricultural Research Station, Tirupati, Andhra Pradesh.
- Wasi Alam attended 21 days Training Workshop on “Advances in Simulation Modelling and Climate Change Research towards Knowledge Based Agriculture” under ICAR-HRM Programme held during 13th November– 3rd December, 2018 at CESCRA, IARI and New Delhi.
• Sudeep attended 72nd national conference of Indian Society of Agricultural Statistics during 13-15 December, 2018 at ICAR-CIAE, Bhopal.
• Anil Rai attended 72nd national conference of Indian Society of Agricultural Statistics during 13-15 December, 2018 at ICAR-CIAE, Bhopal.
• Cini Varghese and Susheel Kumar Sarkar participated in the V Biennial Workshop of AICRP on IFS organized at University of Agricultural Sciences, GKVK campus, Bengaluru during 20-22 December, 2018.
• Cini Varghese and Susheel Kumar Sarkar participated in the National Symposium on “Integrated Farming Systems for 3Es” organized at University of Agricultural Sciences, GKVK campus, Bengaluru during 23-24 December, 2018.
• Rajender Parsad, Seema Jaggi, Susheel Kumar Sarkar, Sukanta Dash, Arpan Bhowmik, Anindita Datta participated in the Third National Workshop of Officer Incharge, Data Management (ICAR Research Data Repository for Knowledge Management) KRISHI during December 4-5, 2018 organized by ICAR-IASRI at NASC, New Delhi.
• Tauqueer Ahmad attended 72nd ISAS conference as Chairman and Convener of the session of Geo-statistics and Remote Sensing at ICAR-CIAE, Bhopal during 13-14 December, 2018.
• Hukum Chandra attended workshop on “Small Area Estimation Techniques and its Applications” at Eastern Africa Statistical Training Centre, Dar Es. Salaam, Tanzania during 03-07 December, 2018.
• Prachi Misra Sahoo and Deepak Singh participated in the 72nd Annual Conference of Indian Society of Agricultural Statistics organised at ICAR-CIAE, Bhopal, Madhya Pradesh during 13-15 December, 2018.

Consultancy/Advisory Services Provided

• Ramasubramanian V. gave advice to Avinash Goyal, M.Sc. (Agricultural Physics) student of IARI on weather indices based regression modelling of Mustard yield prediction on 09.10.2018.
• U.B. Angadi
• Consultancy service project with International Livestock Research Institute (ILRI) is in progress and total consultancy fee is Rs.3,96,750/- for 23 man-days
- New consultancy service proposal “Development database and analysis tool for feed demand-supply assessment in Mali, West Africa” has been prepared with ILRI South_Asia Region, New Delhi and submitted the same for approval. Total consultancy fee is Rs.4,42,500/- for 25 man-days.

- Anil Rai providing consultancy project “The study on field testing of the developed guidelines on estimating post-harvest losses of horticultural crops, livestock products and fish and fish products” Funded by FAO, Rome.

- K.K. Chaturyedi providing the consultancy service to “Centre for Genetic Manipulation of Crop Plants (CGMCP)”, University of Delhi, South Campus, New Delhi for bioinformatics data analysis at ASHOKA.

- Himadri Shekher Roy analysis is done and given to M. C. Gupta, Scientist, Rasi Seeds (P) Ltd regarding path analysis, Genotypic correlation, phenotypic correlation, Divergence analysis etc.

- Anu Sharma provided consultancy to Rajesh Kumar Vaid, Principal Scientist, Veterinary Type Culture Collection, National Research Center on Equines, Sirsa Road, Hisar in analyzing their metagenome data.

- Anu Sharma Provided consultancy to Renu, NBAIM, Mau in analyzing their metaproteomic data.

- Anil Rai providing consultancy project “The study on field testing of the developed guidelines on estimating post-harvest losses of horticultural crops, livestock products and fish and fish products” Funded by FAO, Rome.

- M. A. Iquebal advisory services provided to Rukam Singh Tomar, Associate Professor, JAU, Junagadh regarding sample collection regarding transcriptome data analysis.

- Sarika advisory services provided to Reeta Bhatia, Scientist, IARI, New Delhi regarding molecular marker data analysis for phylogenetic analysis.

- Arpan Bhowmik advisory services provided to Mr. Gaurav Singh, SRF at Water Technology Centre, IARI and a Ph.D. Scholar in Amity University was advised on the use of Principal Component Analysis (PCA) with respect to 19 physiochemical variables affecting different sites in terms of pollution alongside Kali River water. The data pertaining to summer and winter season respectively and the analysis were carried out for both the seasons separately. Important determinants were identified in terms of pollution alongside Kali River water. Further, different polluting sites were grouped based on their similarity w.r.t. pollution. The groupings of different polluting sites were also verified using Hierarchical Cluster Analysis (HCA). Both PCA and HCA yields similar results.
• Arpan Bhowmik advisory services provided to Mrs. Chabi Gupta, a Ph.D. Scholar from XLRI, Jamshedpur on the use of Path analysis to study the cause effect relationship between different psychological variable under two different context.
• U.B. Angadi
• Consultancy service project with International Livestock Research Institute (ILRI) is in progress and total consultancy fee is Rs.3,96,750/- for 23 man-days
• New consultancy service proposal “Development database and analysis tool for feed demand-supply assessment in Mali, West Africa” has been prepared with ILRI South_Asia Region, New Delhi and submitted the same for approval. Total consultancy fee is Rs.4,42,500/- for 25 man-days.
• Anil Rai providing consultancy project “The study on field testing of the developed guidelines on estimating post-harvest losses of horticultural crops, livestock products and fish and fish products” Funded by FAO, Rome.
• Deepak Singh provided consultancy to Dr. Bansa Singh, ICAR- Indian Institute of Pulses Research, Kanpur for analysis for addressing environmental interaction towards exploration of resistance against root knot nematode in mungbean.
• Sh Deepak Singh provided consultancy to Principal Coordinator, MULLaRP ICAR-Indian Institute of Pulses Research, Kanpur for analysis for Multilocation trials for resistant genotypes to rust in lentil.
• Sh Raju Kumar provided consultancy to Archana Anokhe, Ph.D. student of Division of Entomology, Indian Agricultural Research Institute, New Delhi for analyzing the data for Bemisia tabaci (Gennadius) (Hemiptera: Aleyrodidae) population collected from different agro ecological zone.
• Sh Raju Kumar provided consultancy to Bansa Singh, ICAR- Indian Institute of Pulses Research, Kanpur for analysis for addressing environmental interaction towards exploration of resistance against root knot nematode in mungbean.

SOFTWARE DEVELOPED

Statistical and Geographic Information System/ Data bases/mobile apps developed

• R package pscGraph finalized for protein structure comparison using Graph partitioning (Method U.B. Angadi, M.A. Iquebal, Sarika, Anil Rai and Dinesh Kumar)

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• Sample Survey Resources Server (SW-9073/2017) (V.K. Gupta, U.C. Sud, Anshu Bharadwaj, Hukum Chandra and Rajender Parsad)
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