From the Director's desk ...

This Newsletter brings to you the key research achievements, awards and recognitions received, training programmes conducted, workshops and conferences organized/ attended, advisory services provided and significant publications of ICAR-IASRI during the period under report.

For improving the splice site prediction accuracy in plant species, developed a support vector machine based prediction algorithm by incorporating the secondary structures of the nucleotide sequence.

Developed webservers (i) RBPSpot (RNA-Binding-Protein-Spot): Learning on appropriate contextual information for RBP binding sites discovery and (ii) miRbiom: A Machine Learning Approach to Profile miRNAs; an information system SIReDAM (Systematic Information Resources for Dairy Animal Management):A dedicated Management Information System (MIS) for bovines; 08 Databases and 05 R Packages. In addition, work has also been accomplished during the reporting period on various aspects viz. Sampling methodology for 2019/20 Lao Agriculture Census, Partially balanced t-designs, Molecular interactions between 36 natural compounds and the Mpro of COVID-19, etc.

Institute organized three webinars and one workshop under Bharat ki Azadi Ka Amrut Mahotsav to celebrate India's 75 years of Independence and celebrated Kisan Diwas on December 23, 2021. The Institute initiated 09 new projects including Establishment of Centre for Bioinformatics and Computational Biology in Agriculture-BIC, 06 research projects were completed, 50 Research Papers, 01 Booklet and 03 Book Chapters were published. We congratulate Sh. Deepak Singh for receiving the Professor U.S. Nair Best Paper Presentation Award for the year 2021 for the oral presentation and Sh. Prakash Kumar for receiving the Young Scientist Award from Society for Scientific Development in Agriculture & Technology.

The scientists of the Institute brought recognitions to the Institute by way of serving as Expert Members in various high level committees, delivering invited talks in prestigious forums. Several training programmes were conducted in online mode and many lectures have been delivered by the Scientists in various online training programmes.

I earnestly hope that the contents of this Newsletter would be useful and informative to you all. Any constructive comments for better presentation of this newsletter are most welcome.

(Rajender Parsad)

RESEARCH ACHIEVEMENTS

Machine Learning Algorithm for Splice Site Prediction

- Developed a machine learning based prediction algorithm through which the splice site prediction accuracy can be improved in plant species by incorporating the secondary structures of the nucleotide sequence. For this, the support vector machine has been employed for splice site recognition in *Arabidopsis thaliana,* which is a model plant species. The prediction accuracies SVM have also been evaluated with other machine learning methods such as LogitBoost, Random Forest (RF), AdaBoost and XGBoost. The prediction accuracies of SVM, AdaBoost and XGBoost were observed to be at par and higher than that of RF and LogitBoost algorithms. All the computer programming codes written in R are available at https://github.com/meher861982/SSFeature.

Webserver Developed

- Developed a Machine Learning based webserver "**RBPSpot** (RNA-Binding-Protein-Spot): Learning on appropriate contextual information for RBP binding sites discovery" available at https://scbb.ihbt.res.in/RBPSpot/ in collaboration with CSIR-IHBT, Palampur. This work describes an approach to detect RBP binding sites in RNAs using an ultra-fast inexact k-mers search for statistically significant seeds. The seeds work as an anchor to evaluate the context and binding potential using flanking region information while leveraging from Deep Feed-forward Neural Network.

- Developed a webserver **"miRbiom:** A Machine Learning Approach to Profile miRNAs in collaboration with CSIR-IHBT, Palampur" available at https://scbb.ihbt.res.in/miRbiom-webserver and the standalone version available at GitHub repository (https://github.com/SCBB-LAB/miRbiom). This may be used to predict an accurate profile of the miRNAs without any need for miRNA-sequencing or array profiling experiments.

Databases Developed: 08

- *ParkRoxTDB*: Tree Bean (*Parkia roxburghii*) Transcriptome Database**:** an online relational database of cucumber (*Parkia roxburghii*) transcriptome (http://backlin.cabgrid.res.in/parkroxtdb/)
- *Levidb*: Genomics of Virus in Legume Crops**:** Viral diagnostics of legume crop (http://webtom.cabgrid.res.in/levidb/)
- *Millet SSR*: This computational tool stores catalogue of microsatellites fetched (http://webtom.cabgrid.res.in/millet_ssr_db/) from Pearl Millet, Fox Millet, Proso Millet and Sorghum Millet genome.
- **PMDlncRDB**: Pearl millet lncRNAs database**:** A web genomic resource, Pearl millet lncRNAs database
- **LncR-CsExSLDb**: LncRNA based Extended Shelf-Life Database for predicted lncRNA and circular RNA in cucumber (*Cucumis sativus*) transcriptome (in association with ICAR-IARI).
- *BSCM2TDb*: a database on water buffalo that contain the data generated from differential DNA methylation extracted from MeDIP-seq data (ICAR-CIRB, **ICAR-IASRI** and ICAR-NRCE);
- *BtChiLCVDb*: *Bemisia tabaci* Asia II 1 transcriptome database in response to chilli leaf curl virus and is an online relational database of Silverleaf whitefly (*Bemisia tabaci*) transcriptome (ICAR-IARI and **ICAR-IASRI)** and
- *SCMVTDb*: transcriptome-based Mosaic Virus Database in small or green cardamom that contains the information of differential expressed genes, microsatellites, variants, transcriptional factors, pathways, domain and families (ICAR-IISR and **ICAR-IASRI)**

R-packages Developed: 05

- **EEMDSVR**:Ensemble Empirical Mode Decomposition and its Variant Based Support Vector Regression Model. (https://cran.case.edu/web/packages/EEMDSVR/)
- **GreyModel**: Fitting and Forecasting of Grey Model.
- (https://cran.r-project.org/web/packages/GreyModel/index.html).
- **tsfngm**: Time Series Forecasting using Nonlinear Growth Models.
- (https://cran.r-project.org/web/packages/tsfngm/index.html).
- **LARGB**: Leaf Area Determination from Visual Image.
- (https://cran.r-project.org/package=LARGB).

- **FWRGB:** Fresh Weight Determination from Visual Image of the Plant available at https://cran.r-project.org/web/packages/FWRGB/index.html
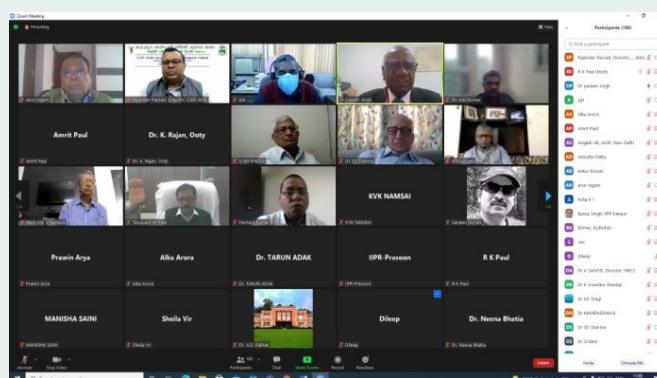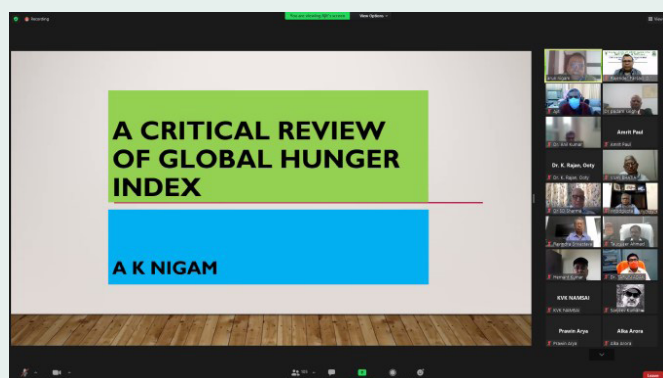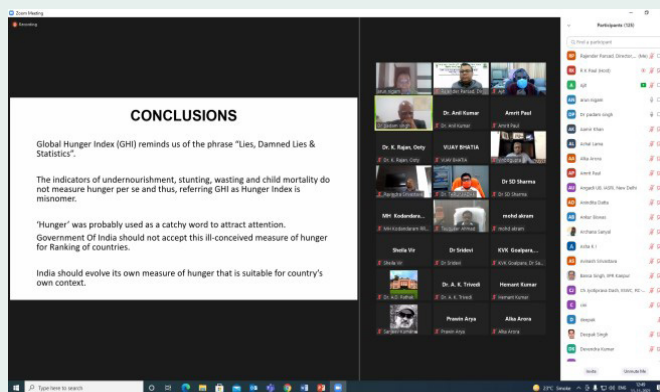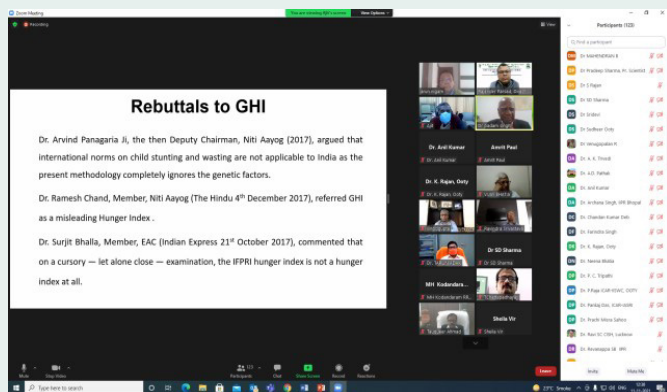
Others

- Sampling methodology for 2019/20 Lao Agriculture Census developed and has been recommended and adopted by Food and Agriculture Organization of the United Nations (FAO) for conducting Agriculture Census and generating estimates for parameters of interests for Lao, PDR.

- Developed two series of partially balanced t-designs using cyclic development of initial block(s) and their association with t-packing designs has been demonstrated.

- Reported the first extensive proteomic description of organ and developmental dissected Picrorhiza kurroa, providing a platform for future studies related to stress tolerance and medical applications. Picrorhiza kurroa being a rich source of phytochemicals, is a promising high altitude medicinal herb of Himalaya in collaboration with CSIR-IHBT, Palampur

- Developed **SIReDAM** (Systematic Information Resources for Dairy Animal Management) : A dedicated Management Information System (MIS) for bovines and made available at http://webtom.cabgrid.res.in/SIReDAM/.

- Performed the virtual screening to find out the molecular interactions between 36 natural compounds and the M^{pro} of COVID-19 in collaboration with ICAR-NBPGR. Four natural metabolites, namely, sesamin, sesaminol, and sesamolinol have been ranked as the top interacting molecules to M^{pro} of COVID-19 based on the affinity of molecular docking which may be evolved as promising therapeutics against COVID-19.

- Modules developed for online data submission (OFR 1, 2 & 3) were released by Dr. S. Bhaskar, ADG (Agronomy, Agroforestry and Climate Change), ICAR, on December 18, 2021.

PANORAMA OF ACTIVITIES

Azadi Ka Amrut Mahotsav Celebrations: Organized following 03 Webinars and one workshop

- Challenges in Agricultural Statistics System: Revisiting Agricultural Census and Surveys by Dr. Dalip Singh, Deputy Director General-Cum-Agriculture Census Commissioner, Govt. of India, Department of Agriculture and Farmers Welfare, Ministry of Agriculture and Farmers Welfare on October 07, 2021. Participants: 79 Faculty and Students from ICAR Institutes and SAUs and IASRI Alumni.

- Data Fusion using Statistical Matching of Complex Patterns by Professor Saumudipta Pyne,Health Analytics Network, and Department of Statistics and Applied Probability, University of California Santa Barbara, USA on October 27, 2021. Participants: 63 faculty and students from AUs and ICAR Institutes.

- A Critical Look at Global Hunger Index under the Chairmanship of Dr. Padam Singh, Formerly Additional Director General, Indian Council of Medical Research on November 11, 2021, Speaker: Professor AK Nigam, Formerly Principal Scientist, ICAR-IASRI and Consultant Advisor, Institute of Applied Statistics and Development Studies to commemorate the 75 years of India's Independence "Azadi ka Amrut Mahotsav". Participants 125 faculty and students from Agricultural Universities, ICAR Institutes and eminent Guests included Dr. VK Gupta, Former ICAR National Professor, Dr. SD Sharma, Dr. VK Bhatia, Former Directors, ICAR-IASRI, Dr. Sheila Vir, Public Health Nutrition and Development Centres and many more.
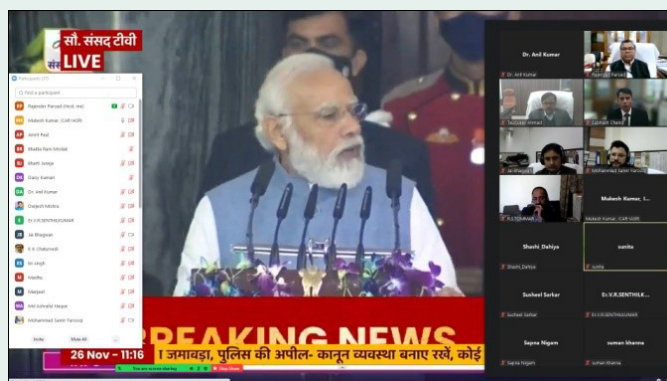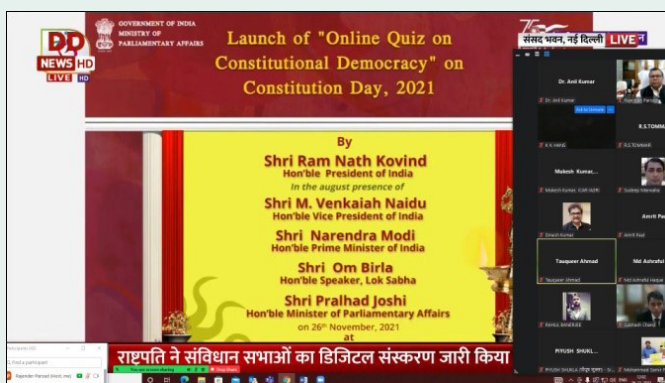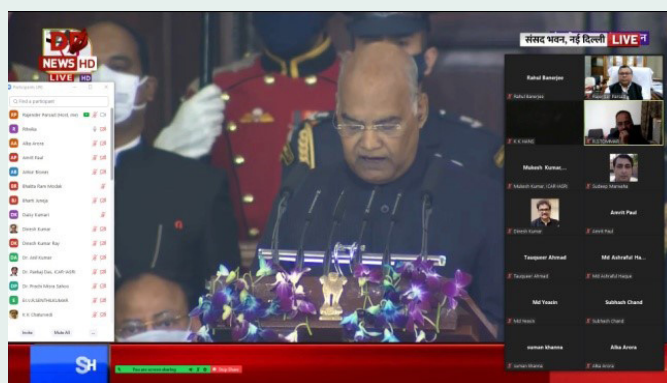
- Online workshop on Mobile Apps for Farmers on December 07, 2021 jointly with ICAR-ATARI, Ludhiana. KVK Portal, KVK App, ICAR Technology Mobile App, ICAR Video Gallery, Mobile Apps for Animal Sciences were demonstrated to the farmers by Dr. Rajender Parsad, Dr. Alka Arora and Dr Mukesh Kumar. Participants: 121 KVK Officials from 22 KVKs and 244 farmers. (Conveners: Dr Alka Arora and Dr Pragya Bahaduria)

Celebrations of Vigilance Awareness Week

- Vigilance Awareness Week was celebrated during October 26-November 01, 2021 on the theme "**Independent India@75: Self Reliance with Integrity**". All officers of the Institute took Integrity Pledge on October 26, 2021. During the week an online seminar on "Independent India @ 75: Self Reliance with Integrity" was delivered by Sh. S.K. Sinha, Chief Administrative Officer, ICAR-IARI, New Delhi on October 27, 2021. A poster with the theme "Public Interest Disclosure and Protection of Informer Resolution-2004 (PIDPI) was also displayed on notice boards and a power point presentation on the Do's & Dont's of CCS (Conduct) Rules was also uploaded on IASRI website to aware the staff of the Office.

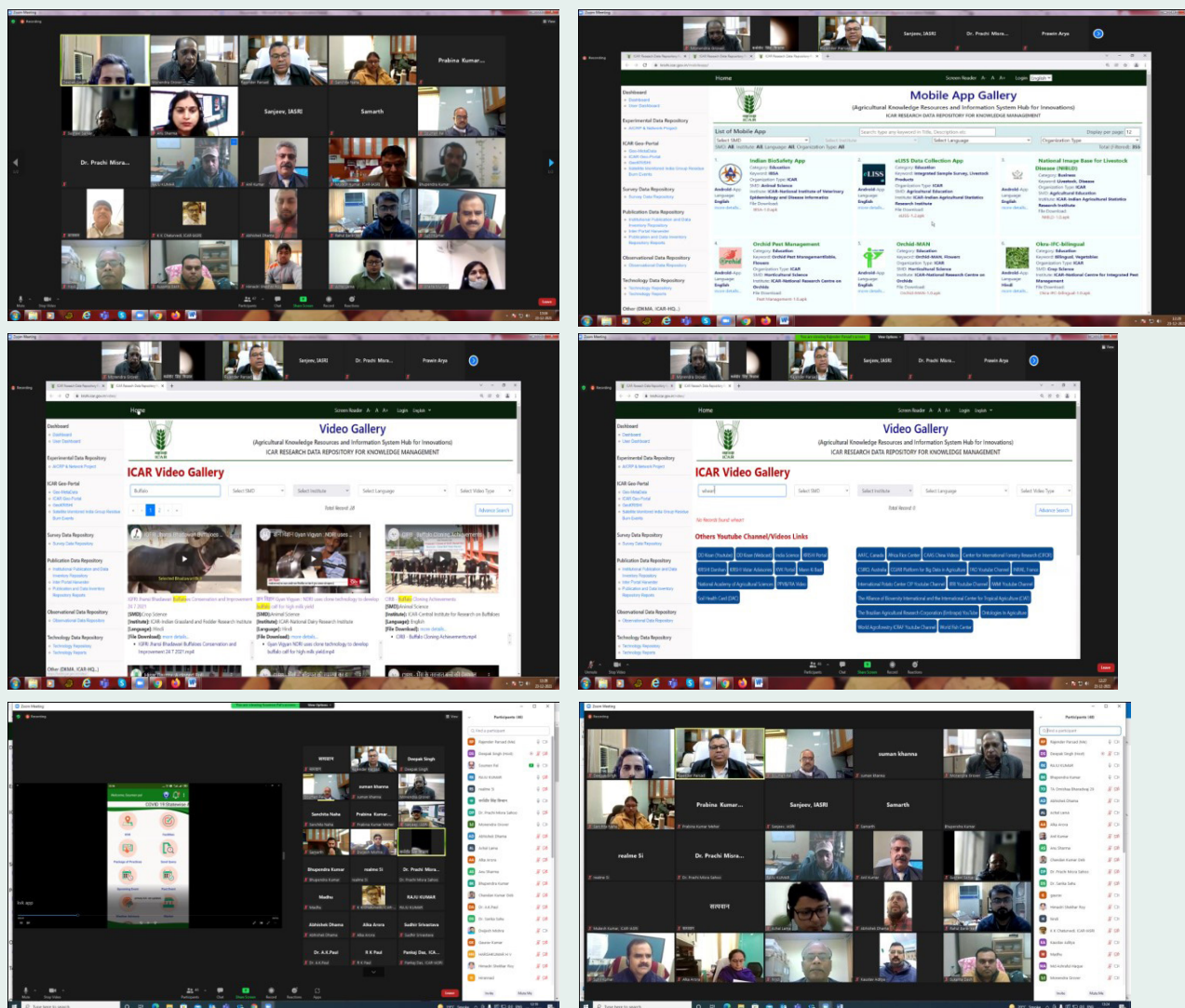## Celebration of Constitution Day 2021 and Pledge of Preamble

- Joined in the Celebrations of Constitution Day and read the Preamble of the Constitution along with the Honourable President of India on November 26, 2021.

Celebrated Kisan Diwas (National Farmer Day)

- Celebrated Kisan Diwas in online mode on December 23, 2021. Six members from farming community namely

Sh. Satyawan (Delhi), Sh. Bhupendra (Muzzafarnagar, U.P.), Sh. Karamvir(Hapur), Sh. Abhishek Dhama(Delhi), Sh Hiranand (Bhiwani, Haryana) and Mr. Gaurav (Haryana) were invited to share their experiences. Director, ICAR-IASRI addressed the meeting and felicitated the farmers. The Director also apprised them of various digital resources developed by IASRI and other ICAR institutes and demonstrated ICAR Video Gallery, ICAR Mobile App Gallery and ICAR Technology Repository. Dr. Soumen Pal demonstrated KVK app and KVK Portal. Sh. Sanjeev Kumar shared the brief of Kisan Sarathi. Dr. Sudeep shared the mobile apps related to veterinary sciences. Dr. Anil Kumar shared the details of the integrated farming project. The farmers while expressing their views lauded the efforts of ICAR scientists in generating microbial culture, organic farming, residue free management of crops, dryland farming, co-operative farming, drip irrigation, integrated farming systems, Gur and shakkar preparation, biogas plant, medicinal crops and farmer producer organizations. The farmers also stressed that more effective marketing system would be helpful in getting the better price. Farmers also stressed the need for further improvement in the famer-research community interaction.(Convener: Sh. Deepak Singh)

Swachhata Campaign

- **Special Swachhata Campaign during October 02-31, 2021**: The campaign was inaugurated on 2nd October by Honourable Minister of State for agriculture Sh. Kailash Chaudhury at ICAR-IARI Pusa ground. The Director and staff of ICAR-IASRI participated in Fitness Campaign Walkathon (5 km). Month long celebrations included a video show on Swachhata, Cleaning of individual rooms, corridors and premises, etc. Outdoor Special National Swachhata Campaign was organized in and outside IASRI Campus. The masks and literature sent by the council were distributed. This was followed by cleanliness drive in the areas adjoining the colony. On this special drive, a lecture was delivered by Sh. Abhishek Srivastava, Chief Administrative Officer, ICAR-IASRI on Record Management.

- **Swachhata Pakhwada** organized during 16-31 December 2021. Swatchhta pledge was taken on December 16, 2021. As part of Swatchhata Pakhwada following activities were performed by ICAR-IASRI Staff/Students and Contractual: Stock taking on digitization of office records/e-office implementation was undertaken. Review of progress on weeding out old records, disposing of old and obsolete furniture, junk materials and white washing/painting was conducted. Cleanliness and Sanitation drive was carried out in residential colony near IASRI campus. Staff members' participated in the above drive. The residents of the colony were counseled on cleaning of their premises and surroundings. Staff members' were requested to perform cleaning in their respective residential colonies and nearby market places. A video show was organized on Promoting Clean and Green Technologies online. The show was attended by staff members. The videos highlighted the importance of clean and green technologies in present scenario. As a part of Swatchata Pakhwada activities a video show was organized on recycling of water, online. The videos emphasized on conservation and recycling of water. The staff members attended the video show.

Others

- Observance of Rashtriya Ekta Diwas 2021 and National Integrity Pledge October 31, 2021.
- Communal Harmony Day (Sadbhavana Diwas) on November 19, 2021.

WORKSHOPS/WEBINARS/MEETINGS ETC. ORGANIZED

Workshops/Webinars

- Training programme on **DUS application** for PPVFRA Officials hybrid mode (online/in-person) during October 04-05, 2021. (Alka Arora).
- Six Webinars **on Implementation and Use of Agricultural Research Management System** (ARMS) were organized for Scientists of Crop Science Division, Agricultural Engineering, Agricultural Education and Natural Resource Management on October 20, 22, November 25 and December 02, 09 and 23, 2021. (SB Lal)
- **Roundtable Discussion on Flaws in Global Hunger Index** at National Academy of Agricultural Sciences, New Delhi on November 08, 2021 (Convener: Dr Mahtab S Bamji and Co-Convener: Dr Rajender Parsad)
- International Webinar on **Fostering Global Collaboration among Agricultural Hunger Educational Institutions** under NAHEP Component-2: Investments in ICAR Leadership in Agricultural Higher Education by ICAR-NAARM, Hyderabad and ICAR-IASRI, New Delhi during November 08-09, 2021.
- Online Review Workshop on **E-Learning PG Courses Call** – 1 (187 participants joined from 22 Agricultural University); Call - 2 (218 participants joined from 28 Agricultural University) on December 7, 2021 and Call-3 (405 participants joined from 45 Agricultural University) on December 10, 2021 under NAHEP Component-2 project "Investments in ICAR Leadership in Agricultural higher Education" for E-Learning.
- Online KRISHI partners Meet on December 23, 2021 under the chairmanship of DDG (NRM).

PUBLICATIONS

Research Papers

1. Ahmad T, Rai A, Sahoo PM, Jha SN and Vishwakarma RK (2021). Sampling methodology for estimation of harvest and post-harvest losses of major crops and commodities. *Journal of the Indian Society of Agricultural Statistics*, **75(1)**, 37-46. http://krishi.icar.gov.in/jspui/handle/123456789/71616

2. Banerjee M, Al-Eryani L, Srivastava S, Rai SN, Pan J, Kalbfleisch TS, States JC (2021).Delineating the effects of passaging and exposure in a longitudinal study of arsenic-induced squamous cell carcinoma in a hacat cell line model. *Toxicological Sciences,* **185(2)**, 184-196. https://doi.org/10.1093/toxsci/kfab129. Epub ahead of print. PMID: 34730829.

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4. Bhardwaj DR, Tahiry H, Sharma P, Pala N, Kumar D, Kumar A and Bharti (2021). Influence of aspect and

elevational gradient on vegetation pattern, tree characteristics and ecosystem carbon density in Northwestern Himalayas. *Land*, **10**, 1109.

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13. Ghosh S, Das TK, Shivay YS, Bhatia A, Md Yeasin, et.al. (2021). Conservation agriculture effects on weed dynamics and maize productivity in maize- wheat- greengram system in north-western Indo-Gangetic Plains of India. *Indian Journal of Weed Science*, **53(3)**, 244–251.

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Booklet

- Sudeep, Arora A, Bharadwaj A, Kumar M, Dahiya S, Islam SN, Pal S, Parsad Rajender, Kumar, P and Agrawal

RC (2021). Strengthening the Agricultural Education through Digital Interventions. IT Booklet by Division of Computer Application, ICAR- IASRI, New Delhi.

Book Chapters

- Singh D and Yadav R (2021). An efficient three parameter family of estimators of finite population mean in sample surveys. In: *Recent Advancements in Sampling Theory & its Application*. Eds. Dharmendra Kumar Yadav, Rohini Yadav, Susheel Kumar Singh and Ashish Kumar Shukla, MKSES Publication, Lucknow, UP, India.

- Kumar N, Kumar R, Samriya JK and Nigam S (2021). Digital Technologies: A Way Forward for Developing Gender Sensitive Agripreneurship. In: *Promoting Women Agripreneurship through Crop-Livestock-Fisheries Technologies* [E-book]. Eds Lipi Das et al. National Institute of Agricultural Extension Management (MANAGE) and ICAR- Central Institute for Women in Agriculture. 144-150.

- Kumar HVH and Reddy BVC (2021). Capital Formation Across the Rural–Urban Interface of Bengaluru North: An Economic Analysis. In: *The Rural-Urban Interface*. Eds Hoffmann E., Buerkert A., Von Cramon-Taubadel S., Umesh K.B., Pethandlahalli Shivaraj P., Vazhacharickal P.J. The Urban Book Series. Springer, Cham, 10.1007/978-3-030-79972-4_6.

PAPERS PRESENTED/LECTURES DELIVERED

Paper presented /Invited talk delivered in Conferences

- Workshop on Product profile development, trial management, digitization of plant breeding experiments and varietal release system organized by ICAR-IIOR Hyderabad on 11 October, 2021
  - Rajender Parsad*, Sukanta Dash and A. Dhandapani. AICRP data management, statistical analysis and interpretation. (Invited Talk)

- International conference on Recent Advances in Statistics (ICRAS-2021) organized online by the Department of Statistics, Sadguru Gadage Maharaj College, Maharashtra during October 11-12, 2021
  - Vinay Kumar L.N.*, Cini Varghese, Seema Jaggi, Mohd. Harun and Eldho Varghese. Efficient p-rep designs for comparing two distinct sets of lines in breeding trials.

- International Conference on Mathematical Sciences (ICMS 2021) organized by Department of Mathematics & Humanities, SVNIT, Surat during October 07-09, 2021
  - Raju Kumar. Identification of outliers in Presence of Masking in linear regression for Unclustered Survey Data.

- International Conference on Mathematics and Computation (ICMC-2021), Applied Sciences & Humanities Department, Rajkiya Engineering College, Kannauj, U.P. during October 22-23, 2021
  - Deepak Singh. An improved class ratio-product-ratio type of estimators for finite population mean using auxiliary information.

- International Conference on Advancements in Interdisciplinary Research (ICAIR-2021) organized by Shia PG College, Lucknow, UP during October26-28, 2021
  - Ranjit Kumar Paul. Wavelets Decomposition and Price Forecasting in Agriculture.

- 29th Annual Conference of the Agricultural Economics Research Association (AERA) organized by Odisha University of Agriculture & Technology (OUAT) Bhubaneswar, Odisha during October 27-29, 2021
  - Ranjit Kumar Paul. Machine learning techniques for predicting price of Brinjal in markets of Odisha, India. (Invited Talk)

- Online Workshop on Sustainable Biochar Production organized by ICRAF at Orissa on October 27, 2021.
  - B. N. Mandal. Introduction to Design of Experiments. (Invited talk)

- 2nd International Agrobiodiversity Congress held virtually during November 15-18, 2021
  - Anil Patidar, Mahesh C. Yadav*, Jyoti Kumari, Shailesh Tiwari, Munesh K. Kushwah, Mohd Harun, Vijay Paul, Gautam Chawla and B.S. Tomar. Identification and selection of climate-smart bread wheat germplasm

lines with enhanced adaptation to global warming.

– Anil Patidar*, Mahesh C. Yadav, Jyoti Kumari, Shailesh Tiwari, Munesh K. Kushwah and Mohd Harun. Morpho-physiologiacal charachterization of bread wheat accessions for heat stress tolerance under late sown conditions of north-western plain zone of India.

- International Symposium on Tropical Meteorology (INTROMET-2021) On changing climate: consequences and challenges to be organized by Cochin university of science and technology (CUSAT), Cochin, Kerala during November23-26, 2021.

  – Ranjit Kumar Paul. Modelling sub-divisional rainfall in India using deep learning techniques

  – Soumen Pal. District-wise Long-term trend analysis of rainfall pattern over Gangetic Region in West Bengal

- Fifth International Agronomy Congress on "Agri Innovations to Combat Food and Nutrition Challenges" organized jointly by Indian Society of Agronomy in Hybrid mode at Professor Jayashankar Telangana State Agricultural University, Hyderabad during November 23-27, 2021

  – SN Islam. Identifying appropriate IFS model for small and marginal farmers applying artificial intelligence and its extension to farmers through web and mobile application

  – Anil Kumar, Sukanta Dash* and Susheel Kumar Sarkar. On-station research experiments: Designing and analysis (the first session under the theme of integrated farming systems for sustainable peasant economy on November 23, 2021)

- Online Indo-French Knowledge Summit-3 organised and co-hosted Savitribai Phule Pune University in partnership with France's Centre National de la Recherche Scientifique (CNRS), and the Indo-French Centre for the Promotion of Advanced Research during November 24-26, 2021.

  – Alka Arora. AI for sustainable agriculture (Invited Talk).

- International Conference on Vegetables Research and Innovations for Nutrition, Entrepreneurship and Environment (ICVEG-21) organized by Indian Society of Vegetable Science (ISVS) held at ICAR-Indian Institute of Vegetable Research on December 14-16, 2021

  – Prakash Kumar. Development of more reliable non-parametric stability measures to a select stable variety: to overcome the impact of climate variation.

  – Ranjit Kumar Paul. Weather based prediction of thrips abundance on tomato using machine learning techniques.

- Seventh International Conference on Statistics for Twenty-first Century-2021 (ICSTC 2021) (Virtual mode) organized by Department of Statistics School of Phsical and Mathematical Sciences, Univeristy of Kerala, Trivandrum during December 15-19, 2021.

  – Raju Kumar. linear regression influence diagnosticsin presence of masking for clustered survey data. (lecture delivered on December 16, 2021)

  – Deepak Singh* and Rohini Yadav. An improved three parameter family of exponential estimators of finite population mean in sample surveys.

- International Conference on Recent Application of Statistical Techniques and Analysis (RASTA-2021) organized by Department of Statistics, Banaras Hindu University (BHU), Varanasi, UP during December 15-17, 2021

  – Rahul Banerjee. Algorithm construction of saturated D-optimal designs for nonlinear models in mixture experiments

- International Symposium on Plant Biotechnology Towards Improving Agri-Food Industry and Healthcare Products (ISPB-2021) organized by BIT-Meshra, Ranchi in collaboration with ICAR-IIAB, Ranchiduring October 27-30, 2021.

  – Sarika. Pprediction of antimicrobial peptides in black pepper using deep learning.

  – M.A. Iquebal. Whole genome based SSR markers from ddRAD-seq data of small cardamom for germplasm improvement.

- Annual Group Meeting of AICRP-IFS held during 18-20 December, 2021 at ICAR-IIFSR, Modipuram

  – Sukanta Dash. Brief description about online data entry and analysis of web application under OFR1, OFR2, OFR3 and OSR during the.

Lecture Delivered (Outside institute)

- One lecture on **Weather based decision support system for crop risk management** in training programme on Statistical genetics and basic statistics in python in sponsored by IDP-NAHEP, SKUAST-K organized at FoA, Wadura Jammu and Kashmir on October 01, 2021. (Prakash Kumar)

- One lecture on **Application of ML techniques in Price Forecasting using R** in the training programme on Data Analysis in Social Sciences Research for researchers / academicians working in social sciences organized by ICAR-NAARM, Hyderabad during October 4-8, 2021. (Ranjit Kumar Paul)

- One lecture on **Introduction to Design of Experiments** in the Workshop on "Sustainable Biochar Production" organized during October 26-29, 2021 at Odissa. On 27th October, 2021 on MS Team platform. (B.N. Mandal)

- One lecture on **Artificial Intelligence: Its role in agriculture and climate crisis in India** in the special lecture series organized by The Education Committee India, Islamic Cultural Centre Islamic Cultural Centre Lodhi Road, New Delhi on October 30, 2021. (Shashi Dahiya)

- Two lectures entitled (i) **Fundamentals of Design of Experiments**; (ii) **Factorial Experiments** and hands on session on both topics were delivered on December 03-04, 2021 to the participants of a training program on Data science using R-Software organized by SKUAST-K-LISA, Division of Agricultural Statistics in collaboration with IDP-NAHEP-SKUAST-K and LISA-2020 at Faculty of Horticulture, Shalimar, Srinagar during November 29- December 06, 2021 (Susheel Kumar Sarkar)

- Two lectures (i) **Correspondence Analysis** and (ii) **Survey Data Analysis** were delivered on November 30 and December 01, 2021 in the training program on Applications of Statistical and Econometric Techniques in Agriculture organized by Department of Agricultural Economics, CCS Haryana Agricultural University Hisar during November 24-December 14, 2021 (Deepak Singh).

- One lecture on **An introduction to National Image Base for Plant Protection (NIBPP) Mobile App** and one hands-on session in the KVK in Workshop on NAHEP Component 2 activities at UASB, Bengaluru. (Chandan Kumar Deb)

- Training Programme on Applications of Statistical and Econometric Techniques in Agriculture organized by Academy of Agricultural Research and Education Management, Directorate of Human Resource Management in collaboration with the Department of Agricultural Economics, CCS Haryana Agricultural University for Scientists/Teachers and extension personnel working in CCSHAU, Hisar and outstations/SAUs/ICAR Institutes during November 24 - December 14, 2021.
  - One Keynote talk on **Statistics, Web and Data**. (Rajender Parsad)
  - Four lectures on (i) **Fundamentals of Design of Experiments;** (ii) **Basic Principles of Design of Experiments;** (iii) **Testing of Hypothesis and** (iv) **Factorial Experiments** (Susheel Kumar Sarkar)

- One lecture on **Perspective on Evidence-based Research in Social Science** to the participants of the NAHEP-CAAST training programme on Time Series Techniques for Forecasting in Agriculture organized online by Division of Agricultural Economics, ICAR-IARI, New Delhi during December 1-10, 2021. (Rajender Parsad)

- Four lectures on (i) **Block Design**; (ii) **ANOVA**; (iii) **ANCOVA** and (iv) **MANOVA** and their practicals using R software were delivered on December 03-04-2021 in one-week training programme on "Data science using R-Software" for UG and PG students being organized by SKUAST-K-LISA, Division of Agricultural Statistics in collaboration with IDP-NAHEP-SKUAST-K and LISA-2020 at Faculty of Horticulture, Shalimar, Srinagar during November 29 to December 06, 2021. (Sukanta Dash)

- Online Training programme on **Applications of Statistical and Econometric Techniques in Agriculture** organized by Academy of Agricultural Research and Education Management (AAREM), Directorate of Human Resource Management (DHRM) in collaboration with the Department of Agricultural Economics, CCS Haryana Agricultural University, Hisar, Haryana during November 24 to December 14 2021
  - One lecture on **Testing of Hypothesis** (Arpan Bhowmik)
  - Two lectures on (i) **Regression Analysis and (ii) Machine Learning Techniques** (R.K. Paul)
  - Two lectures on (i) **Support Vector Machine and (ii) Spatio Temporal Time Series Modeling** (Mrinmoy Ray)
  - One lecture on **Overview of Sampling Techniques** (Ankur Biswas)
  - Two lectures (i) **Cluster Analysis** and (ii) **Principal Component Analysis in advance faculty** (Wasi Alam)

- – Lecture on **An Overview of Co-integration Analysis** on December 06, 2021 (Rajeev Ranjan Kumar)

- One lecture on **Multi-equation Time Series Model** was delivered on December 07, 2021 in an online training course on "Multi-equation time series model" organized under NAHEP-CAAST by Division of Agricultural Economics, ICAR-Indian Agricultural Research Institute, New Delhi during December 01-10, 2021 (Achal Lama)

- One lecture on **Time Series Analysis and Machine Learning Techniques** in the workshop Application of R Software in Agricultural Research under Faculty Development Training under NAHEP-IDP, CAEPHT, Ranipool, Gangtok, Sikkim during December 6-11, 2021. (R.K. Paul)

- One lecture on **ICAR Web applications in nutshell** in Training programme on Advances in web and mobile application development organized by ICAR-NAARM on December 07, 2021. (Alka Arora)

- One lecture on **Development of Mobile Applications for Agriculture** in training programme on Advances in web and mobile application development organized by ICAR-NAARM on December 07, 2021. (Sudeep)

- Brainstorming session on e-Office/Paperless office organised by Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth Dapoli on December 07, 2021.
  - – One lecture on **E-Extension Services.** (Alka Arora)
  - – One lecture on **e-Office Implementation in ICAR.** (Sudeep)

- Two lectures (online mode) on (i) **Split and Strip Plot Designs** and (ii) **Logistic Regression and Probit Analysis** in a training program on Statistical Designs and Analytical Methods for Multifactor Experiments organized by ICAR- Central Marine Fisheries Research Instituteunder the LBS Young Scientist Award project of ICAR during December 08-17, 2021(Arpan Bhowmik)

- One Keynote lecture on **ICT Applications** in a virtual training programme on Advances in web and mobile application development organized by ICAR-NAARM on December 10, 2021. (Anil Rai)

- One lecture on **Tests for Mean and Variance on Normal Distribution** at the Department of Microbiology in the School of Interdisciplinary and Life Sciences of Central University of Haryana, Mahendergarh on December 10, 2021. (Sarika)

- One Lecture on **Gene Expression Analysis using NGS Data** was delivered on December 13, 2021 in online Faculty Training on Molecular Biology Tools and It's Application in Agriculture & Allied Sciences at Centre of Excellence in Agri Biotechnology, Department of Biochemistry and Physiology, College of Biotechnology, Sardar Vallabhbhai Patel University of Agri. & Tech. Meerut during December 01-14, 2021. on December 13, 2021. (lecture (Sarika)

- One Lecture on **Marker discovery using NGS data and its application in Agriculture** was delivered on December 13, 2021 in online Faculty Training on Molecular Biology Tools and It's Application in Agriculture & Allied Sciences at Centre of Excellence in Agri Biotechnology, Department of Biochemistry and Physiology, College of Biotechnology, Sardar Vallabhbhai Patel University of Agri. & Tech. Meerut during December 01-14, 2021. (M.A. Iquebal)

- One lecture on **Testing of Hypothesis and Statistical Inference** to the participants of a training program on 4th Refresher Course in Research Methodology (IDC) in online mode organized by HRDC-JNU during December 06-18, 2021. (Susheel Kumar Sarkar)

- One lecture on the progress of the project **Planning, designing and analysis of experiments planned ON STATION under AICRP on IFS** during Annual Group Meeting of AICRP-IFS at ICAR-IIFSR, Modipuram organized in hybrid mode by ICAR-IIFSR during December 18-20, 2021. (Susheel Kumar Sarkar)

- One lecture on **Application of computational biology for a value added** course on Bioanalytical techniques for interdisciplinary research, Utkal University, Bhubaneswar on December 22, 2021. (Sunil Kumar)

PARTICIPATION

International Conference/ Workshop/Symposium etc.

- International Webinar Conference on Alternate Cropping Systems for Climate Change and Resource Conservation organised by ICAR-IIFSR, Modipuram, UP, during September 29 - October 01, 2021 (Prabina Kumar Meher)

- International Conference on Mathematical Sciences (ICMS 2021) organized by Department of Mathematics &

Humanities, SVNIT, Surat during October 07-09, 2021 (Raju Kumar)

- First International Conference on Mathematics and Computation (ICMC-2021), organized by Applied Sciences & Humanities Department, Rajkiya Engineering College, Kannauj, Uttar Pradesh, during October 22 - 23, 2021. (Deepak Singh)

- International Conference on Advancements in Interdisciplinary Research (ICAIR-2021) was organized by Shia PG College, Lucknow, UP during October26-28, 2021. (Ranjit Kumar Paul)

- International Symposium on Plant Biotechnology towards Improving Agri-Food Industry and Healthcare Products (ISPB-2021) organized by BIT-Meshra, Ranchi in collaboration with ICAR-IIAB, Ranchi during during October 27-30, 2021. (M.A. Iquebal and Sarika)

- International Webinar on Fostering Global Collaboration Among Agricultural Hunger Educational Institutions organized under NAHEP Component-2: Investments in ICAR Leadership in Agricultural Higher Education by ICAR-NAARM, Hyderabad and ICAR-IASRI, New Delhi during November 08-09, 2021. Patron for the Webinar. Guest of Honour during Inaugural function and President for Plenary and Valedictory Session. (Rajender Parsad, Sudeep, Achal Lama and Ramasubramanian, V.)

- Fifth International Agronomy Congress on Agri Innovations to Combat Food and Nutrition Challenges organized jointly by Indian Society of Agronomy, New Delhi and Professor Jayashankar Telangana State Agricultural University, Hyderabad during November 23–27, 2021. (Sukanta Dash)

- International Symposium on Tropical Meteorology (INTROMET-2021) on Changing Climate: Consequences and Challenges to be organized by Cochin university of science and technology (CUSAT), Cochin, Kerala during November23-26, 2021. (Ranjit Kumar Paul, Soumen Pal)

- International Conference on Vegetable Research and Innovations for Nutrition, Entrepreneurship and Environment (ICVEG-21) held at ICAR-IIVR, Varanasi, UP during December 14-16, 2021. (Ranjit Kumar Paul, Prakash Kumar, Sarika Sahu)

- Seventh International Conference on Statistics for Twenty-first Century-2021 (ICSTC 2021) organized by Department of Statistics, School of Physical and Mathematical Sciences, University of Kerala, Trivandrum during December15-19, 2021in a virtual mode. (Raju Kumar and Deepak Singh)

- International Conference on Recent Application of Statistical Techniques and Analysis (RASTA-2021) organized by Department of Statistics, Banaras Hindu University (BHU), Varanasi, UP during December 15-17, 2021 in an Online mode (Rahul Banerjee)

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

- Workshop on Food Balance Sheets (FBS) and its Potential Use for measuring undernourishment in India" organised jointly by Food and Agriculture Organization of the United Nations (FAO), Rome and Ministry of Statistics & Programme Implementation (MoSPI), Govt. of India in online mode during September 28 to October 1, 2021. (Tauqueer Ahmad, Kaustav Aditya, Ankur Biswas, Ranjit Kumar Paul)

- National Conference on Integrated Farming system: A Tool for enhancing Income and Nutritional Security by ICAR-Research complex for Eastern Region, Patna, Bihar(online) during October 05-07, 2021. (Sapna Nigam, Samarth Godara)

- 29th Annual Conference of the Agricultural Economics Research Association (AERA) organized by Odisha University of Agriculture & Technology (OUAT) Bhubaneswar, Odisha during October 27-29, 2021. (Ranjit Kumar Paul)

- Webinar for Scientists of ICAR Institutes on Implementation and Use of Agricultural Research Management System (ARMS)" SMD Agricultural Education, Agricultural Engineering and Natural Resource Management Online on October 22, 2021. (All Scientists)

- Online interaction of Secretary, DARE & DG, ICAR with ICAR Scientists on October 28, 2021. (All Scientists)

- Workshop on NAHEP Component 2 activities at UASB, Bengaluru at LH3, South Block, College of Agriculture, GKVK, Bengaluru during November 24-25, 2021. (Chandan Kumar Deb)

- Workshop on AI for Sustainable Agriculture organized under Indo-French Knowledge Summit-3 during 24-26 November 2021. (Alka Arora)

- One day orientation Workshop on NAARM's DRIVE Dashboard and National S&T Survey 2020-21 organized by ICAR-NAARM, Hyderabad on November 29, 2021. (Ramasubramanian, V. and U.K. Pradhan)

- National Workshop on Farmers' Income and Research Impact Assessment organized by ICAR-NIAP on November 29, 2021(Virtual). (Harish Kumar H.V. and Ranjit Kumar Paul)

- Hindi workshop on "कृषि में प्रतिदर्श तकनीकों का अनुप्रयोग एवं आंकडों का विश्लेषण" during November 30-December 02, 2021. (Sunil Kumar Yadav)

- Virtual Interaction Meeting (with young scientists of ICAR) with Secretary, DARE & DG, ICAR on December 08, 2021. (All young scientists)

- Annual Group Meeting of AICRP-IFS at ICAR-IIFSR, Modipuram organized in hybrid mode by ICAR-IIFSR during December 18-20, 2021. (Cini Varghese, Susheel Kumar Sarkar, Sukanta Dash, Arpan Bhowmik)

- Launch of ISSA (Indian Statistical Services Association) Website on December 22, 2021 at Centenary Lawns, Delhi Gymkhana Club, New Delhi. (Rajender Parsad)

Participation in Meetings

- Meeting of Joint Coordination Committee of KISAN-SARATHI under the Chairmanship of DDG (Agricultural Extension) on October 08, 2021. (Rajender Parsad and Anil Rai)

- NAHEP External Advisory Panel Meeting (online) organized by ICAR-NAARM, Hyderabad under the NAHEP on November 10, 2021. The agenda of the panel meeting was to appraise the progress and formulate the way forward for the achievement of the overall objective of NAHEP enhancing the quality and relevance of agricultural sciences. (Rajender Parsad, Sudeep Marwah, Alka Arora, Anshu Bharadwaj, Shashi Dahiya, SN Islam)

- Online meeting of the Board of Studies of the Department of Statistics & Operations Research, AMU, Aligarh on 20 November, 2021. (Tauqueer Ahmad)

- Data Validation Committee for Agricultural University Ranking System on and November 12, 18, 22, 26, 2021. (Alka Arora)

HUMAN RESOURCE DEVELOPMENT

Training Programmes/Workshops Organized

Trainings conducted:

S.No.	Title	Venue	Period	No. of Particpants
1	Statistical Techniques for Data Analysis in Agriculture (Course Coordinators: Ajit, Ranjit Kumar Paul and Soumen Paul)	ICAR-IASRI, New Delhi	October 04-13, 2021	125
2	Experimental Data Analysis (Coordinators: Cini Varghese, B.N. Mandal and Mohd. Harun)	ICAR-IASRI, New Delhi	October 20-29, 2021	16
3	Molecular Structure Simulation and Modelling (Program Director: Anil Rai; Coordinator: Sunil Kumar and U.B. Angadi)	ICAR-IASRI, New Delhi	October 27-30, 2021	72
4	Proteomics Data Analysis (Coordinator: K.K. Chaturvedi)	ICAR-IASRI, New Delhi	November 24-26, 2021	26
5	SNP Mining, GWAS and Genomic Selection (Coordinator : D.C. Mishra)	ICAR-IASRI, New Delhi	December 16-21, 2021	101

हिन्दी कार्यशाला

- राजभाषा संबंधी नियमों एवं उपनियमों की जानकारी देने हेतु राजभाषा नीतिः कार्यान्वयन विषय पर नवम्बर 26, 2021 को एक दिन की कार्यशाला का आयोजन : सहभागी 40 ।

- कृषि में प्रतिदर्श तकनीकों का अनुप्रयोग एवं आंकड़ों का विश्लेषण पर 30 नवम्बर 2021 से 02 दिसम्बर 2021 को प्रतिदर्श सर्वेक्षण प्रभाग द्वारा तीन दिवसीय हिन्दी कार्यशाला आयोजितः सहभागी 25 ।

Seminars Delivered

A total of 18 seminars on different areas of Agricultural Statistics, Computer Application and Bioinformatics which include presentations on new project proposals, salient findings of the completed research projects and Training undertaken at International level by the Scientists, Course/ Thesis/ ORW Seminars of students of M.Sc. and Ph.D. disciplines of Agricultural Statistics, Computer Application and Bioinformatics. The category-wise break-up is given below.

Category	Type of Seminar	Number
Scientist	Project Completion	4
	New Project Proposal	1
	Foreign Visit	
	General	
Student	Course	4
	ORW	
	Thesis	9
Total		**18**

Internship Programme

– Two M.Sc. Bioinformatics (Mr. Siddhartha Hati and Mr. Himanshu Behera) students of OUAT, Bhubaneswar worked as Interns/Trainee for their dissertation work during September 09, 2021 to December 24, 2021 under the guidance of Dr. Prabina Kumar Meher. The title of the study for Mr. Siddhartha Hati was **A Computational Study on Identification of Root-associated Protein in plants** and for Mr. Himanshu Behera was **Identification of Plant Species through machine Learning Approach using DNA Barcode**.

CONSULTANCY/ADVISORY SERVICES PROVIDED

- Achal Lama advised Sh. Vanlalhruaia, Ph.D. student, Plant Pathology Dept., BCKV, Mohanpur, Nadia, West Bengalto model and forecast disease incidence on rice crop using gompertz and logistic regression models in R.

- Pankaj Das advised Jaswinder Singh Brar, Principal Fruit Scientist, Punjab Agricultural University, Ludhiana in data analysis.

- Rahul Banerjee advised Ashish Rout, Scientist of ICAR-IINRG, Namkum, Jharkhand in analysis of Augmented Designs.

- Bharti provided advised to farmers on cultivation of wheat crop and decomposition of crop residue.

- Prakash Kumar advised Kanupriya, Scientist, ICAR-IIHR, Bangalore (Karnataka)on Descriptive statistics, Correlation between morphological and biochemical traits, PCA, Clustering and Mantels test for analysis of morphological, biochemical and molecular diversity in karonda (Carissa carandas L.) germplasm.

- M.A. Iquebal advised (i) Suman Lata, Scientist, ICAR-IARI regarding SSR markers and its validation in bhindi; (ii) RK Yadav, Scientist, ICAR-IARI regarding SSR markers and its validation in bhindi; (iii) Amlendu Ghosh, Senior Scientist, ICAR-IARI regarding metagenome and meta-transcriptome analysis.

- Sarika advised (i) Muraleedhar S. Aski, Scientist, ICAR-IARI regarding transcriptome data analysis in lentil; (ii) Prachi Yadava, Scientist, ICAR-IARI regarding SNP data analysis in drosophila; (iii) MS Saharan, Principal Scientist, IARI regarding secretome analysis.

- Ramasubramanian V. advised (i) Dr.K.Prabakaran, Assistant Professor (Agrl.Statistics), Agricultural College & Research Institute, Madurai regarding weather indices based regression modelling for forecasting crop yields; (ii) Mr. Dhande Kranthi Kumar, Ph.D. (Fisheries Economics) student of ICAR-CIFE, Mumbai regarding his part of thesis work on Forecasting Future Prospects of Fish and Paddy Production in Andhra Pradesh using VAR model.

- Himadri Roy analyzed data provided by Utpal Ekka, Scientist, Division of Agricultural Engineering, ICAR-IARI, New Delhi.

- Prakash Kumar advised Pritee Singh, Scientist, ICAR-IIHR, Bangalore on Evaluation of bioactive constituents of Garcinia indica (kokum) as a potential source of hydroxycitric acid, anthocyanin, and phenolic compounds germplasm data.

- Samarendra Das advised (i) Prativa Sahu, Scientist, ICAR-IIWM, Bhubaneshwar on the experimental designs for conducting experiments of Dragon fruit in fields.; (ii) Aanchal Malahotra, Ph.D. Candidate, University of Louisville, USA statistical methods and analysis for mapping and quantification of miRNA reads (for human studies).

- Kaustav Aditya advised Subrat Behera, Asstt. Prof, Bihar Agriculture University, Sabour, Bhagalpur about CCE in the State of Bihar.

- Rahul Banerjee advised Datta Bawaskar Madan, Scientist-B, BSMTC Balaghat, BTSSO, Central Silk Board, Ministry of Textiles, GoI in conducting PCA and Discriminant Analysis.

- B.N. Mandal advised a Ph.D. student from Horticulture Division on analysis of repeated measures data along with arc sin transformation for percent data recorded in an experiment conducted using completely randomized design. Analysis procedure was suggested and multiple comparison test using Tukey's HSD test was advised. Finally graphical representation was also suggested to represent the results of multiple comparison procedure.

- Mohd Harun advised (i) Ph.D. Student on analysis of data via an experiment on Hemp Varietal Trial conducted to determine the ranking, each for transplant and clone group. There were 26 varieties under the first group and 14 under the later. The data was collected on characters like Plant Height at five different physiological stages, Dry Weight (kg/plant), Floral Yield (Kg/plant), Avg. Flowering (days) etc. The one-way analysis of variance was done and post-hoc test was also performed for both the groups and separately for each of the characters; (ii) Ph.D. Student Muzaffar Hasan regarding a study on Anthocyanin extraction from plant by-products and evaluation of the anthocyanins through split plot design. The experiment was conducted under a split-plot design set up with solvent extraction methods as main plot factor and different anthocyanin extracts as sub plot factor. The solvent extraction methods (CSE and MAE) are taken as the two levels of main plot factor as they are hard to change factors and needed to be compared with higher precision in comparison to anthocyanin extracts considered as levels of sub plot factor. The ANOVA was performed for the data obtained through the experimental design for various biochemical parameters.

- Prakash Kumar advised Anuja AR, Scientist (Agricultural Economics), Socio Economic Evaluation and Technology Transfer Division, ICAR- Central Marine Fisheries Research Institute, Kochi, Keralaon web scraping and article mining in python for key words related to marine fisheries sector and COVID-19 for a 6 month period - since March 2020 data.

- Samarendra Das advised Prativa Sahu, Scientist, ICAR-IIWM, Bhubaneshwar regarding the experimental designs for conducting experiments of Dragon fruit in fields.

- Wasi Alam advised Sneh Devra, M.Sc. student, Agricultural Statistics at Junagdh Agricultural University, Junagdhon Time Series Forecasting By Combining ARIMA and ANN

- Rajeev Ranjan Kumar advised Dr. Sandhya Sanad, scientist, ICAR-NRCPB, related to principal component analysis, correlation analysis using "R software".

- Rahul Banerjee advised Ashish Rout, Scientist, ICAR-IINRG, Namkum, Ranchi in conducting factorial ANOVA and Split Plot analysis.

- D.C. Mishra advised (i) Gyan Prakash Mishra, Principal Scientist, ICAR-IARI regarding transcriptome data analysis; (ii) Harshvardhan Chaudhary, Principal Scientist, ICAR-IARI regarding SNP data analysis; (iii) Navin Chandra Gupta, Senior Scientist, NIPB regarding secretome data analysis and (iv) Aneet Kaur, Scientist, NRC on Yak regarding transcriptome data analysis.

AWARDS AND RECOGNITIONS

Awards

Deepak Singh

- Professor U.S. Nair Best Paper Presentation Award for the year 2021 for the oral presentation on the topic entitled "An improved three parameter family of exponential estimators of finite population mean in sample surveys" (Deepak Singh and Rohini Yadav) in "Seventh International Conference on Statistics for Twenty-first Century-2021" organized by International Statistics Fraternity (ISF), Department of Statistics, University of Kerala, School of Physical & Mathematical Sciences, the University of Kerala during December 15-19, 2021.

Prakash Kumar

- Received Young Scientist Award on the occasion of International Web Conference on Global Research Initiatives for Sustainable Agriculture and Allied Science) organized by Society for Scientific Development in Agriculture & Technology on December 13, 2021.

Recognitions

Rajender Parsad

- Nominated as Treasurer, National Academy of Agricultural Sciences for January 01, 2022-December 31, 2024.
- Co-Chair, Symposium on Big Data for Smart Agriculture during the Fifth International Agronomy Congress (IAC) on Agri-Innovations to Combat Food and Nutrition Challenges held in a Hybrid mode at PJTSAU, Hyderabad, Telangana during 23-27 November 2021 (Session was held on November 25, 2021)
- Guest of Honour during Inaugural function and President for Valedictory function of the International Webinar on Fostering Global Collaboration Among Agricultural Hunger Educational Institutions organized under NAHEP Component-2: Investments in ICAR Leadership in Agricultural Higher Education by ICAR-NAARM, Hyderabad and ICAR-IASRI, New Delhi during November 08-09, 2021.

Anil Rai

- Expert member of a National level Committee on Mission Mode in the domain of Precision Agriculture constituted by CSIR under the Chairmanship of Ex- Secy (DARE) and DG, ICAR.
- Chairman of ICT Implementation and Organizational Management Committee of ICAR, New Delhi.
- Chaired a session on "Precision Agriculture & Climate change" in International Potato e-Conference – New Paradigms in Food Security and Industrial Applications. Organized by ICAR-CPRI, Shimla on November 24, 2021.

Alka Arora

- Member, Technical Committee and Rapporteur for the Brainstorming Session "Implementation of Global collaborative Partnerships" in International Webinar on Fostering Global Collaborations Among Agricultural Higher Educational Institutions at ICAR-NAARM and ICAR-IASRI (under NAHEP Component 2) during November 08-09, 2021.

NEW PROJECTS/ SCHEMES/ PROGRAMME/ CENSUS/ SAMPLE SURVEYS/ EVALUATION STUDIES/ SOFTWARE DEVELOPED/ INITIATED/ COMPLETED

New Projects Initiated

1. 'Establishment of Centre for Bioinformatics and Computational Biology in Agriculture-BIC'. DBT Funded, w.e.f. December 16, 2021. (**Anil Rai**, Sunil Kumar, KK Chaturvedi, Sanjeev Kumar, MA Iquebal, Sarika, Anu Sharma, Dinesh Kumar, Monendra Grover, DC Mishra, Samir Farooqi. UB Angadi, Sudhir Srivastava, Neeraj Budhlakoti)

2. 'Diversified Farming through Livestock and Agriculture under Farmer Farm, Innovations, Resources, Science and Technology Programme (ICAR-CIRB Farmer First)'. Funded by Farmer First programme, ICAR, w.e.f. November 25, 2021. (**Anil Kumar**, Sukanta Dash)

3. 'Development of Artificial Intelligent based Computational Tools for Genomic Data Analysis in Domestic Animal Species'. Funded by LBS outstanding young scientist scheme, w.e.f. November 12, 2021. (**MA Iquebal**)

4. 'Efficient Designs for Double Cross Experiments under Fixed/Mixed Effects Model', w.e.f. November 11, 2021. (**Md. Harun,** Cini Varghese)

5. 'Development of Artificial Intelligence integrated Big-Data based System for Automatic Query-response Generation and Analysis of Indian Farmers' Queries, w.e.f. December 09, 2021. (**Samarth Godara**, Madhu, Sanchita Naha)

6. 'Development of Spatio-Temporal Neural Network Models for forecasting Space-time data', w.e.f. December 21, 2021. (**Mrinmoy Ray**, KN Singh, Kanchan Sinha, Rajeev Ranjan Kumar)

7. 'An Effective Approach for Combining Time Series and Deep Learning Models', w.e.f. November 25, 2021. (**Ranjit Kumar Paul** and Md. Yeasin).

8. 'Development of Machine learning models and Bayesian network for discovery of Nucleic acid-binding protein and their application in disease/pest surveillance', w.e.f. November 25, 2021. (**Upendra Kumar Pradhan**, Samarendra Das and Prabina Kumar Meher)

9. 'Statistical Approaches for Analysis of Zero-inflated and Over-dispersed Counts Data and their application in single cell studies', w.e.f. November 25, 2021. (**Samarendra Das**, Upendra Kumar Pradhan, Sudhir Srivastava and Prakash Kumar)

Completed Project:

1. 'Crop diversification: Pattern, determinants and its impact on nutritional security in India' completed on October 01, 2021.

2. 'Role of research and development in Indian agriculture: An economic analysis' completed on October 01, 2021.

3. 'Prospects of irrigation in India: Trends, determinants and impact on agricultural productivity' completed on October 01, 2021.

4. 'ICT based extension strategies for nutrition sensitive agriculture in the states of UP and Odisha' funded by NASF. completed on October 31, 2021.

5. 'Plant source based environmentally safe crop protection and production technologies: Development and capacity building under the Niche Area of Excellence (NAE) Programme of ICAR at IARI, New Delhi' completed on December 31, 2021.

6. 'Modelling dynamics of institutional credit to agriculture in India' completed on December 28, 2021.

PERSONNEL

Congratulations on your Promotion/ New Assignment/ New Joining

Name	Designation	Effective date
Smt. Megha Chopra	Assistant Administrative Officer	December 09, 2021
Sh. RA Joshi	Chief Technical Officer	December 29, 2021
Sh. Bhakt Ram Modak	Chief Technical Officer	December 29, 2021
Sh. Udaivir Singh	Chief Technical Officer	December 29, 2021
Ms. Jyoti Gangwani	One Advance Increment	December 29, 2021
Sh. UC Bandooni	One Advance Increment	December 29, 2021
Sh. Gyan Singh	One Advance Increment	December 29, 2021

Wish you a Happy Retired Life

Name	Designation	Effective date
Sh. U.C. Bandooni	CTO	October 31, 2021
Smt. Harsh Kapoor	Assistant Administrative Officer	October 31, 2021
Sh. Jot Singh	SSS	November 30, 2021

Transfer/Deputation/ Resignation

Name	Designation	Effective date
Sh. Shivaswami G.P.	Scientist	October 01, 2021 (Transferred to ICAR-NDRI, RS, Bengaluru)
Sh. Rajesh T.	Scientist	October 01, 2021 (Transferred to ICAR-NDRI, RS, Bengaluru)
Dr. Vandita Choudhary	Scientist	October 16, 2021 (Transferred to ICAR-CAZRI, Jodhpur)
Dr. Dinesh Kumar	Principal Scientist	December 02, 2021 (On Deputation to CAU, Haryana)