



- Research Achievements
- Papers presented/Lectures Delivered
- Consultancy/Advisory Services
- Copyrights/MOUs
- Panorama of Activities
- Participation in Conferences
- Awards and Recognitions
- Personnel
- Publications
- Human Resource Development
- Projects Initiated/Completed

## 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.

The Institute has developed (i) geographically weighted regression (GWR) model-assisted integrated estimator of finite population total under a two-phase sampling design; (ii) resolvable dichotomized split-set partially balanced incomplete block designs; (iii) a prediction tool for DNA sequences with 6mA sites by combining ensemble machine learning strategy, hybrid feature selection and bootstrap samples; (iv) A database of lncRNAs and circRNAs for Common Carp and (v) a Mobile App: Sheep & Goat SHRIA (Smart Heuristic Response based Intelligent Assistant).

The Institute also celebrated Vigilance Awareness Week; Swachhata Special Campaign 3.0; Swachhata Campaign, Kisan Diwas and Constitution Day 2023.

A total of 63 Research Papers, 09 Book Chapters; 04 Popular Articles; 02 R Packages were published. Initiated 04 new research projects. Through four training programmes, 107 personnel were trained, and 15 participated in Hindi Workshop. Additionally, 2760+ participants sensitized through 18 sensitization workshops/training programs on Blended Learning Platform.

Triparty Memorandum of Understanding(MoU) has been signed between (1) Department of Food and Public Distribution (DFPD), Ministry of Consumer Affairs, Food and Public Distribution (MCAF&PD), Govt. of India, (2) The Food Corporation of India (FCI), Head Quarters, New Delhi and (3) ICAR-Indian Agricultural Statistics Research Institute (IASRI), New Delhi at ICAR-IASRI, New Delhi for conducting a study titled "Sampling procedure for selection of representative sample for food grain quality check for DCP and Non-DCP system".

The scientists of the Institute brought recognitions by way of serving as Expert Members in various high level committees, presenting research work in prestigious conferences/ workshops.

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*  
(Rajender Parsad)

## RESEARCH ACHIEVEMENTS

### Geographically Weighted Regression (Gwr)-assisted Integrated Estimator of Finite Population Total under Two-Phase Sampling: A Model-Assisted Approach

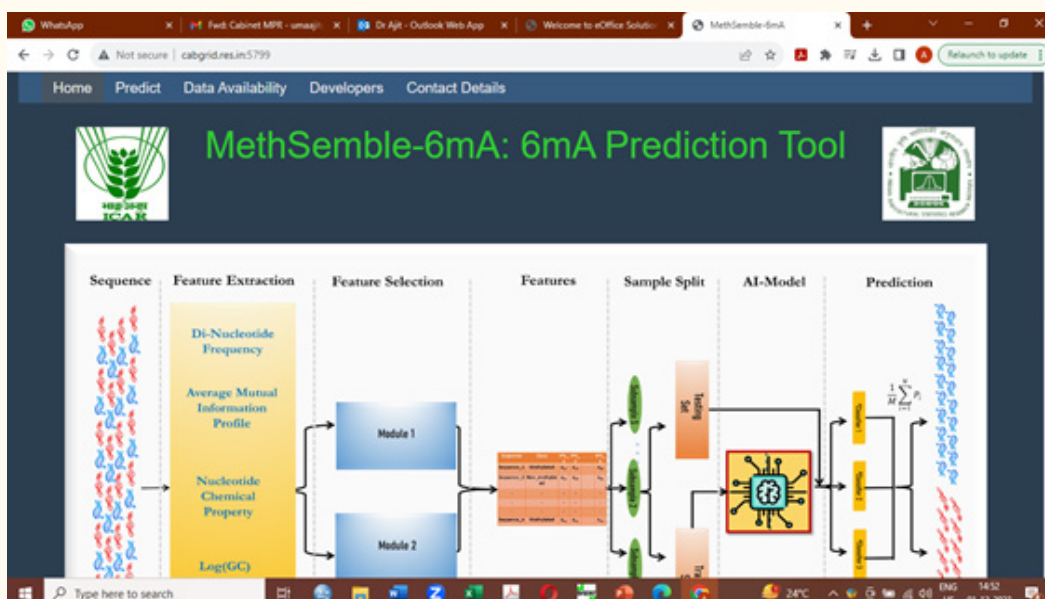
In survey sampling, auxiliary information is used to precisely estimate the finite population parameters. There are several approaches available in the literatures that provide a practical method for incorporating auxiliary information during the estimation stage. In order to effectively utilize the auxiliary information, a geographically weighted regression (GWR) model-assisted integrated estimator of finite population total under a two-phase sampling design has been proposed. Spatial simulation studies have been conducted to empirically assess the statistical properties of the proposed estimator. In the presence of spatial non-stationarity, empirical findings reveal that the proposed estimator outperforms all existing estimators such as two-phase HT, ratio, and regression estimators, demonstrating the importance of spatial information in survey sampling.

### Resolvable Dichotomized Split-Set Partially Balanced Incomplete Block Designs

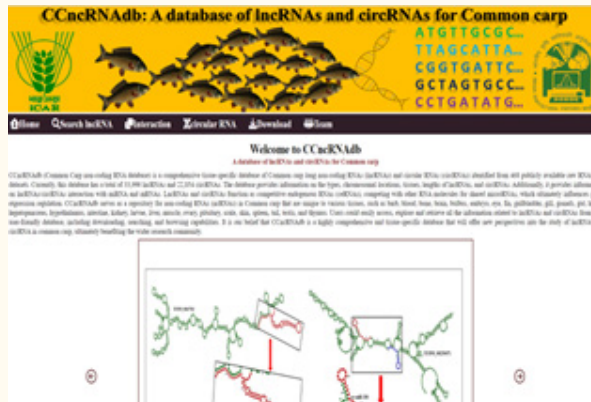
A four- class association scheme named as Dichotomized Split-Set association scheme is defined for different number of treatments. Additionally, a method for constructing Partially Balanced Incomplete Block (PBIB) designs based on this association scheme is developed, The proposed designs are cost effective in terms of resources as they require lesser replications. They are resolvable; hence they possess high application potential in areas like multi-site varietal trials where experimenters generally prefer incomplete block designs. The efficiency factors for these designs are computed in comparison to an orthogonal block design and are found to be quite high.

### MethSemble-N6-methyladenine (6mA): 6mA Prediction Tool

Developed a prediction tool for DNA sequences with 6mA sites by combining ensemble machine learning strategy, hybrid feature selection and bootstrap samples. The tool utilizes five different feature sets for DNA sequence vectorization. Nine machine learning models were employed with relevant features selected through the feature selection module. The top three best-performing models viz. gradient boosting, random forest and SVM, were then combined into a robust ensemble model for predicting DNA sequences with 6mA sites. MethSemble-6mA will serve as a useful resource for plant breeders for epigenetic-based crop improvement research and is available at <http://cabgrid.res.in:5799/>

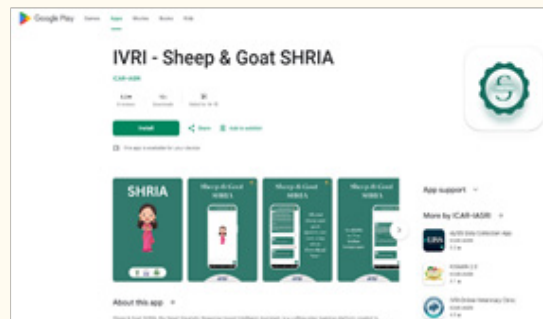


- CCncRNadb:** A database of lncRNAs and circRNAs for Common carp Common Carp non-coding RNA database serves as a useful repository for non-coding RNAs (ncRNAs) in Common Carp that are unique to various tissues, such as barb, blood, bone, brain, bulbus, embryo, eye, fin, gall bladder, gill, gonads, gut, heart, hepatopancreas, hypothalamus, intestine, kidney, larvae, liver, muscle, ovary, pituitary, scale, skin, spleen, tail, testis, and thymus. Users could easily access, explore and retrieve all the information related to lncRNAs and circRNAs available at <http://backlin.cabgrid.res.in/ccncrnadb/>



**Mobile App: Sheep & Goat SHRIA(Smart Heuristic Response based Intelligent Assistant):**

ICAR-IASRI in collaboration with ICAR-IVRI developed a mobile app Sheep & Goat SHRIA (Smart Heuristic Response based Intelligent Assistant), a cutting-edge learning platform created to empower individuals involved in sheep and goat farming. This chatbot leverages the power of advanced Natural Language Processing (NLP) and machine learning algorithms to provide real-time, and relevant information to its users. Sheep & Goat SHRIA support for ten Indian languages with speech input and output facilities, to enhance the accessibility and smoothness of the learning process. Sheep & Goat SHRIA Dashboard has been established and is available at <https://shria-sg.icar.gov.in>



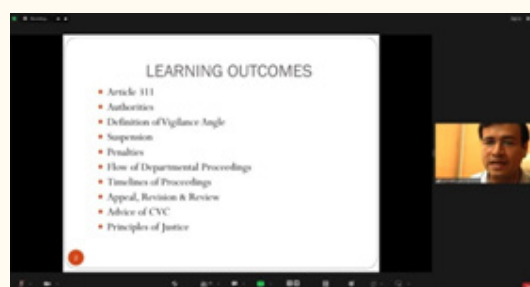
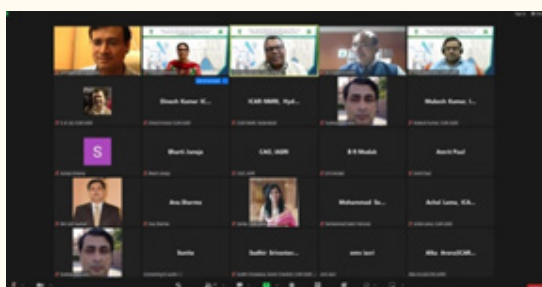
## R-Packages Developed: 02

- **ECTSVR:** The co-integration based support vector regression model is a combination of error correction model and support vector regression. This hybrid model allows the researcher to make use of the information extracted by the cointegrating vector as an input in the support vector regression model. It is available at <https://cran.r-project.org/package=ECTSVR>
- **EMDANNhybrid:** This package is designed for application of Empirical Mode Decomposition based Artificial Neural Network for univariate time series forecasting. It also provides accuracy measures along with an option to select the proportion of training and testing data sets. Users can choose among the available choices of parameters of Empirical Mode Decomposition for fitting the ANN Models. The dependency of the study variable assuming first order autocorrelation has been modeled. It is available at <https://cran.r-project.org/package=EMDANNhybrid>

## PANORAMA OF ACTIVITIES

### Celebrations of Vigilance Awareness Week

- Institute organized the Vigilance Awareness Week during October 30 – November 05, 2023. All staff member took oath on October 30, 2023 in presence of Dr. Rajender Parsad, Director, ICAR-IASRI. A webinar was organized jointly with ICAR-National Institute of Meat Research, Hyderabad. Sh. Somnath, Under Secretary (Vigilance), ICAR delivered the talk on the topic “CCS (CCA) Rules 1965”.



### Swachhata Special Campaign 3.0 (October 02-31, 2023) (Swachhata Pakhwara)

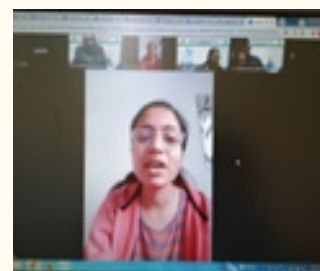
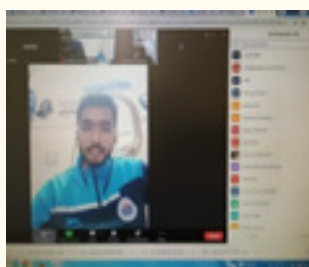
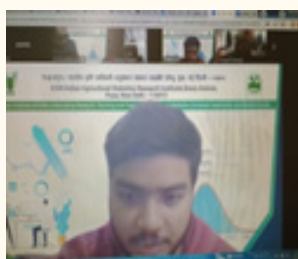
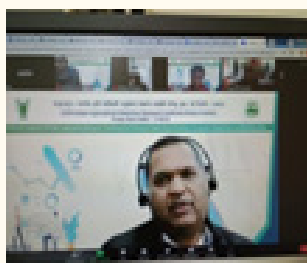
- Staff and students took the Swachhta Pledge on October 03, 2023. A campus tour was conducted to ensure comprehensive cleanliness throughout the campus. During the campaign a debate competition was organized on ‘Time spent on Swachhta mission is time well spent’. Several initiatives were undertaken for campus wide cleaning. Dr. Bimlesh Mann, ADG (EP&HS) was the Chief Guest during the valedictory session. She also planted a sapling of Basil Plant and addressed the staff on the occasion. Dr. Rajender Parsad, Director, ICAR-IASRI, also addressed the staff and reiterated for clean and green campus.





### Swachhata Campaign : December 16-31, 2023

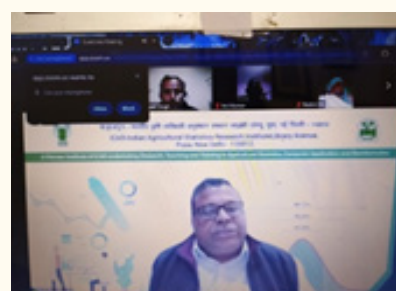
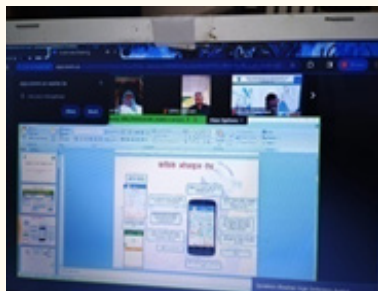
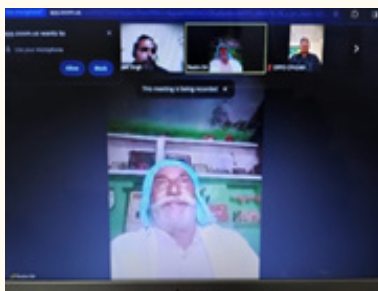
- The cleanliness activities during Swachhata Pakhwada (December 16-31, 2023) were initiated with a Swachhata pledge on December 16, 2023 in online mode. The members were also encouraged to take pledge on <https://pledge.mygov.in/swachhta-pledge-2022/>. Discussions were held on water saving and its reuse, efficient and effective use of electricity, single use plastic free campus, participation in plantation drive, etc. During Swachhata Pakhwada several other activities were performed by ICAR-IASRI Staff/Students and Contractual staff viz. stock taking on digitization of office records/e-office implementation; review of progress Swachhata Action Plan (SAP); Cleanliness and Sanitation drives in residential colony near ICAR-IASRI campus; cleaning awareness in vicinity of Institute Campus; promoting clean and green technologies and organic farming practices. 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. Video shows on the following topics were organized: (i) Campaign on cleaning of sewerage & water lines, awareness on recycling of waste water; (ii) Recycling of waste water; (iii) भारत का प्लास्टिक अपशिष्ट संकट” और “इकोइंडिया: क्या प्लास्टिक कचरे से उत्पन्न ईंधन जीवाश्म ईंधन की जगह ले सकता है और ऊर्जा जरूरतों को पूरा कर सकता है?; (iv) Documentary film on Swachh Bharat Mission Gramin. A debate was also organized on swachhata amongst staff and contractual members on the topic Time spent on Swachhata mission is time well spent. Students carried out swachhata activities in their rooms, hostel premises and in the vicinity of hostel. The International Training Hostel was renovated and refurbished. The boundary wall of the Institute was painted. The Institute campus was maintained as clean and green campus. The different flowers are blooming in the campus. All pots and trees have been painted for a better look. A swachhata campaign was also run on social media. As part of valedictory function, Honorable Deputy Director General (Agricultural Education), ICAR; Assistant Director General, Human Resource Management, ICAR and Director, ICAR-CIWA, Bhubaneswar made campus visit and appreciated the clean and green campus with rooftop solar panels, rainwater harvesting system.



### Celebrated Kisan Diwas (National Farmers' Day)

- Kisan Diwas was celebrated online on December 23, 2023. Director, ICAR-IASRI inaugurated the event and explained the importance of Celebrating Kisan Diwas on the Birthday of Late Choudhary Charan Singh, Former Prime Minister of India. In 2001, the Government of India announced that December 23 (his birthday) would be celebrated as National Farmer's Day to honour Chaudhary Charan Singh's contributions for the welfare of farming community. Director, ICAR-IASRI, also welcomed the farmers (i) Sh. Jagpal Singh, IARI Innovative Farmer Awardee and IARI Fellow Awardee from Jhajhar Haryana; (ii) Sh. Thakur Gopal from Bharatpur, Rajasthan; (iii) Sh. Anil Kumar, Krishi Karman Awardee Farmer from Khagria, Bihar and (iv) Sh. Kulwant Singh from Bulandshahar, Uttar Pradesh. The invited farmers also delivered talks on the Kisan Diwas on various topics like Bee Keeping: Crop

Management, Bee Management and Pollination; Biogas Plant Use: its installation, organic farming and water harvesting; Polyhouse Farming and Seed Production respectively. Dr. Alka Arora, Dr. Soumen Pal and Dr. K.K.Chaturvedi presented various digital initiatives of ICAR such as ICAR Video Gallery, ICAR Mobile App Gallery, Technology Repository, KVK Portal, KISAAN 2.0 (Krishi Integrated Solution for Agri Apps Navigation), Mobile apps developed in collaboration with ICAR-Indian Veterinary Research Institute (IVRI), Izatnagar, Kisan Sarathi - System of Agri-information Resources Auto-transmission and Technology Hub Interface. The farmers, while expressing their views, appreciated the efforts of ICAR scientists and emphasized the need for further improvement in the interaction between the farmer and research communities.. They also stressed on the need of more advertisement of Kisan Haat.



### Celebrations of Constitution Day 2023 and Pledge of Preamble

- Institute celebrated Constitution Day on November 26, 2023. The staff and students read Preamble alongwith Director, ICAR-IASRI, New Delhi.

### Others:

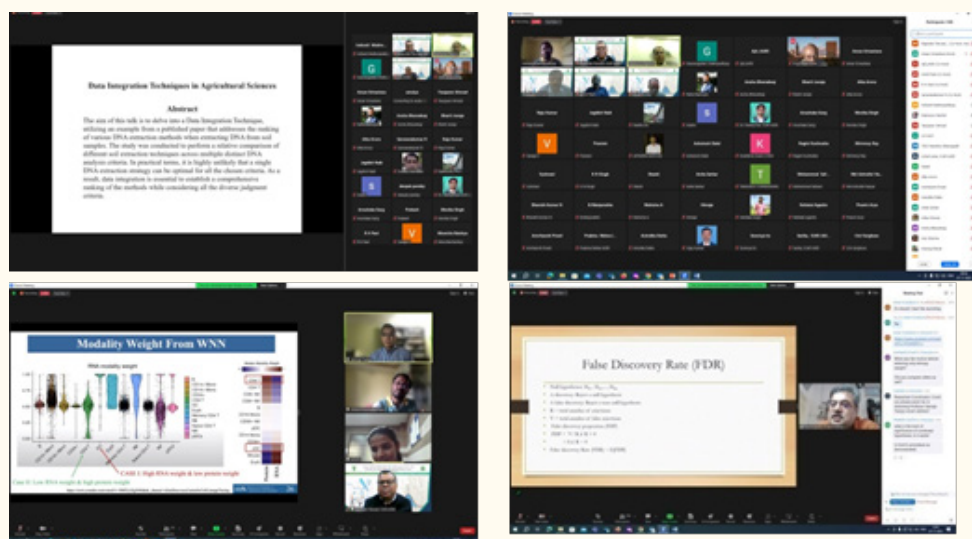
- Communal Harmony Day (Sadbhavana Diwas) was celebrated on November 19, 2023.
- Dr Rajender Parsad, Director, ICAR-IASRI and Dr Ajit visited the exhibition organized as part of the Global Partnership on Artificial Intelligence Summit 2023 during December 12-14, 2023. ICAR Video Gallery <https://krishi.icar.gov.in/video/> has been embedded in the AI Chatbot being developed by Digital Greens for Ministry of Agriculture and farmers Welfare. Also visited the stall of BHASHINI.



## WORKSHOPS/WEBINARS/ MEETINGS ETC. ORGANIZED

### Workshop

Online workshop on Statistical Methods of Data Integration in Agricultural Sciences was organized at ICAR-IASRI, New Delhi on November 07, 2023. The workshop was chaired by Professor Indranil Mukhopadhyay, Human Genetics Unit, Indian Statistical Institute, Kolkata. Speakers in the workshop were (i) Professor Mamunur Rashid, Department of Mathematical Sciences, DePauw University, USA delivered a talk on 'Data Integration Techniques in Agricultural Sciences'; (ii) Professor George Tseng, Vice Chair (Research), Departments of Biostatistics, School of Public Health, University of Pittsburgh, USA delivered a talk on 'Selective introduction to Multi-omics Integrative Analysis' and (iii) Professor Gaurangadeb Chattopadhyay, Head, Department of Statistics, University of Calcutta, India delivered a talk on 'An Introduction to Multiple Testing'. Over 130 participants attended the workshop.



### 22<sup>nd</sup> Research Advisory Committee Meeting

22<sup>nd</sup> Research Advisory Committee Meeting of the Institute was held on November 28, 2023 under the Chairmanship of Professor Bikas K. Sinha, Former Member, National Statistical Commission, Government of India; Members: Professor K. Muralidharan, Professor Indranil Mukhopadhyay, Dr. Bimlesh Mann, Dr. Rajender Parsad, Dr. Ajit and Invitees: Heads of the Divisions and Professors of all the three disciplines.

At the outset, Dr. Rajender Parsad, Director, ICAR-IASRI, welcomed all the members of RAC. Thereafter, Professor Bikas Sinha, Chairman welcomed all the members of the RAC and other invitees. Professor Sinha congratulated all scientists of the Institute for working in the direction to fulfill the recommendations of last RAC. He emphasized that the research programs of the Institute are in accordance with the Government of India Programs. He further said that although few projects are linked with Sustainable Development Goals (SDGs), yet more emphasis should be laid on linking their search projects with SDGs.

Action taken report on the recommendations of 21<sup>st</sup> RAC meeting was presented by the Member Secretary. The research, education, training and development activities of the Institute were presented by Director, ICAR-IASRI along with genesis and growth of the Institute. He appraised that the Institute is catering to the needs of (i) National Agricultural Research and Education System (NARES); (ii) National Agricultural



Statistics System (NASS); (iii) E-Governance activities of ICAR and simultaneously prove to peers on Basic Research in Statistical Sciences. He emphasized that efficient design of experiments, statistical methodologies, information systems/portals, bioinformatics tools developed by the Institute are widely being adopted in NARES, NASS and several African and Latin American countries. The contributions of the Institute in terms of human resource development were also presented. He also presented the significant research achievements of the Institute during last one year.

RAC members highly appreciated the contributions and achievements made by the Institute in all spheres of research, teaching, training, advisory services and e-governance services. From the daylong deliberations, presentations and discussions on the research, teaching and training activities of the Institute, the following action points/recommendations emerged:

1. The Institute should conduct more refresher courses and training programmes for the teachers/faculty/researchers at SAUs and scientific colleagues from ICAR-Institutes to make them aware about the recent tools, techniques, and packages in the disciplines of Agricultural Statistics, Computer Applications and Agricultural Bioinformatics.
2. IASRI has acquired the expertise to develop mobile apps, accordingly the Institute should collaborate/help the extension scientists of other Institutes/SAUs in developing commodity-specific mobile apps. AI enabled applications should be made as user friendly as possible.
3. Research efforts on using remote-sensing-data in research studies should be strengthened. Efforts should also be made to take research projects on early forewarning systems for crops pests and diseases.
4. E-courses developed and available on E-learning Portal and Agri-Diksha Web Channel should be advertised to reach out to more stakeholders.
5. The Institute should plan online Hackathon on the topics related to Statistical Sciences.
6. A Virtual Centre of excellence on AI be in place at the Institute.
7. The Institute should initiate PG Diploma/Diploma Courses on Data-Science





## Seminars Delivered

A total of 20 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.

Seminars Delivered	Type of Seminar	Number
<b>Scientist</b>	Project Completion	
	New Project Proposal	1
	Foreign Visit	1
<b>Student</b>	General	
	Course	11
	ORW	5
	Thesis	2
<b>Total</b>	Guest Seminar	
		<b>20</b>

## PUBLICATIONS

### Research Papers

- Adak S, Bandyopadhyay K, Sahoo RN, KrishnanP, Sehgal VK, Kumar SN, Datta SP, Sarangi A, Bana RS, Mandal N, Bhattacharya P and Yeasin M (2023). Interactive effect of tillage, residue, nitrogen, and irrigation management on yield, radiation productivity and water productivity of winter wheat in semi-arid climate. *Journal of Agrometeorology*, **25(3)**, 383-391. <https://doi.org/10.54386/jam.v25i3.2240>
- Aditya K, Kumar, R, Bharti, Sanyal, S (2023). Environmental impact of greenhouse gas emissions from the tea industries of Northeastern States of India. *Frontiers in Sustainable Food Systems*, **7**, 1220775. <https://doi.org/10.3389/fsufs.2023.1220775>
- Ahmad SF, Singh A, Deb CK, Panda S, Gaur GK, Dutt T, Mishra BP and Kumar A (2023). Evaluation of imputation possibility from low-density SNP panel in composite Vrindavani cattle. *Animal Genetics*, **54(5)**, 647-648. <https://doi.org/10.1111/age.13339>; <https://krishi.icar.gov.in/jspui/handle/123456789/82015>

4. Aiswarya S, Padaria, RN, Burman, RR, Sarkar, S, Kumar, P and Lama, A (2023). Analysing the climate change adaptations among the communities of Agasthyamalai biosphere reserves. *Current Science*, **125(12)**, 1354-1359.
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9. Kanupriya C, Chaturvedi K, Karunakaran G, Singh P, Venugolalan R, Samant D and Kumar P (2024). Phenotypic diversity in *Tamarindus indica* L. sourced from different provenances of India. *Agroforestry Systems*, **98**, 477-490. <https://doi.org/10.1007/s10457-023-00925-0>
10. Chaudhary K, Jha GK, Jaiswal R, Venkatesh P and Parsad Rajender (2023). Agricultural Price Forecasting Based on Variational Mode Decomposition and time-Delay Neural Network. *Statistics and Applications*, **21(2)**, 237-259. <http://krishi.icar.gov.in/jspui/handle/123456789/80951>
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18. Jangir CK, Sangwan PS, Panghaal D, Kumar S, Meena RS, Bharti, Jat RD, Singh N (2023). Spatial variability and statistical analysis of soil properties in the rice wheat-based systems of North-West India. *Communications in Soil Science and Plant Analysis*, **55(8)**, 1205-1223. <https://doi.org/10.1080/00103624.2023.2296989>.
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## Book Chapters

- Banerjee R, Bharti, Das P, Srivastava V, Ankita Kataria S, Ahmed B and Varshney N (2023). An Overview of Statistical Techniques for Analysis of Data in Agricultural Research. In *Emerging Issues in Agricultural Sciences* Volume 8. Eds. Prof (Dr.) Abd Elmoneim Osman Elkhalfa. B P International, 27 Old Gloucester Street London WC1N 3AX, UK, pp. 190-206. <https://doi.org/10.9734/bpi/eias/v8/6853C>
- Das Pankaj, Banerjee Rahul, Bharti, Rangi Abhilasha and Varshney Nitin (2023). An overview of data analytics in smart agriculture. In *Research and Reviews in Agriculture Science* Volume IV, pp 14-30, (Eds. Dhankar, R., Sharma A., Mangla, M. and Dhanker P.), Bhumi Publishing India. ISBN: 978-93-95847-30-8.
- Kumar Prakash, Paul Ranjit Kumar, Roy Himadri Shekhar, Yeasin Md., Ajit and Paul AK (2023). Big data analysis in computational biology and bioinformatics. In: *Reverse Engineering of Regulatory Networks*, pp 181-197, (Eds. Sudip Mandal). ISBN: 978-1-0716-3461-5. [https://doi.org/10.1007/978-1-0716-3461-5\\_11](https://doi.org/10.1007/978-1-0716-3461-5_11).
- Jena RK, Moharana PC, Pradhan UK, Sharma GK, Ray P, Roy PD and Ghosh D (2023). Soil fertility mapping and applications for site-specific nutrient management – a case study. In: *Remote Sensing of Soils: Mapping, Monitoring, and Measurement*, pp 65-80, (Eds. S. Dharumarajan, S. Kaliraj, K. Adhikari, M. Lalitha and N. Kumar), Paperback ISBN: 9780443187735. Elsevier. <https://www.elsevier.com/books/remote-sensing-of-soils/s/978-0-443-18773-5>; <https://doi.org/10.1016/B978-0-443-18773-5.00025-9>
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- Madhu, Banavath SN, Manasa Shevakula, Nigam S and Singh A (2023). Geographic Information Systems (GIS) and its Applications. In *Research Trends in Multidisciplinary Research*, 49, pp 125-150, (Eds. R. Jayakumar, Raja Reddy. Duvvuru, Arun Kumar and Madan Mohan Laddunuri), AkiNik Publications ISBN: 978-93-5570-932-5. <https://doi.org/10.22271/ed.book.2509>; <http://krishi.icar.gov.in/jspui/handle/123456789/81098>



- Moharana PC, Jena RK, Yadav B, Naitam R, Kumar N, Pradhan UK and Sharma, GK (2023). Digital soil mapping algorithm for soil quality assessment and monitoring – a case study in desert ecosystem of India. In: *Remote Sensing of Soils: Mapping, Monitoring, and Measurement*, (Eds. S. Dharumarajan, S. Kaliraj, K. Adhikari, M. Lalitha and N. Kumar), Paperback ISBN: 9780443187735. Elsevier <https://www.elsevier.com/books/remote-sensing-of-soils/s/978-0-443-18773-5>; <https://doi.org/10.1016/B978-0-443-18773-5.00032-6>
- Pradhan UK and Meher PK (2023). Computational prediction of RNA binding proteins: features and models. In *Bioinformatics and Computational Biology: Technological Advancements, Applications, and Opportunities*, (Eds. Tiratha Raj Singh, Hemraj Saini, Moacyr Comar Junior), Chapman & Hall. ISBN: 9781032361581. <https://www.routledge.com/Bioinformatics-and-Computational-Biology-Technological-Advancements-Applications/Singh-Saini-Junior/p/book/9781032361581>
- Rout AK, Das R, Mahanandia NC, Dey S, Parida SN, Mondal M, Panda SP, Jena Rajkumar, Behera B and Behera BK (2023). Identifying Novel Antibiotic Resistance Genes (ARGs): Important aspect of metagenomic research. In: *Biotechnological Tools in Fisheries and Aquatic Health Management*, pp231-246, (Ed. Bijay Kumar Behera), Singapore: Springer Nature Singapore. ISBN: 978-9819929801. [https://doi.org/10.1007/978-981-99-2981-8\\_12](https://doi.org/10.1007/978-981-99-2981-8_12).

## Popular Articles

- Devi, S., Bharti. (2023). Kuhl Irrigation System: a case study of Kangra Valley of Himachal Pradesh. *Times of Agriculture e-magazine*, 62-63.
- Grover Monendra, Mishra Dwijesh and Jha Girish Kumar (2023). Unlocking the secrets of nature with Physics-Informed Neural Networks. *Science Reporter*, A CSIR Publication, pp 48-50.
- Grover Monendra, Mishra Dwijesh, Chaturvedi Krishna Kumar and Jha Girish Kumar (2023). Unveiling the quantum frontier in agriculture. *Agriculture Today*, October issue, pp 48-49
- Nigam S, Jain R, Singh Vaibhav K and Marwaha, S. (2023) Image-based Identification of Wheat Fungal Diseases using Artificial Intelligence. In: *Population Diversity, Pathogenomics and Development of Diagnostics of Emerging Fungal Plant Pathogens*, pp80-86 - A Training Manual, TB-ICN: 310/2023, Eds. Singh Vaibhav K, Saharan MS, Kamil D, Bashyal BM and Gurjar MS. ICAR-Indian Agricultural Research Institute (IARI), New Delhi.

## PAPERS PRESENTED/LECTURES DELIVERED

### Paper presented /Invited talk delivered in Conferences

- 6<sup>th</sup> CWSS International Conference on Agricultural Innovations for Sustainable Development Goals with Special Focus on Natural Farming held at Farmers Academy & Convention Centre, BCKV, Kalyani, Nadia, West Bengal during September 30-October 02, 2023 Ankur Biswas. Geographically weighted regression based model-calibration approach under two stage sampling design.
- National Conference on Spices, Aromatic and Medicinal Plants for Economic Prosperity and Ecological Sustainability-2023 held at ICAR-Central Inland Agricultural Research Institute, Port Blair, Andaman Nicobar Islands during October 05-06, 2023
  - Sneha Murmu. Identification of potent phytochemicals against *Magnaporthe oryzae* through virtual screening and molecular dynamics simulation approach. (Oral Presentation)

- International Conference on Structural Biology and Drug Discovery organized by University School of Biotechnology, Gautam Buddha University, Greater Noida during October 11-12, 2023
  - Anu Sharma. Prediction of anti-microbial resistance gene using deep learning approach for in silico drug designing.
- 6<sup>th</sup> International Rice Congress, Manila, Philippines during October 16-19, 2023
  - Girish Kumar Jha. Determinants of expenditure on inorganic and organic fertilizers among Indian paddy growers.
- 5<sup>th</sup> International Conference on Sustainable Natural Resource Management under Global Climate Change at NASC Complex, New Delhi during November 07-10, 2023
  - Bharti. Data envelopment analysis-based study on onion farming efficiency and sustainable development.
  - Pankaj Das. Spatial prediction and mapping of soil properties using machine learning techniques in India.
- International conference on Drive Agriculture forward: Recent Trends and Innovation in Agricultural Market Intelligence held at Anand Agriculture University, Anand during December 11-13, 2023
  - Girish Kumar Jha. AI-based agricultural price forecasting Models: An Innovative Market Intelligence System.
- VIII International Conference on Global Research Initiatives for Sustainable Agriculture and Allied Sciences organized by Aastha Foundation, Meerut and University of Agricultural Sciences, Raichur, Karnataka during December 18-20, 2023
  - Sudhir Srivastava. An improved model-based normalization approach for addressing heterogeneity in LC-MS proteomics expression data.
- 5<sup>th</sup> International Conference on Deep Learning, Artificial Intelligence and Robotics organized by NIT, Kurukshetra held during December 07-09, 2023
  - Md. Ashraful Haque, Chandan Kumar Deb, Sudeep Marwaha, Subrata Dutta, Mehraj Ul Din Shah, Ananta Saikia and Abhishek Shukla\*. Rice disease identification using vision transformer (ViT) based network.
  - Vaibhav Kumar Singh, Bishnu Maya Bashyal, Sudeep Marwaha, Rajender Parsad, Sapna Nigam\*. Image-based rice weed identification using deep learning and attention mechanisms.
  - Sudeep Marwaha, Sapna Nigam, Md. Ashraful Haque, Madhu Akshay Dheeraj\*. ADNet: An attention embedded DenseNet121 model for weed classification.
- International Conference on Systems and Technologies for Smart Agriculture organized by C-DAC, Kolkata during December 19-20, 2023
  - Md Ashraful Haque\*, Chandan Kumar Deb, Akshay Dheeraj, Sudeep Marwaha and Mehraj Ul Din Shah. Swin transformer-based disease identification model for Apple plants.
  - Chandan Kumar Deb\*, Sudeep Marwaha and Ashraful Haque. Leveraging autoencoders for accurate plant disease diagnosis in the face of unbalanced data.
- International Conference on Communication and Intelligent System organized by Malaviya National Institute of Technology Jaipur during December 16-17, 2023
  - Chandan Kumar Deb\*, Sudeep Marwaha and Ashraful Haque. Convolution Neural Network (CNN) based live pig weight estimation in controlled imaging platform.

- International Conference on Statistics, Data Science and Reliability: Exploring Trends, Methods & Application organized at Maharshi Dayanand University, Rohtak during December 24-26, 2023
  - Bharti, K. Aditya, T. Ahmad, R. Banerjee and D. Singh. Generalized regression estimator in dual frame surveys under two-stage sampling
- Ninth International Conference on Statistics for Twenty-first Century - 2023 organized by Department of Statistics, University of Kerala during December 15-18, 2023 (online presentation).
  - Cini Varghese. Minimally replicated PBIB designs in an invited paper session on statistical designs for experimentation.
  - Susheel Kumar Sarkar. Basic design of experiments with co-variates in an invited paper session on statistical designs for experimentation.
  - Sukanta Dash. Designs for cropping sequence experiments in an invited paper session on statistical designs for experimentation.
  - Anindita Datta. Efficient statistical designs under row-column setup with multiple units in an invited paper session on statistical designs for experimentation.
  - Mohd. Harun. Incomplete block designs using Hadamard Matrices in an invited paper session on statistical designs for experimentation.

### Lecture Delivered (Outside institute)

- ‘Artificial intelligence: case studies in Indian agriculture’ on October 12, 2023 in the XVI Agricultural Science Congress organized by ICAR-NAARM, Hyderabad at ICAR-CMFRI, Kochi, Kerala during October 10-13, 2023. (Alka Arora). (Invited Lecture)
- ‘Embracing digital agriculture in Uttar Pradesh’ in a Multi-Stakeholder workshop held at Hotel Taj organised by KWPF and The World Bank on October 13, 2023. (Sudeep Marwaha). (Invited Lecture)
- ‘Statistical measures for sampling and accuracy assessment’ on October 13, 2023 for the two week special course on “Remote Sensing and GIS in Predictive Soil Mapping” organized by Indian Institute of Remote Sensing, Dehradun during October 09-20, 2023. (Ankur Biswas). (Invited Lecture)
- ‘ICAR repository for knowledge management’ on October 17, 2023 in the PUSA Krishi’s ‘SHITIJ 2023-24’ program. (Alka Arora) (Invited Lecture)
- ‘Advances in genotyping and handling genotypic data in horticultural crops’ on December 05, 2023 in the 11 days training programme under the NAHEP-CAAST program on Advances in Experimental Designs and Genomics for Tailoring Horticultural Crops at the Division of Fruits & Horticultural Technology, IARI during December 01-12, 2023. (Sarika Sahu)
- ‘(i) Overview and principles of GIS (ii) Spatial data analysis and applications in agriculture’ on December 13, 2023 in the training program on Remote Sensing for Agriculture Applications for BIMSTEC countries organized by the Division of Agricultural Physics at ICAR-IARI during December 04-14, 2023. (Prachi Misra Sahoo)
- ‘About R, R Installation & Setting R Environment’ on December 04, 2023 in the 12 days training programme on Advances in experimental designs and genomics for tailoring horticultural crops organized under NAHEP-CAAST program at Division of Fruits & Horticultural Technology, ICAR-IARI, New Delhi during December 01-12, 2023. (Rajeev Ranjan Kumar).

## PARTICIPATION

### International Conference/ Workshop/Symposium etc.

- International Conference on 'From research to impact: Towards just and resilient agri-food systems' jointly organized by CGIAR and ICAR at NASC, New Delhi during October 09-12, 2023. (Anindita Datta and Sanchita Naha)
- International Conference on 'Next Gen preparedness for food security and environmental sustainability' which was organized in collaboration with Norwegian Institute of Bioeconomy Research, Norway during November 22-24, 2023 to celebrate the 100th anniversary of the AAU-Assam Rice Research Institute (AAU-ARRI), formerly the Regional Agricultural Research Station at Titabar, Jorhat at the Department of Biotechnology- North East Centre for Agricultural Biotechnology (DBT-NECAB), Assam Agricultural University, Jorhat. (Dinesh Kumar)
- 6th International Rice Congress in Manila, Philippines from October 16-19, 2023. (Girish Kumar Jha)
- International conference on 'Biochemical and biotechnological approaches for crop improvement' from October 30- November 01, 2023 at National Agricultural Science Complex, New Delhi, India. (Sarika Sahu).
- 5th International Conference on 'Deep learning, artificial intelligence and robotics' organised by National Institute of Technology, Kurukshetra during December 07-09, 2023. (Md. Ashraful Haque, Sapna Nigam, Akshay Dheeraj)
- International Conference on 'Systems and technologies for smart agriculture' organised by C-DAC Kolkata, during December 19-20, 2023. (Md. Ashraful Haque, Chandan Kumar Deb).
- International Conference on 'Communication and intelligent systems' organised by Malaviya National Institute of Technology Jaipur, India in Hybrid mode, during December 16-17, 2023. (Chandan Kumar Deb)
- International Conference on 'Statistics, data science and reliability: exploring trends, methods & application' at MDU Rohtak during December 24-26, 2023. (Bharti)
- Ninth International Conference on 'Statistics for Twenty-first Century-2023' organized by Department of Statistics, University of Kerala, Kerala during December 15-18, 2023 in an online mode. (Cini Varghese, Susheel Kumar Sarkar, Sukanta Dash, Anindita Datta, Mohd Harun)

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

- XVI Agricultural Science congress and ASC Expo, Science Congress organized at ICAR-CMFRI, Kochi during October 10-13, 2023. (Rajender Parsad, Sudeep Marwaha and Alka Arora)
- UKRI GCRF South Asian Nitrogen Hub (SANH) Annual Meeting in Sri Lanka from October 02-06, 2023. (Girish Kumar Jha)

- Bioeconomy 2023 on 'Bioeconomy: Legal and Ethical Dimensions' organized by Indian Institute of Technology Guwahati during October 11-12, 2023. (Dinesh Kumar)
- Workshop on 'Learning outcome based Curriculum Framework Guidelines and Implementation in IARI' organized by ICAR-IARI on October 09, 2023. (K.K. Chaturvedi, Alka Arora, Anshu Bharadwaj, Soumen Pal, Achal Lama and Chandan Kumar Deb)
- Brain Storming Session on 'Use of Technology in Generating Crop Area and Yield Estimation on Real Time Basis' held at NASC Complex, New Delhi under the Chairmanship of Additional Secretary, MoA&FW, Govt. of India on October 03, 2023. (Tauqueer Ahmad)

## HUMAN RESOURCE DEVELOPMENT

### Training Programmes/Workshops Organized: 04 (Participants 122)

S.No.	Title	Venue	period	No. of Participants
1	Omics Data Analysis: Genome to Proteome under ICAR-Consortium Research Platform on Genomics Project ( <i>Coordinators:</i> Girish Kumar Jha, Sudhir Srivastava and Sneha Murmu)	ICAR-IASRI, New Delhi	October 09-18, 2023	50
2	Blended Learning Techniques for Quality Higher Education ( <i>Coordinators:</i> S.N. Islam, Sapna Nigam, Madhu)	ICAR-IASRI, New Delhi	December 19-26 2023	21
<b>Workshop</b>				
3	Metagenomics Data Analysis ( <i>Coordinators:</i> Girish Kumar Sha, Anu Sharma, Samir Farooqi and Sneha Murmu)	ICAR-IASRI, New Delhi	December 11-13, 2023	16
<b>हिन्दी कार्यशाला</b>				
4	सांख्यिकीय एवं मशीन लर्निंग तकनीक के माध्यम से समय श्रृंखला का पूर्वानुमान (संयोजक: कंचन सिन्हा, मरिमोय राय एव राजीव रंजन कुमार)	भा.कृ.अनु.प-भा.कृ.सां.अ.सं, नई दिल्ली	दिसम्बर 07-13, 2023	15

### Students internship

- Two M.Sc. Bioinformatics students OUAT Bhubaneswar for their M.Sc. dissertation work (i) Mr. Padma Lochan Sethi and (ii) Mr. Prasanjit Behera. Both students worked at ICAR-IASRI for a period of 4 months (15 June-14 October, 2023). They were assigned two research problems and they completed the work successfully. (P.K. Meher)

## Sensitization Workshop/Trainings

### NARES-Blended Learning Platform: 18 (2760+ participants):

(i) CSK Himachal Pradesh Agricultural University, Palampur, Himachal Pradesh: October 04-05, 2023: Participants 36 (Madhu); (ii) ICAR-Central Institute of Fisheries Education: October 06, 2023: Participants 115 (Sudeep Marwaha); (iii) Anand Agricultural University, Anand: October 10, 2023: Participants 124 (SN Islam); (iv) MPUAT, Udaipur: October 12, 2023: Participants 100 (Soumen Pal); (v) SKNAU-Jobner: October 26-27, 2024: Participants 668 (Shashi Dahiya); (vi) SKUAST-Kashmir: October 30-31, 2023: Participants 29 (Chandan Kumar Deb); (vii) YS Parmar University of Horticulture and Forestry, Nauni, Solan: October 30-31, 2023: Participants 147 (Sudeep Marwaha); (viii) Pandit Deen Dayal Upadhyaya Pashu Chikitsa Vigyan Vishwavidyalaya(DUVASU), Mathura: October 30-31, 2023: Participants 472 (Alka Arora); (ix) Chaudhary Charan Singh Haryana Agricultural University: November 03-04, 2023: Participants 125 (Shashi Dahiya); (x) Lala Lajpat Rai University of Veterinary and Animal Sciences: November 03-04, 2023: Participants 70 (Shashi Dahiya); (xi) Banda University of Agriculture and Technology: November 07-08, 2023: Participants 378 (Chandan Kumar Deb); (xii) West Bengal University of Animal and Fishery Sciences: November 23-24, 2023: Participants 128 (MD. Ashraful Haque); (xiii) Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth: December 05-06, 2023: Participants 143 (Sanchita Naha and Sapna Nigam); (xiv) Indira Gandhi Krishi Vishwavidyalaya: December 14-15, 2023: Participants 78 (Soumen Paul); (xv) Jawaharlal Nehru Krishi Vishwa Vidyalaya: December 12-13, 2023: Participants 42 (Samarth Godara); (xvi) Nanaji Deshmukh Veterinary Science University Jabalpur: December 14-15, 2023: Participants 27 (Samarth Godara); (xvii) UAS Dharwad; December 21-22, 2023: Participants 56 (Anshu Bharadwaj) and (xviii) Vishwa Bharti; December 21-22, 2023: Participants 25 (Md. Ashraful Haque)

## CONSULTANCY/ADVISORY SERVICES PROVIDED

- Prakash Kumar advised (i) Sh. Ankit Kumar Sinha, M.Sc. Student, IARI, Jharkhand, data analysis for raw data for path coefficient, cluster analysis, statistical genetics analysis of 46 genotypes to Ankit Kumar Sinha, M.Sc. Student, IARI, Jharkhand and (ii) Dr. Prashant Kumar, Scientist, ICAR-Directorate of Rapeseed Mustard Research, Bharatpur, Rajasthan, data analysis work for GWAS analysis of SNP data of mustard crop.
- Rahul Banerjee advised Sh. Suraj Kataria, Ph.D. Scholar, Department of Anthropology, Faculty of Science, University of Delhi on calculation of Confusion Matrix, Precision, Recall and Accuracy.
- Pankaj Das advised Sh. Aravind K.S., Ph.D. student, ICAR-IARI in data processing and debugging the R code for his research work on crop yield prediction using ML techniques.
- Bharti advised (i) Dr. Meera Devi, Scientist, KVK Kandaghat-Solan, Himachal Pradesh on the analysis of variance technique (ANOVA); (ii) Dr. Sapna Thakur, Assistant Professor, PAU Ludhiana on correlation and regression analysis and (iii) Miss Eram Arzoo, Ph.D. Second year student, PG School IARI on graphical representation of data.
- Kaustav Aditya advised Dr. Soulima Das, Junior Scientist, BCKV, West Bengal about split plot design analysis on 22nd November 2023.
- Sarika Sahu advised Mr. Nikhil Chand, Ph.D. student from Sardar Vallabhbhai Patel University of Agriculture, Meerut for the bioinformatics analysis of the following - analysis co-expression network

for identification of candidate genes regulating Phosphorus Use Efficiency in wheat (*Triticum aestivum* L.), gene regulatory network of 1194 genes related to Phosphorus Use Efficiency, KEGG pathways study and analysis co-expression network for identification of candidate genes regulating Nitrogen Use Efficiency in wheat (*Triticum aestivum* L.).

## AWARDS AND RECOGNITIONS

### Awards

- Best Oral Presentation (3rd prize) in International Conference on Systems and Technologies for Smart Agriculture (ICSTA 2023) organized by Centre for Development of Advanced Computing (C-DAC) Kolkata, in association with the University of Calcutta at Kolkata, India during December 19-20, 2023.
- Chandan Kumar Deb, Sudeep Marwaha, Md. Ashraf Haque, Chiranjit Pal, Abhishek Shukla, Amit Trivedi, Subrata Dutta, Kalpit Shah, Mehraj Ul Din Shah, Prasanna Kumar M K. “Leveraging Autoencoders for Accurate Plant Disease Diagnosis in the Face of Unbalanced Data” in the Springer book series “Transactions on Computer Systems and Networks”. (In Press)

### Recognitions

#### Rajender Parsad

- Chaired, 17th Meeting of Technical Monitoring Committee on Fisheries Statistics, Department of Fisheries, Ministry of Fisheries, Dairying and Animal Husbandry, Govt. of India held online on October 27, 2023..

### Visit Abroad

- Girish Kumar Jha attended 6th International Rice Congress in Manila, Philippines from October 16-19, 2023

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

### Initiated

1. ‘Landscape Diagnostic Survey of cotton production practices and crop performance in Maharashtra’ w.e.f. October 10, 2023. (ICAR: IASRI:Soumen Pal, Ranjit Kumar Paul; ICAR-CICR: Ramkrushna G.I, Y.G. Prasad, A.R. Reddy (ATARI-Hyderabad), M.V. Venugopalan, Shailesh Gawande, Rahul M. Phuke, M. Sabesh, R. Jaya Kumarvaradan)
2. ‘An AI-based approach for modelling evapotranspiration using remote sensing observations’ w.e.f. November 14, 2023 (Himadri Shekhar Roy, MdYasin, Ranjit Kumar Paul, Prakash Kumar)
3. ‘Development of Advanced information and Communication Technologies (ICTs)-based communication and Education Tools for Millets Promotion w.e.f. November 30, 2023. (In Collaboration with IIMR, Hyderabad: Rajendra R. Chapke, I. K. Das, J. Stanley; ICAR-IASRI: Sudeep Marwaha, Shashi Dahiya, Chandan Kumar Deb, Ashraf Haque, Akshay Dheeraj)
4. ‘NNP Project: Sequence to Systems (S2S): Development of a genome to systems discovery software and server platform using high throughput data and Machine Learning. (DBT)’ w.e.f. October 05,

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### MoU

**A Triparty Memorandum of Understanding:** (MoU) has been signed between (1) Department of Food and Public Distribution (DFPD), Ministry of Consumer Affairs, Food and Public Distribution (MCAF&PD), Govt. of India, (2) The Food Corporation of India (FCI), Head Quarters, New Delhi and (3) ICAR-Indian Agricultural Statistics Research Institute (IASRI), New Delhi at ICAR-IASRI, New Delhi for conducting a study titled “Sampling procedure for selection of representative sample for food grain quality check for DCP and Non-DCP system”.



### Transfer/ Resignation/Deputation

Name	Designation	Effective date
Sh. Sanjay Bokolia	Chief Administrative Officer (Sr. Grade)	10.10.2023 (Joined the Institute)
Sh. Vipin Dagar	LDC	03.11.2023 (Deputation extended to October 28, 2024)

### Wish you a Happy Retired Life

Name	Designation	Effective date
Sh. Raghbir Singh	Bearer	30.11.2023
Sh. Udaivir Singh	Chief Technical Officer	30.11.2023
Mrs. Uma	Chief Technical Officer	30.11.2023

### Transfer/ Resignation/Deputation

Name	Designation	Effective date
Sh. Abhishek Srivastava	Chief Administrative Officer	12.10.2023 Transferred to ICAR-IISR, lucknow



**Compiled and Edited By**

Rajender Parsad, Ajit and Upendra Kumar Pradhan

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