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# ICAR-IASRI NEWS

JULY - SEPTEMBER 2022

ICAR-IASRI NEWS Volume 27 No. 3; July – September 2022



## *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 identified heat stress-responsive miRNA and their target genes, which have critical role in gene regulation during grain filling under heat stress conditions in wheat. Comparative transcriptome analysis has been performed, unfolding the pathways regulating the seed-size trait in cultivated lentil. In association with ICAR-IVRI, our institute developed an Online Vet Clinic App as an extension of Referral Veterinary Clinic services offered at IVRI premises.

To celebrate *Bharat ki Azadi ka Amrut Mahotsav*, organized a Webinar on Cyber security Essentials in Education/ Research Sector. On the occasion of celebrations of Annual Day, 32$^{th}$ Nehru Memorial Lecture was delivered by Dr. G.P. Samanta, Chief Statistician of India on the topic '**Sustainable Development Goals**'. Scientists who have published in 10+ Impact Factor Journals were also felicitated. Agricultural Research Data Book 2022, ISO Certificates of ICAR-Data Centre were released and Kisan Call Centre Data Repository-Collated Historically Aggregated Knowledge based System with Hypertext User-Interface (KCC-CHAKSHU Portal: https://kcc-chakshu.icar.gov.in/) was also launched on the occasion of Annual day. The staff and students of the Institute also celebrated Independence Day and Teachers Day. Hindi Pakhwada was organized during September 14-30, 2022. A total of 45 Research Papers, 03 R Packages were published and 01 new research project initiated. We congratulate our Alumni Dr. Tanuj Mishra for receiving Jawaharlal Nehru Award for best Ph.D. thesis in Social Sciences and Dr. A.R. Rao for ICAR-Rafi Ahmad Kidwai Award. We are happy to share that KISAN SARATHI, KRITIGYA Hackathon Portal, Clean and Green Campus Award Portal and IT Systems in Agricultural Education found a place in the presentation made by Honourable Secretary, DARE and Director General, ICAR on ICAR Foundation Day. Through 04 sensitization training programmes each of one day, trained 180 personnel and 25 participated in Hindi Workshop.

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. Many lectures have been delivered by the Scientists in various training programmes conducted by other organizations.

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

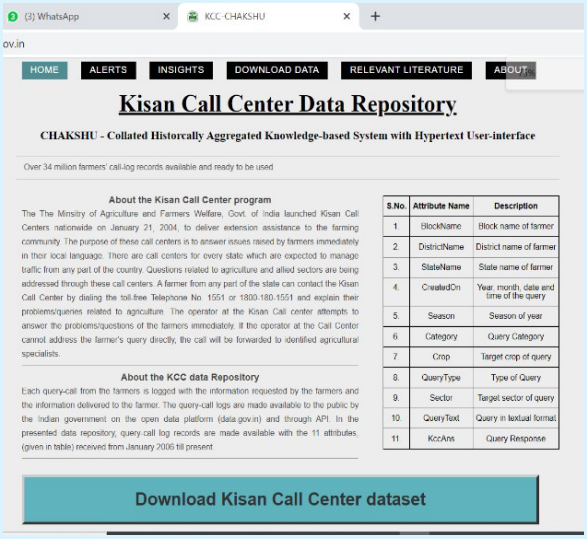
## Identified Heat Stress Responsive miRNA and their Target Genes

Identified heat stress-responsive miRNA and their target genes, which have critical role in gene regulation during grain filling under heat stress conditions in wheat. This valuable information will enrich the knowledge about involvement of different key genes and their expression pattern regulating the grain filling process when exposed to high temperature conditions. This knowledge can be further utilized in identification, characterization, and breeding strategies to develop heat stress-tolerant in wheat varieties. This enhances gene functions and regulators, paving the way for improved heat tolerance in wheat varieties, making them more suitable for production in the current climate change scenario. (CDU, ICAR-IIWBR, ICAR-NBAIM, ICAR-IASRI and CUH)

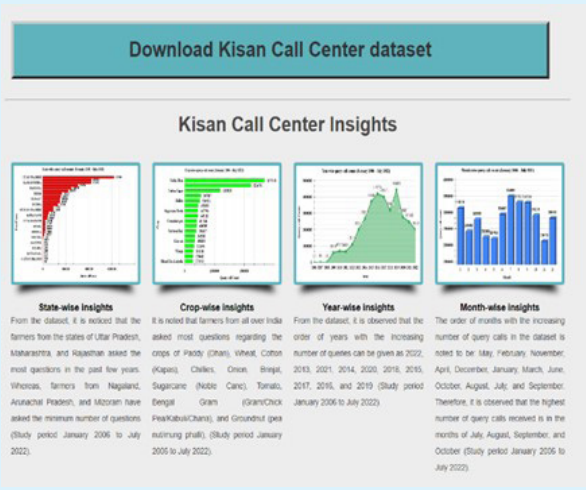
## Comparative Transcriptome Analysis

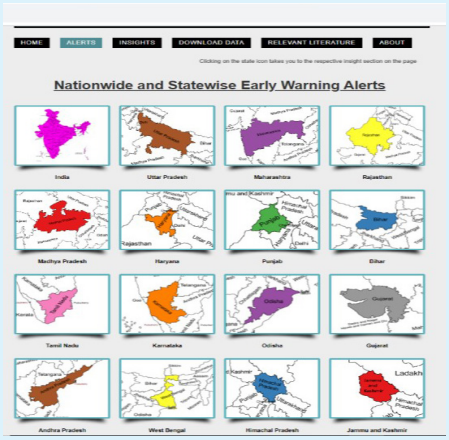
Comparative transcriptome analysis has been performed, unfolding the pathways regulating the seed-size trait in cultivated lentil (Lens culinaris Medik.). It is of interest that the xyloglucan endotransglucosylase gene was found differentially regulated, suggesting their role during seed development, however, at maturity, no significant differences were recorded for various cell wall parameters including cellulose, lignin, and xylose content. This is the first report on lentils that has unfolded the key seed size regulating pathways and unveiled a theoretical way for the development of lentil genotypes having customized seed sizes. (ICAR-IARI, CSIR-Central Salt and Marine Chemicals Research Institute (CSMCRI), ICAR-IASRI, ICAR-NIPB, UNESCO-Regional Centre of Biotechnology (RCB), ICAR-NBPGR and ICARDA)

## KCC-CHAKSHU: Collated Historically Aggregated Knowledge-based System with Hypertext User-interface




The Ministry of Agriculture and Farmers Welfare, Govt. of India launched Kisan Call Center nationwide, to deliver extension assistance to the farming community. The purpose of these call centers is to answer issues raised by farmers immediately in their local language. There are call centers for every state which are expected to manage traffic from any part of the country. Questions related to agriculture and allied sectors are being addressed through these call centers. Each query-call from the farmers is logged with the information requested by the farmers and the information delivered to the farmer. The query-call logs are made available to the public by the Indian government on the open data platform (data.gov.in) and through API. Using this an Online Repository KKC-CHAKSHU (Kisan Call Centre-Collated Historically Aggregated Knowledge Based System using Hypertext User Interface: kcc-chakshu.icar.gov.in) has been developed and launched on July 02, 2022 by Dr. G.P. Samanta, Chief Statistician of India and Secretary, Ministry of Statistics and Programme Implementation, Govt. of India. In the present data repository, 30 million+ query-call log records are made available with the 11 attributes such as the farmer's location (block, district and state), time of call (year, month, date and time of call, season), the question asked by the farmer (query category, crop, Type of query, target sector of query, query in text format) and the solution provided by the Kisan Call Center operator, received from January 2006 till present. The portal also gives access to






nationwide and state-wise early warnings/alerts with query-count and query rate-based insights. The insights are helpful for timely planning for short-term extension activities, which can help reduce the yield gap due to delayed help to farmers.

Furthermore, various nationwide insights regarding the demand for help are also made available. For example, state-wise number of farmers' phone calls made by the Indian farmers are available. Similarly, crop-wise, year-wise, month-wise, sector-wise, category-wise, query type-wise, hour-wise, and many more insights are available through this platform. These insights can be helpful for other call centres and help policy-makers direct the national-level resources.

## Developed Online Vet Clinic App

ICAR-IVRI in association with ICAR-IASRI developed an **Online Vet Clinic App** which was released at ICAR-IVRI Convocation on August 23, 2022. This App is an extension of Referral Veterinary Clinic services offered at IVRI premises with the following features: (i) the animal owner will have easy and hassle-free access to IVRI veterinary polyclinic services at any given point in time from the comfort of his/her home, (ii) direct access to consultancy/advice from the leading scientific experts in the fields of veterinary medicine, surgery, reproduction, pathology, parasitology, nutrition, breeding and management, (iii) provision to the animal owner for sharing basic information like age, gender, and weight along with photos and videos of the animal(s) with the IVRI experts so as to enable accurate diagnosis of the condition and ensure effective prescription/remedies for the problem and (iv) multiple convenient communication channels to the animal owner for interaction with experts including voice calls, video calls and chat which will install within animal owners a greater sense of belongingness. The mobile App is available at https://play.google.com/store/apps/details?id=net.iasri.ivri.animalscience.ovcca

## Developed R - Packages: 04

- **'iRoCoDe'** for the generation of the row-column design (https://cran.r-project.org/web/packages/iRoCoDe/index.html). A catalogue of designs has been prepared using "iRoCoDe" for ≤ 20 treatments. Further, a general form of the information matrix of these incomplete row–column designs has been derived, and characterization properties of component designs of the final array have been studied. The designs obtained are cost-effective and efficient as they require less experimental resources and have high canonical efficiency factors.
- **'vmdTDNN'** (VMD Based Time Delay Neural Network Model) for forecasting univariate time series with Variational Mode Decomposition (VMD) based time delay neural network models. (https://cran.r-project.org/web/packages/vmdTDNN/ )
- **'VMDML'** (Variational Mode Decomposition Based Machine Learning Models) Application of Variational Mode Decomposition based on different Machine Learning models for univariate time series forecasting. This package has implemented four different variants of Variational Mode Decomposition based univariate models namely VMDARIMA, VMDRF, VMDSVR and VMDTDNN. (https://cran.r-project.org/web/packages/VMDML/)
- **'Auto-Weather-Indices':** Calculating Weather Indices (https://cran.r-project.org/web/packages/AutoWeatherIndices/index.html). This package provides the user with weather indices from the weather variables. The obtained weather indices are crucial inputs for further implementation of any statistical tools such as regression analysis, time series models or any machine learning algorithm in regression framework.

## Developed Biological-Database/Software-Tool: 03

- **TiGeR** (Database): *Tilletia indica* genomic resource freely accessible at http://backlin.cabgrid.res.in/tiger.
- **DeepAProt** (Software-Tool)**:** Abiotic stress protein classification tool using Deep Learning in cereal: A web-based

tool that helps the biologist to classify the unknown protein sequence to the respective class of abiotic stress. This web-server is freely accessible at http://login1.cabgrid.res.in:5000.

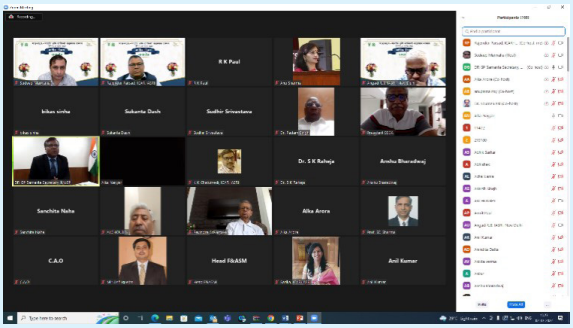
- **ASRpro** (Online prediction application): Computational model for identifying genes responsive to six abiotic stresses: cold, drought, heat, light, oxidative, and salt. The predictions were performed using support vector machine (SVM), random forest, adaptive boosting (ADB), and extreme gradient boosting (XGB). The online prediction application, **ASRpro**, is made freely available (https://iasri-sg.icar.gov.in/asrpro/) for predicting abiotic SRGs and proteins.

# PANORAMA OF ACTIVITIES

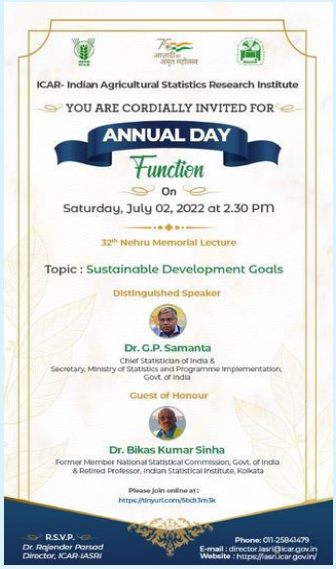
## Azadi Ka Amrut Mahotsav Celebrations: 01 Webinar

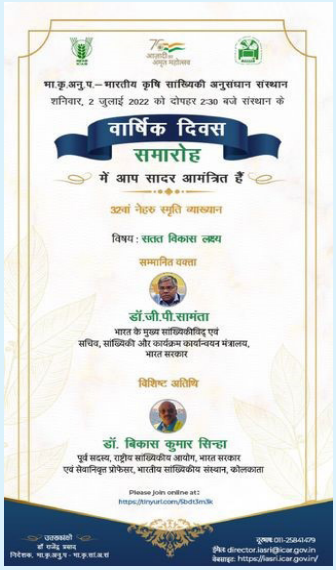
– **Cyber security Essentials in Education /Research Sector** by Sh. Ravi Badge, President and owner CMIT Solutions, New Jersey was organized on July 01, 2022.

## Annual Day




– Celebrated Annual Day of the Institute on July 02, 2022 in online mode. **Dr. G.P. Samanta**, Chief Statistician of India & Secretary, Ministry of Statistics and Programme Implementation, Government of India was the Chief Guest of the function delivered **32th** Nehru Memorial Lecture on the topic **Sustainable Development Goals** and Professor Bikas Sinha, Former Member, National Statistical Commission and Retired Professor, Indian Statistical Institute, Kolkata was the Guest of Honour. Agricultural Research Data Book 2022, ISO Certificates of ICAR-Data Centre were released and Kisan Call Centre Data Repository-Collated Historically Aggregated Knowledge based System with Hypertext User-Interface (KCC-Chakshu Portal: https://kcc-chakshu.icar.gov.in/) was launched on the occasion. Following students received Nehru Memorial Gold Medal for being the Best M.Sc. student for the session 2019-2021: (i) Mr. Manoj Varma, M.Sc. (Agricultural Statistics); (ii) Ms. Pratiksha Subba, M.Sc. (Computer Application) and (iii) Mr. Bibek Saha, M.Sc. (Bioinformatics). Certificates of Appreciation were also given to following authors for publishing research papers in Journals with 10+ IF: (i) Dr. Hukum Chandra (Posthumously); (ii) Dr. Vandita Kumari and (iii) Dr. Sudhir Srivastava.



## Independence Day

– The Institute celebrated 75 years of Independence on August 15, 2022. Dr. Rajender Parsad, Director hoisted the National Flag at ICAR-IASRI, New Delhi and addressed the staff and students. The students and faculty presented a cultural programme on the occasion.

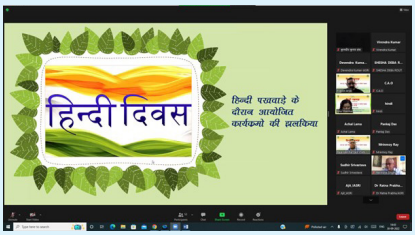
## Teacher's Day

– The Institute celebrated Teacher's Day on September 05, 2022 in Hybrid mode (both Offline and Online). Dr. (Mrs.) Pankaj Mittal, Secretary General, Association of Indian Universities presented the Teacher's day lecture; Dr. Murari Singh, Former Senior Biometrician, ICARDA was conferred as Inspiring Teacher in the presence of Dr. R.C. Agarwal, DDG(Agricultural Education), ICAR and Dr. Rajender Parsad, Director, ICAR-IASRI. Students organized cultural program and decorated the different buildings with beautiful Rangoli's.



# हिन्दी पखवाड़ा

## वर्ष 2022 के दौरान संस्थान में आयोजित हिन्दी पखवाड़ा की रिपोर्ट




संस्थान में 14 से 30 सितम्बर, 2022 के दौरान हिन्दी पखवाड़े का आयोजन किया गया । इस वर्ष हिन्दी पखवाड़े का उदघाटन हिन्दी दिवस एवं दूसरे आखिल भारतीय राजभाषा सम्मेलन के अवसर पर 14 सितम्बर, 2022 को सूरत, गुजरात में श्री अमितशाह, माननीय गृह एवं सहकारिता मंत्री द्वारा किया गया था जिसमें संस्थान से प्रभारी, हिन्दी एकक श्री उदय वीर सिंह एवं मुख्य वित्त एवं लेखा अधिकारी, श्री केवल कुमार शर्मा ने सहभागिता की थी। हिन्दी पखवाड़े का आयोजन एवं इससे संबन्धित प्रतियोगिताएं दिनांक 17 से 29 सि. तम्बर, 2022 के दौरान संस्थान में आयोजित की गयी। दिनांक 17 सितम्बर, 2022 को काव्य पाठ प्रतियोगिता का आयोजन किया गया। हिन्दी पखवाड़ा के दौरान डॉ दरोगा सिंह स्मृति व्याख्यान के साथ–साथ वैज्ञानिक प्रभागों में हिन्दी में सर्वाधिक वैज्ञानिक कार्य करने के लिए प्रभागीय चल–शील्ड, डिजिटल हिन्दी शोध–पोस्टर प्रस्तुति प्रतियोगिता, डिजिटल हिन्दी पोस्टर प्रस्तुति प्रतियोगिता, हिन्दी श्रुतलेख तथा हिंदीतर कर्मियों के लिए शब्दार्थ लेखन प्रतियोगिताएं भी आयोजित की गईं। सभी प्रतियोगिताओं में संस्थान के विभिन्न वर्ग के कर्मियों ने बढ़–चढ़कर हिस्सा लिया। संस्थान में प्रत्येक वर्ष हिन्दी दिवस के अवसर पर डॉ दरोगा सिंह स्मृति व्याख्यान का आयोजन किया जाता है। लेकिन इस वर्ष इस कड़ी का इकत्तीसवां व्याख्यान दिनांक 30 सितम्बर, 2022 सिम्बायोसिस युनिवेर्सिटी ऑफ एप्लाईड साइंसिज, इंदौर के कुलपति M,Œ iFoh iky ;kno जी द्वारा दिया गया और इस कार्यक्रम की अध्यक्षता संस्थान के निदेशक महोदय Mk jkt Un i l kn द्वारा की गई। दिनांक 30 सितम्बर, 2022 को हिन्दी पखवाड़ा के समापन समारोह के अवसर पर इस दौरान आयोजित प्रतियोगिताओं के सफल प्रतियोगियों के साथ–साथ वर्ष 2021–22 के लिए सरकारी काम–काज मूल रूप से हिन्दी में करने के लिए प्रोत्साहन योजना के अंतर्गत भी नकद पुरस्कारों की घोषणा की गयी। इसके अतिरिक्त इस अवसर पर अगस्त, 2021 से अगस्त, 2022 तक की अवधि के दौरान संस्थान में आयोजित हिन्दी कार्यशालाओं के वक्ताओं को प्रशस्ति–पत्र प्रदान किए जाने की भी घोषणा की गयी।

# WORKSHOPS/WEBINARS/MEETINGS ETC. ORGANIZED

## Research Advisory Committee Meeting

The 21st Meeting of Research Advisory Committee (RAC) of the Institute was held on August 23, 2022. The meeting was Chaired by Professor Bikas K Sinha, Ex-Professor of Statistics, ISI Kolkata and Former Member, National Statistical Commission, Govt. of India. Professor K. Muralidharan, Professor, Department of Statistics, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara, Gujarat; Dr. Indranil Mukhopadhyay, Professor, Human Genetics Unit, Indian Statistical Institute, Kolkata; Dr. Mausam, Professor, Jai Gupta Chair, Department of Computer Science and Engineering, IIT Delhi; Dr. P.S. Pandey, ADG (EP&HS), ICAR, New Delhi; Dr. Rajender Parsad, Director, ICAR-IASRI, New Delhi as Members also graced the occasion. Dr. Ajit as Member Secretary organized the meeting. Head of Divisions and Professors of teaching disciplines were also present as invitees.

At the outset, Dr. Rajender Parsad, Director, ICAR-IASRI, welcomed all the members of the Research Advisory Committee (RAC). He also presented brief bio-data of all esteemed members of RAC. Thereafter, Professor Bikas Sinha, Chairman, RAC also welcomed all the members of the Research Advisory Committee and other invitees. Professor Sinha congratulated all scientists of the Institute who worked in the direction of fulfilling the recommendations of last RAC. He emphasized that the research programmes of the Institute are in accordance with the Government of India Programmes. He further said that although few projects are linked with SDGs (Sustainable Development Goals), yet more emphasis should be laid on linking the research projects with SDGs.

The research and development activities of the Institute were presented by Dr. Rajender Parsad along with brief mention about the growth of the Institute since inception in 1930. He emphasized that several statistical methodologies have been developed through basic research and these are widely being adopted in National Agricultural Research and Education System (NARES) and several African and Latin American Countries. Following are some of the salient achievements of the Institute.

- Developed efficient and cost effective design of experiments, analysis of experimental data and their innovative applications for both single factor and multi-factor experiments with respect to crop improvement programmes, breeding trials, food processing, post-harvest storage and value addition, crop sequence experiments, agroforestry experiments, designs for multi-stage trials, experiments in which it is difficult to change level of factors, artificially created environments, farmers' participatory research trials for resource conservation technologies, experiments with mixtures, etc. involved in the planning, designing and analysis of several AICRPs including Integrated Farming Systems Research (both on station and on farm trials), Soil Test Crop Response, Long Term Fertilizer Experiments, Vegetable Crops, Sorghum, Small Millets, Maize, Oilseeds, etc. Efforts made through advisory services have led to the adoption of efficient designs and advanced statistical analytical techniques by the stakeholders.
- Developed procedure of estimation of genetic parameters beginning with Military Dairy Farm data; Construction of selection indices; Procedures for G × E interactions; Progeny testing and sire evaluations; Detection of QTLs; Classification of genotypes using molecular marker data; Procedures for studying genotype environment and QTL environment interactions, etc. Procedures of estimation of genetic parameters have also been suggested for incorporating the effect of unbalanced data, presence of outliers, aberrant observations and non- normality of data sets.
- Developed Forecasting crop yield models and Forewarning of pests and diseases models, Non-linear models, Structural time series, Neural network, Machine learning algorithms, ARIMAX, LASSO, Bayesian and random Forest, etc. Weather indices based models have been used for FASAL programme of Govt. of India by Indian Meteorological Department. Internet-based forewarning system for aphid in mustard crop successfully adopted in Models for forewarning of aphids in Mustard by then National Research Centre on Rapeseed and Mustard, Bharatpur. Developing a WIAYFS (Weather Indices based Automated Yield Forecasting System) web tool. The statistical models developed have potential applications in long term projections of food grain production, aphid population, Marine Fish Production, etc.
- Developed Sampling Methodology for Crop yield estimation through Crop Cutting Experiments (CCE) (Successfully adopted in General Crop Estimation Surveys; widely being adopted in African and Latin American Countries); Estimation of harvest and Post-harvest losses of major crops and commodities; Successfully adopted in AICRP on Post harvest technology: Accepted by Ministry of Food Processing,

Govt. of India; Estimation of post-harvest losses of horticultural crops (fruits and vegetables), livestock (meat and milk) and fish, field tested in Mexico, Zambia, Nepal and Thailand: Accepted by Food and Agriculture Organization (FAO) and United Nation (UN) member countries; Estimating crop area, yield and production under mixed, repeated and continuous cropping, field tested in Indonesia, Rwanda and Jamaica: Accepted by FAO; Estimation of private food grains stock at farmers level; Alternative methodology for estimation of area and production of horticultural crops: Accepted by Ministry of Agriculture and farmers Welfare (MOA&FW) and adopted in Haryana; Integrated methodology for estimation of multiple crop area of different crops in North Eastern Hilly Regions using remote sensing data: Adopted in Meghalaya, Tripura and North Eastern States; Integrated sample surveys for livestock products, fruit and vegetable surveys, etc; Estimation of cotton production using double sampling approach: adopted in all major cotton growing states'; Small area estimation techniques: Skewed data, spatial non-stationarity, and others.

- Integration of technologies and CCEs for providing estimates at GP (Gram-Panchayat) level for PMFBY (Prime Minister Fasal Bima Yojna).
- Statistical packages and software: (i) SPAR : Statistical Package for Agricultural Research data analysis, (ii) SPAD: Statistical Package for Augmented Designs, (iii) SPFE: Statistical Package for Factorial Experiments, (iv) SPBD: Statistical Package for Balanced Incomplete Block Designs, (v) SPAB: Statistical Package for Animal Breeding and (vi)SSDA: Software for Survey Data Analysis
- R-Packages: 30+ R-packages have been developed with most of them having 10000+downloads
- Web Resources for E-learning and e-advisory: Design Recourses Server; Sample Survey Resources Server are being used throughout the Globe; Service oriented computing through Indian NARS Statistical Computing Portal has 200+ logged on users per day from NARES, developed Information Systems for AICRPs serving as research data repository, standardization of analysis and reports
- KRISHI portal (Agricultural Knowledge Resources and Information Systems Hub for Innovation) as a centralized research data repository for knowledge management (recognized in the form of Gold Icon Award from MEITY, Govt. of India)
- ASHOKA (Advanced supercomputing Hub for OMICS Knowledge in Agriculture) for high performance computing in the field of agricultural bioinformatics and computational biology.
- National Agricultural Biocomputing Portal established at the Institute is playing an important role as a single point access to High Performance Computing (HPC) facility and in development of algorithms for Genome Assembly and automation of tools for NGS. 60+ biological databases/servers/systems/prediction tools have been developed.
- Established ICAR Data Center and ICAR-DR (Disaster-Recovery) that holds certified IT Service Management System (ISO/IEC 20000-1:2011) and Unified Communication & Web hosting services with "icar.gov.in" domain. It also hosts ICAR Cloud Infrastructure and Services: KRISHI MEGH. Several of the Mobile Apps developed have 50000+ and 10000+ downloads. **KVK-Portal and Mobile App (**Presently, 677 KVKs throughout the country enrolled; ATARIs monitor the activities of KVKs using this portal and Portal has been visited **20 lakhs +** times); **Education Portal (**Being used by students and faculty in NARES: 17,93,500 + views in last three years); **KRISHI**-Portal (Central Research Data Repository to support the Open Government Data Platform and Digital-India programme; ICAR received the Gold Icon Award; **KISAN-SARATHI**: System of Agri-information Resources Auto-transmission and Technology Hub Interface initiated have a two way exchange with farmers); Academic management System being used in 52 Agricultural Universities.
- ICAR-IASRI fraternity has been conferred with many national awards, specifically to mention are Professor P.V. Sukhatme, National Award in Statistics by Ministry of Statistics and Programme Implementation (five recipients in various years), Rafi Ahmad Kidwai Award (three recipients), National Award in Statistics in Honour of CR Rao (two recipients), INSA-Fellow (two recipients), ICAR-National Professor (One recipients), ICAR-National-Fellow (three recipients), NAAS Young Scientist Award in Social science (three recipients), Recognition Award from NAAS in Social Sciences (two recipients), NAAS Fellow (twelve recipients), NAAS Associate (four recipients), Lal Bahadur Shastri Young Scientist (five recipients), Jawaharlal Nehru Award for Ph.D. Thesis (five recipients), C Subramaniam ICAR Best Teacher Award (two recipients), IARI Best Teacher Award (eight recipients) and many other Young-Scientist-Award by various societies.

– He also presented the research, teaching and training activities of the Institute and summarized and significant research achievements of the Institute (during the last two years).

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 day long deliberations, presentations and discussions on the research, teaching and training activities of the Institute, the following action points/ recommendations emerged:

1. The Institute should put rigorous emphasis on enhancing the visibility of the Institute (a) improving contents/ look-and-feel of the website, social-media-posting, ICAR-IASRI Wikipedia page etc. (b) highlighting the impact factor of the papers published, h-index, placement of students. Further aspects of Impact of Research, Teaching and Training activities of the Institute also need to be studied.
2. The Institute should organize following two Workshops (i) "Meta-Data-Analysis" under the consultation and guidance of Prof. Bikas Sinha and (ii) "Data-Integration" under the consultation and guidance of Prof. Indranil Mukhopaddhyay and other members.
3. Policy paper on Fertilizer Recommendations based on data from Long Term Fertilizer Experiments data, Organic farming, and various Experiments and Surveys should be brought out at the earliest possible by including the soil data from Long Term Fertilizer Experiments.
4. Proposal on virtual Centre of Excellence on Artificial Intelligence may be prepared and implemented the earliest possible.
5. Policy paper on Fertilizer Recommendations based on data from Long Term Fertilizer Experiments data, Organic farming, and various Experiments and Surveys should be brought out at the earliest possible by including the soil data from Long Term Fertilizer Experiments.
6. ICAR-IASRI should initiate PG Diploma/Diploma Courses on Data-Science.
7. Ecosystem for Early Warnings on agricultural crops/animals should be developed.

## Other Meetings

- Meetings for the feedback, improvement, enrichment and resolving the issues of KVKs in Kisan Sarathi.
- Organized and Co-chaired a meeting along with the Director of the institute on Precision Agriculture on Farm Machinery on August 25, 2022 in ICAR-CIAE, Bhopal and August 26, 2022 at ICAR-IISS, Bhopal. (Anil Rai)

## Seminars Delivered

- A total of 48 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 | 5 |
| | New Project Proposal | |
| | Foreign Visit | |
| | General | |
| Student | Course | 20 |
| | ORW | 9 |
| | Thesis | 14 |
| **Total** | | **48** |

# PUBLICATIONS

## Research Papers

1. Alam K, Biswas DK, Bhattacharyya R, Das D, Suman A, Das TK, Paul RK, Ghosh A, Sarkar A, Kumar R. and Chawla G. (2022). Recycling of silicon-rich agro-wastes by their combined application with phosphate solubilizing microbe to solubilize the native soil phosphorus in a sub-tropical Alfisol. *Journal of Environmental Management*, **318**, 115559.
2. Bana RS, Dawar R, Haldhar S M, Godara S, Singh A, Bamboriya SD, Kumar V, Mishra AK and Choudhary M (2022). Natural farming: Is it safe to march ahead? *Journal of Agriculture and Ecology*, **14**, 1-11.
3. Biswas B, Chakraborty D, Timsina J, Ray BJ, Ghosh DK, Sarkar A, Mondal M, Bhowmick UR, Adhikary S, Kanthal S, Patra K, Parsad Rajender, Mahapatra BK (2022). Agroforestry offers multiple ecosystem services in degraded lateritic soils. *Journal of Cleaner Production*, **365**, 132768. https://doi.org/10.1016/j.jclepro.2022.132768
4. Chaudhari SK, Patra A, Dey P, Bal SK, Gorantiwar S and Parsad R (2022). Sensor based monitoring for improving agricultural productivity and sustainability-A review. *Journal of the Indian Society of Soil Science,* **70(2)**, 121-141. https://krishi.icar.gov.in/jspui/handle/123456789/74683
5. Das S, Pradhan U, and Rai SN (2022). Five years of gene networks modeling in single-cell RNA-sequencing studies: current approaches and outstanding challenges. *Current Bioinformatics*, **17(10)**, 888-908. https://doi.ore/10.2174/1574893617666220823114108
6. Dey SS, Sharma P, Das M.A, Jaiswal S, Behera TK, Kumari K, Boopalakrishnan G, Iquebal MA, Bhattacharya RC, Rai A and Kumar D (2022). Genome wide identification of lncRNAs and circRNAs having regulatory role in fruit shelf life in health crop cucumber (Cucumis sativus L). *Frontiers in Plant Science*, **13**, 884476. https://doi.ore/10.3389/fpls.2022.884476
7. Dutta H, Mishra GP, Aski MS, Bosamia TC, Mishra DC, Bhati J, Sinha SK, Vijay D, Manjunath PCT, Das S, Pawar PM, Kumar A, Tripathi K, Kumar RR, Yadava DK, Kumar S and Dikshit HK (2022). Comparative transcriptome analysis, unfolding the pathways regulating the seed-size trait in cultivated lentil (Lens culinaris Medik.). *Frontiers in Genetics*, **13**:942079. https://doi.org/10.3389/fgene.2022.942079
8. Ghosh S, Das TK, Shivay YS, Bandyopadhyay KK, Sudhishri S, Bhatia A, Biswas DR, Yeasin M and Ghosh S (2022). Weeds response and control efficiency, greengram productivity and resource-use efficiency under a conservation agriculture-based maize-wheat-greengram system. *Indian Journal of Weed Science*, **54(2)**, 157–164.
9. Godara S and Toshniwal D. Deep (2022). Learning-based query-count forecasting using farmers' helpline data. *Computers and Electronics in Agriculture*, **196**, 106875.
10. Godara S, Toshniwal D, Parsad Rajender, Bana R, Singh D, Bedi J, Jhajhria A, Dabas JPS and Marwaha S (2022). AgriMine: A deep learning integrated spatio-temporal analytics framework for diagnosing nationwide agricultural issues using farmers' helpline data. *Computers and Electronics in Agriculture*, **201**, 107308. https//doi.org/10.1016/j.compag.2022.107308, http://krishi.icar.gov.in/jspui/handle/123456789/73866
11. Hatte VM, Prakash S, Kumar NR, Vivekanandan E and Ramasubramanian V (2022). Constraint analysis of fishermen and market intermediaries of marine fish markets in Ratnagiri, Maharashtra, India. *Asian Journal of Agricultural Extension, Economics and Sociology*, **40(10),** 90-96.
12. Jain P, Singh A, Iquebal MA, Jaiswal S, Kumar S, Rai A and Kumar D (2022). Genome-wide analysis and evolutionary perspective of cytokinin dehydrogenase gene family in wheat (Triticum aestivum L.). *Frontiers in Genetics*, **13**, 931659. http://doi.org/10.3389/fgene.2022.931659
13. Jaiswal R, Choudhary K and Kumar RR (2022). STLELM: A decompositionbased hybrid model for price forecasting of agricultural commodities. *National Academy Science Letters*, **46(6)**, 477-480. https://doi.org/10.1007/s40009-022-01169-9
14. Jayaswal D, Mainkar P, Kumar K, Agarwal Y, Prabha R, Kalia V and Kansal R (2022). Pyramiding and evaluation of segregating lines containing lectin and protease inhibitor genes for aphid resistance in Brassica juncea. *Indian Journal of Biochemistry and Biophysics,* **59(8)** 800-807. https://doi.org/10.56042/ijbb.v59i8.62319
15. Karkute SG, Kumar V, Tasleem M, Mishra DC, Chaturvedi KK, Rai A, Mithra SA, Gaikwad K, Sharma TR and

Solanke AU (2022). Genome-wide analysis of von willebrandfactor A (vWA) gene family in rice for its role in imparting biotic stress resistance with emphasis on rice blast disease. *Rice Science*, **29(4)**, 375-384.

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17. Karmakar S, Varghese C, Haque MA, Jaggi S, Harun M, and Varghese E (2022). A note on the construction of incomplete row-column row–column designs: An algorithmic approach. *Journal of Statistical Planning and Inference*, **222**, 108-121. https://doi.org/10.1016/j.jspi.2022.06.004, http://krishi.icar.gov.in/jspui/handle/123456789/73635
18. Kumar B, Kumar A, Jaiswal S, Iquebal MA, Angadi UB, Tomar RS, Rai A and Kumar D (2022). Genome-wide identification of long non-coding RNAs in pearlmillet (Pennisetum glaucum (L)) genotype subjected to drought stress. *MDPI Agronomy,* **12(8)**, 1976. https://www.mdpi.com/2073-4395/12/8/1976/htm
19. Kumar SS, Mir SA, Wani OA, Babu S, Yeasin M, Bhat MA, Hussain N, Ali Wani AI, Kumar R, Yadav D and Dar SR (2022). Land-use systems regulate carbon geochemistry in the temperate Himalayas. India. *Journal of Environmental Management*, **320**, 115811.
20. Madhu and Kumar R (2022). Detection and Classification of Tumor using SVM and ANN with GLCM features, *CBIR. Journal of Algebraic Statistics*, **13(1)**, 1790-1804.
21. Maji AK, Marwaha S, Kumar S, Arora A, Chinnusamy V and Islam S (2022). SlypNet: Spikelet-based yield prediction of wheat using advanced plant phenotyping and computer vision techniques. *Frontiers in Plant Science* **13**, 889853. http://krishi.icar.gov.in/jspui/handle/123456789/74051
22. Mandal NK, Kumari K, Kundu Arora A, Bhowmick A, Kumar P, Iquebal MA, Jaiswal S, Behera TK, Munshi Das A and Dey SS (2022). Cross-talk between the cytokinin, auxin and gibberellin regulatory networks determining parthenocarpy in cucumber. *Frontiers in Genetics*, **13**, 957360. https://www.frontiersin.org/articles/10.3389/fgene.2022.957360/full
23. Meher PK, Sahu TK, Gupta A, Kumar A and Rustgi S (2022). ASRpro: A machine-learning computational model for identifying proteins associated with multiple abiotic stress in plants. *The Plant Genome*, e20259. https://doi.org/10.1002/tpg2.20259
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26. Padhi SR, John R, Bartwal A, Tripathi K, Gupta K, Wankhede DP, Mishra GP, Kumar S, Rana JC, Riar A and Bhardwaj R (2022). Development and optimization of NIRS prediction models for simultaneous multi-trait assessment in diverse cowpea germplasm. *Frontiers in Nutrition*, **9**. https://doi.org/10.3389/fnut.2022.100155
27. Parihar AK, Gupta S, Hazra KK, Lamichaney A, Gupta DS, Singh D, Kumar R, Singh AK, Vaishnavi R, Muniyandi SJ, Das SP, Sharma JD, Yadav RK, Jamwal BS, Choudhary BR, Khedar OP, Prakash V, Dikshit HK, Panwar RK, Kumar M, Kumar P, Mahto CS, Borah HK, Singh MN, Das A, Patil AN, Nanda HC, Kumar V, Rajput SS, Chauhan DA, Patel MH, Kanwar R, Kumar J, Mishra SP, Kumar H, Swarup I, Mogali SC, Kumaresan D, Manivannan N, Byregowda M, Muthaiyan P, Rao PJM, Shivani D, Prusti AM, Mahadevu P, Iyanar K and Dass (2022). Multi-location evaluation of mungbean (*Vigna radiata L*) in Indian climates: eco-phenological dynamics, yield relation and characterization of locations. *Frontiers in Plant Science*, **13**. https://doi.org/10.3389/fpls.2022.984912
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30. Paul RK, Yeasin Md and Paul AK (2022). The volatility spillover of potato prices in different markets of India. *Current Science*, **123(3)**, 482-487.

31. Paul RK, Yeasin Md, Kumar P, Kumar P and Gupta A (2022). Machine learning techniques for forecasting agricultural prices: A case of brinjal in Odisha, India. *PLOS ONE*, **17(7)**, e0270553. https://doi.org/10.1371/journal.pone.0270553

32. Pratap V, Dass A, Dhar S, Babu S, Singh VK, Singh R, Krishnan P, Sudhishri S, Bhatia A, Kumar S, Choudhary AK, Singh R, Kumar P, Sarkar, SK, Verma, SK, Kumari, K, San, AA (2022). Co-implementation of tillage, precision nitrogen, and water management enhances water productivity, economic returns, and energy-use efficiency of direct seeded rice. *Sustainability*, **14**, 11234. https://doi.org/10.3390/ su141811234, http://krishi.icar.gov.in/jspui/handle/123456789/74091

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36. Sagar A, Hasan M, Singh DK, Al-Ansarib N, Vishwakarma, Kumar D, Chakraborty D, Kumar A, Malkani P, Singh MC, Iquebal MA, Srivastava A and Ahmed E (2022). Development of smart weighing lysimeter for measuring evapotranspiration and developing crop coefficient for greenhouse chrysanthemum. *Sensors*, **22**, 6239. https://doi.org/10.3390/s22166239

37. Saha S, Singh D, Rangari S, Negi L, Banerjee T, Dash S, Kundu A, Dutta A, Mandal A, Patanjali N, Kumar R, Kumar A, and Singh A (2022). Extraction optimization of neem bioactives from neem seed kernel by ultrasonic assisted extraction and profiling by UPLC-QTOF-ESI-MS. *Sustainable Chemistry and Pharmacy*, **29**, 100747. http://krishi.icar.gov.in/jspui/handle/123456789/73643

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40. Singh D, Singh CK, Siddiqui MH, Alamri S, Sarkar SK, Rathore A, Prasad SK, Singh D, Sharma NL, Kalaji HM and Brysiewicz A (2022). Hydrogen sulfide and silicon together alleviate chromium (VI) toxicity by modulating morpho-physiological and key antioxidant defense systems in Chickpea (Cicer arietinum L) varieties. *Frontiers in Plant Sciences*, **13**, 963394. https://doi.org/10.3389/fpls.2022.963394

41. Tanwy D, Mishra DC and Rai A (2022). Role of bioinformatics in the development of plant genetic resources. *Indian Journal of Plant Genetic Resources*, **35(3)**, 200–203. https://doi.org/10.5958/0976-1926.2022.00069.9

42. Thankchen J, Iyer R, Gupta K, Azmi F.T and Ray M (2022). Relationship between employee resilience and work role performance in higher education. *Positif Journal*, **22(9),** 138-153.

43. Thapa S, Mahapatra S, Baral D, LamaA, Shivakoty P and Das S (2022). Status of false smut of rice in different districts of West Bengal. *Oryza*, **59**, 167-171, http://krishi.icar.gov.in/jspui/handle/123456789/73606

44. Tiwari D, Murmu S, Indari O, Jha H.C and Kumar S (2022). Targeting Epstein-Barr virus dUTPase, an immunomodulatory protein using anti-viral, anti-inflammatory and neuroprotective phytochemicals. *Chem*

*Biodivers*, **19(9),** e202200527. https://onlinelibrary.wiley.com/doi/10.1002/cbdv.202200527

45. Yeasin M, Haldar D, Kumar S, Paul RK, and Ghosh S (2022). Machine Learning Techniques for Phenology Assessment of Sugarcane Using Conjunctive SAR and Optical Data. *Remote Sensing*, **14(14)**, 3249. https://doi.org/10.3390/rs14143249

### Book Chapters

- Tandon Gitanjali, Jaiswal Sarika, Iquebal Mir Asif, Rai Anil, Kumar Dinesh. (2022). Whole Genome Wide SSR Markers Identification Based on ddRAD-seq Datain. In: *Plant Genotyping: Methods and Protocols*. Eds Yuri Shavrukov, Springer Science Media, pp 59-66, LLC, 1 New York Plaza, New York, NY 10004, U.S.A.

### Popular Articles

- Triveni Dutt, Rupasi Tiwari, Anuj Chauhan, Ujjwal Kumar De, Brijesh Kumar, Subhisha C., Rajender Parsad, Sudeep, Sanjeev Kumar, Sameer Srivistave, Keshav Kant. IVRI-Online Veterinary Clinic. ICAR-IVRI, Izatnagar and ICAR-IASRI, New Delhi
- राहुल बनर्जी, भारती, पंकज दास एवं मनीष कुमार (2021). कृषि में सांख्यिकी का अनुप्रयोग, कृषि सेवा हिन्दी ऑनलाइन, ई–पत्रिका। (https://wwww.krishisewa.com/)

## PAPERS PRESENTED/LECTURES DELIVERED

### Paper presented /Invited talk delivered in Conferences

- Pusa Krishi's flagship incubation programs -- **ARISE & UPJA 2021** organized by ZTM & BPD Unit, IARI, New Delhi on July 6, 2022
  - Alka Arora. ICAR Repository for Knowledge Management.
- DBT-sponsored workshop on **AI in Modern Biology** at ICGEB, New Delhi from August 23 -25, 2022
  - Sarika Sahu. Identification and characterization of ncRNAs and hands on session on August 24, 2022.
- International Conference on **Systems Analysis for Enabling Integrated Policy Making** organised by TIFAC during August 10-12, 2022
  - Das P*, Kumar S and George J. Application of machine learning techniques for prediction of soil properties.
- Online International Conference on **Advances in Agriculture and Food System towards Sustainable Development Goals** jointly organized by ICAR, AIASA and UAS Banglore at University of Agricultural Sciences, Bangalore during August 22-24, 2022
  - Bharti*, Mohammed J, Ahmad T and Bansal S. Application of randomized response technique in forestry – A case study to measure proportion of forest encroachment in Shimla district of Himachal Pradesh.
  - Sneha Murmu. Bioactivity prediction of microbial-derived natural products using machine learning algorithm on August 22, 2022.
- International Conference on **Biotechnological Trends and Prospects** organized by University of Agricultural Sciences, GKVK, Bangalore during September 13-15, 2022
  - Ratna Prabha. Metagenomics insights into reproductive tract of White Pekin and Khaki Campbell ducks.
- International Conference on **Mathematical Modelling, Analysis and Computing** (MMAC-2022) organized by Department of Mathematics, Thiruvalluvar University, Vellore, Tamil Nadu in an Online Mode during September 14-16, 2022
  - Rahul Banerjee. Construction of Saturated Designs for Mixture Experiments on September 16, 2022.
- Conference on Molecular Biology and **Bioinformatic Tools and its Application in Agriculture and Allied Sciences** organized by Centre of Excellence in Agri Biotechnology, College of Biotechnology, SVPUAT, Meerut during September 08-21, 2022
  - Sarika. Gene Expression analysis using NGS data on September 17, 2022.

- Mir Asif Iquebal. Marker discover using NGS Data and its application in agriculture on September 17, 2022.

- International Conference on **Advances in Agriculture, Veterinary and Allied Sciences for Improved Livelihood and Environment Security** (AAVASILES-2022) organized jointly by ICAR-IGFR, RRS, Srinagar, ICAR-NAHEP, BAU, Ranchi and NADCL, Baramulla at University of Kashmir, Hazratbal in an online mode during September 28-30, 2022
  - Sneha Murmu. Prediction of protein-protein interactions between anti-CRSIPR and CRISPR-Cas using machine learning technique on September 29, 2022.

## Lectures Delivered (Outside Institute)

- DST-SERB sponsored high end workshop on Statistical and Machine Learning Techniques for Agricultural Systems Modeling and Forecasting using R organized by ICAR-Indian Institute of Rice Research, Hyderabad during July 18-30, 2022
  - Two lectures on (i) **Wavelets for time series analysis** and (ii) l**ong memory time series model**s on July 25, 2022. (Ranjit Kumar Paul).
  - One lecture on **Basics of python programming** on July 23, 2022. (Prakash Kumar)
  - One lecture on **LASSO and elastic net regression** on July 19, 2022. (Bishal Gurung)
  - One lecture on **Extreme learning machin**e on July 23, 2022. (Rajeev Ranjen Kumar)
  - One lecture on **Nonlinear growth model**s on July 20, 2022. (Mrinmoy Ray)
  - Two lectures on (i) **ARCH family of models** on July 22, 2022 and (ii) **Bayesian time series modeling** on July 27, 2022. (Achal Lama)

- One Special lecture on **Data and web resources** was delivered on July 26, 2022 to the participants of Training Programme on Big Data Analysis and Research Methods using Statistical Softwares organized by Division of Statistics and Computer Science under the aegis of IDP SKUAST-J, Jammu during July 26-August 01, 2022. (Rajender Parsad)
- Refresher Course on Statistical and Data Analysis for the Methods for teachers and scientists of SAUs organized by Agricultural Research & Education Management, Directorate of Human Resource Management in collaboration with Department of Mathematics and Statistics, COBS&H at CCS HAU, Hisar during from July 30 to August 19, 2022
  - Two lectures (i) **Basics of python programming on response surface methodology** on August 09, 2022 and (ii) **Basics of python programming on stability analysis** on August 10, 2022. (Prakash Kumar)
  - Two lectures on (i) **Time on series analysis** on August 09, 2022 and (ii) **Machine learning techniques** on August 10, 2022. (Ranjit Kumar Paul)
  - Two lectures on (i) **Factorial experiments** on August 09, 2023 and (ii) **Group of experiments** on August 10, 2022. (Susheel Kumar Sarkar)
  - One lecture on **Application of augmented design in plant breeding** on August 12, 2022 (H.S. Roy)
  - Two lectures on (i) **Principal component analysis** and (ii) **Discriminant analysis** on August 12, 2022. (Anindita Datta)

- One lecture on **ICAR Web applications in nutshell** on August 3, 2022 in Training programme on Advances in Web and Mobile Application Development organized by ICAR-NAARM, Hyderabad organized during August 02-06, 2022. (Alka Arora)
- One lecture on **Introduction to Big Data Analytics and its scope and hands-on experience using R programming** in the National Webinar on Scope of Big-Data Analytics in Agriculture and Allied Sectors organized by Department of Statistics & Computer Applications, S.V. Agricultural College-Tirupati, Acharya N.G. Ranga Agricultural University, Andhra Pradesh on August 26, 2022. (Anshu Bharadwaj).
- Faculty Training Program on Molecular Biology and Bioinformatic Tools and it's Application in Agriculture & Allied Sciences organized by College of Biotechnology, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut during September 08-21, 2022
  - One lecture on **Role of ncRNAs to mitigate the stress challenges in agriculturally important crops** on September 17, 2022. (Sarika Sahu)

  - One lecture on **Metagenomics: an introduction to the microbial world** on September 16, 2022. (Ratna Prabha)

- High-end Workshop (Karyashala) entitled Hands-on-training using Q-GIS and R Programming: an Integrated Approach towards Understanding the Changing Dynamics in Water Resources organized by KSCSTE-Centre for Water Resources Development and Management (CWRDM) Kunnamangalam, Kozhikode, Kerala during September 15-28, 2022
  - One lecture on **Wavelet-based time series modeling for forecasting precipitation** on September 21, 2022. (Ranjit Kumar Paul)
  - One lecture on **Modelling and forecasting of drought index using machine learning techniques** on September 22, 2022. (Rajeev Ranjan Kumar)

- One lecture on **Statistical data analysis and interpretation** and Demo for publication and technology data entry in KRISHI Portal to the scientists of ATARI, Ludhiana at ATARI, Ludhiana on September 19, 2022. (Sukanta Dash)
- Three lectures on (i) **Descriptive statistics** on September 24, 2022, (ii) **Factor analysis** on September 27, 2022 and (iii) **Cluster analysis** on September 28, 2022 in International Workshop on Advanced Statistical Data Analysis using SPSS organized by Science Tech Institute & MKSES Lucknow, during September 24-30, 2022. (Ranjit Kumar Paul)
- One lecture on **Linear programming models for economic applications** in the Webinar Series of School of Management, Presidency University on September 27, 2022 through online mode. (Harish Kumar H V)

## PARTICIPATION

### International Conference/ Workshop/Symposium etc.

- International Conference on **Systems Analysis for Enabling Integrated Policy Making** in New Delhi at Scope Convention Centre, Lodi Road, New Delhi hosted by TIFAC (Technology Information, Forecasting and Assessment Council), an autonomous body under the Department of Science and Technology during August 10-12, 2022. (Bishal Gurung and Pankaj Das)
- International Symposium on **Probability and Statistics: New Frontiers (ISPS 2022)** organized jointly by the Department of Statistics, University of Calcutta and Calcutta Statistical Association to celebrate 75 years of CSA in virtual mode during August 12-14, 2022. (Soumen Pal, Ranjit Kumar Paul and Raju Kumar)
- International Conference on **Advances in Agriculture and Food System Towards Sustainable Development Goals (AAFS2022)** jointly organized by ICAR, AIASA and UAS Banglore at University of Agricultural Sciences, Bangalore in an online mode during August 22-24, 2022. (Soumen Pal, Sneha Murmu, Bharti, Sanchita Naha and Ratna Prabha)
- International Conference on **Biotechnological Trends and Prospects** organized by University of Agricultural Sciences, GKVK, Bangalore on September 13-15, 2022. (Ratna Prabha)
- International Conference on **Advances in Agriculture, Veterinary and Allied Sciences for Improved Livelihood and Environment Security (AAVASILES-2022)** organized jointly by ICAR-IGFR, RRS, Srinagar, ICAR-NAHEP, BAU, Ranchi and NADCL, Baramulla at University of Kashmir, Hazratbal in an online mode during September 28-30, 2022. (Sneha Murmu)

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

- Digital India Week to celebrate **Catalyzing New India's Techade** during July 04-06, 2022 and National Start-up Conference on Accelerating Start-up Economy–Conference on Leveraging Capital Corporates and Connects on July 5, 2022 organized by Ministry of Electronics and Information Technology, Govt. of India at Gandhinagar, Gujarat. (K.K. Chaturvedi and S.B. Lal)
- National Conference on **Crop Production Estimation** to discuss methodologies of crop production estimates by the Government and various other agencies at the A.P. Shinde Symposium Hall, National Agriculture Science

Complex (NASC), Pusa, New Delhi organized by Directorate of Economics & Statistics (DES), Ministry of Agriculture and Farmers Welfare, Government of India on July 13, 2022. (Rajender Parsad, Tauqueer Ahmad, Prachi Misra Sahoo, Kaustav Aditya and Ankur Biswas)

- **ICAR Foundation Day** on July 16, 2022. (Rajender Parsad)
- **ICAR-APAARI Knowledge Management** workshop organized by ICAR-Directorate of Knowledge Management in Agriculture on July 23, 2022. (Rajender Parsad)
- One day training on **e-Office Product Administrator Training** on August 02, 2022 organized by NIC, New Delhi. (K.K. Chaturvedi and S.B. Lal)
- Indo U.S. Visioning workshop on **Developing a Diverse, Robust AI Workforce in Indian** organized by Institute of Science, Bengaluru during August 10 – 11, 2022. (Alka Arora)
- National Workshop on **Pathways for Successful Implementation of SCSP Scheme** at ICAR-NAARM, Hyderabad during August 18-19, 2022. (Mukesh Kumar)
- National Symposium on **Food, Nutrition and Environmental Security** organized by Trust for Advancement in Agricultural Sciences at NASC, New Delhi during August 29-30, 2022. (Rajender Parsad)
- 17th National Seminar on **Survey Results of various Rounds of NSS** organized by National Statistical Office (NSO), Ministry of Statistics & Programme Implementation (MoSPI), Govt. of India at Cochin University of Science and Technology, Kochi, Kerala on September 1-2, 2022. (Tauqueer Ahmad)
- Web workshop on **Linear Algebra, Matrix Theory and Linear Estimation** organized by SSCA, New Delhi on September 02, 2022. (Rajender Parsad and Ramasubramanian V.)
- One-day National Level workshop for all stakeholders of PMFBY on **Technology Based Yield Estimation and Smart Sampling Technique (SST)** organized by Credit Division, Department of Agriculture & Farmers' Welfare, Ministry of Agriculture and Farmers Welfare, Government of India on September 13, 2022 at NASC Complex, Pusa, New Delhi. (Prachi Misra Sahoo)
- Orientation workshop with the Central Ministries/Departments on **Authentication and Usage Ecosystem** at UIDAI HQs, Bangla Sahib Road, New Delhi on September 14, 2022. (Soumen Pal)
- **KVK-CSISA** Network Annual Workshop at NASC Complex, New Delhi on September 23, 2022. (Alka Arora)
- National Symposium on **Mainstreaming of Agricultural Higher Education by Private Universities in India** at NAARM, Hyderabad on September 29, 2022. (Sudeep, Alka Arora, Anshu Bharadwaj, and Shashi Dahiya)
- Second Steering Committee Meeting of **ICAR- Network Program on Precision Agriculture (NePPA)** at Lecture Hall, NASC Complex, New Delhi on August 10, 2022. (Anil Rai)

## Meetings

- Procurement through GeM meeting under the Chairmanship of Secretary, ICAR on July 12, 2022. (Rajender Parsad, Abhishek Srivastava and K.K. Sharma)
- Meeting to discuss the follow-up activities related to developing methodology for area and production estimation of horticulture crops under the chairmanship Dr. T.R. Sreenivas, ADG (Horticulture Statistics), DA&FW, Ministry of Agriculture and Farmers Welfare, Govt. of India and Joseph CF, Advisor (Horticulture Statistics), DA&FW at Krishi Bhawan, New Delhi on 15 July, 2022. (Tauqueer Ahmad and Prachi Misra Sahoo)
- Revision of ARS syllabus based on New BSMA recommendations and revised qualification on August 04, 2022. (Rajender Parsad, Anil Rai and Sudeep)
- Felicitation function at ICAR-IARI, New Delhi of Dr. Trilochan Mohapatra, Former Secretary, DARE & Fomer Director General, ICAR and Welcome to Dr. Himanshu Pathak, New Secretary, DARE & Director General ICAR on August 04, 2022. (Rajender Parsad)
- One-day review meeting of AICRP on EAAI (online) and also presented the progress of the project as PI from the coordinating centre ICAR-IASRI, New Delhi on August 10, 2022. (Kaustav Aditya)
- 11th meeting of Institute Management Committee of National Institute of Plant Biotechnology on August 18, 2022. (Rajender Parsad)
- Meeting of Group of Officers (GoO) on ASRB-CAS guidelines and score cards under the Chairmanship of Additional Secretary DARE and Secretary ICAR on August 18, 2022. (Anil Rai)
- 417th Academic Council Meeting PG School, IARI, New Delhi on August 27, 2022. (Rajender Parsad, Alka Arora

and Cini Varghese)

- Interaction with Directors of ICAR Institutes under the Chairmanship of Secretary, DARE & Director General, ICAR on August 30, 2022. (Rajender Parsad)
- Fifth Divisional meeting of Subject Matter Division (Agricultural Education) on September 05, 2022. (Rajender Parsad)
- 16th Technical Monitoring Committee (Fisheries) meeting to validate the Fish and Fish Seed Production Data for the financial year 2020-21 and 2021-22 on September 07, 2022. (Rajender Parsad)
- Meeting of the Award Review Committee constituted to review/rationalize the awards instituted by Ministry of Statistics and Programme Implementation at Khurshid Bhawan, New Delhi on September 09, 2022. (Rajender Parsad)
- Executive Council Meeting of National Academy of Agricultural Sciences on September 16, 2022. (Rajender Parsad)
- Meeting of Implementation & Operational Management Committee of Information & (IOMC) Communication Technology (ICT) Unit, ICAR on September 19, 2022. (Rajender Parsad, Anil Rai, Sudeep, Mukesh Kumar, K.K. Chaturvedi, S.B. Lal, Sanjeev Kumar, Subhash Chand and Jai Bhagwan)
- Technical Committee for Direction (TCD) for Integrated Livestock Sample Survey at The Lalit, Ashok Hotel, Kumarakrupa Road, Bangaluru on September 29, 2022 . (Rajender Parsad, Tauqueer Ahmad and Prachi Misra Sahoo)

## HUMAN RESOURCE DEVELOPMENT

### Training Programmes/Workshops Organized: 4 (205 participants)

| S. No. | Title | Venue | Period | No. of Participants |
|---|---|---|---|---|
| **Sensitization Training Programmes** | | | | |
| 1. | Land Record Management System (LRMS) for Institutes of ICAR including their regionals stations and KVKs (Coordinators: SB Lal, Mukesh Kumar and KK Chaturvedi) | ICAR-IASRI, New Delhi (Online) | July 14, 2022 | 50 |
| 2. | AU-PIMS for the University of Horticulture Science, Bagalkot. (Coordinator: Alka Arora) | ICAR-IASRI, New Delhi (Online) | July 22, 2022 | 37 |
| 3. | Basic of AgriDiksha (Coordinator: Anshu Bharadwaj) | ICAR-IASRI, New Delhi (Online) | (i) July 07, 2022 and (ii) July 21, 2022 | 93(56+37) |
| **हिन्दी कार्यशाला** | | | | |
| 3. | बुनियादी सांख्यिकीय तकनीक और आनुवंशिकी में इसका अनुप्रयोग (संयोजकः आर. के. पॉल, मो. यासीन एवं प्रकाश कुमार) | भाकृअनुप–भा.कृ.सां.अ.सं., नई दिल्ली (ऑन–लाइन) | अगस्त 03-05, 2022 | 25 |

### Training Programmes Attended

- Training programme on **Introduction to ENVI Analytics** organized by ESRI India from June 29–July 1, 2022. (Sapna Nigam)
- Executive Development Programme for **Leadership Development** organized by ICAR-NAARM, Hyderabad during July 04-09, 2022. (Rajender Parsad)
- Webinar-based training on **Bhuvan portal** (https://bhuvan.nrsc.gov.in) utilization organized by ISRO during July 12-14, 2022. (Ankur Biswas, Pankaj and Bharti)
- Hindi workshop on **"बुनियादी सांख्यिकीय तकनीक और आनुवंशिकी में इसका अनुप्रयोग"** during August 03-05, 2022 organized by Division of Statistical Genetics, ICAR-IASRI, New Delhi. (Sneha Murmu, Soumya Sharma and Ritwika Das)
- MDP Training Program on **Public Procurement (Basic)** at Arun Jaitley National Institute of Financial Management, Faridabad during August 29 - September 3, 2022. (Alka Arora)

## CONSULTANCY/ADVISORY SERVICES PROVIDED

- Ramasubramanian V. advised Dr. Muralikrishnan, Scientist, Division of Agricultural Extension, ICAR-IARI, New Delhi regarding trend analysis of Rainfall/ Temperature for the June-September months over years for Bahraich and Guwahati districts.
- B.N. Mandal advised Dr. Benukar Biswas, Associate Professor, Bidhan Chandra Krishi Vishwa Vidyalaya on selection of a representative year from 27 years daily weather parameters data to represent the long-term average of these weather variables. The representative year will be used as an input to a crop simulation model.
- M.A. Iquebal advised Dr. Anju Bajpai, ICAR-CISH, Lucknow regarding SNP and GWAS analysis in mango.
- Sarika advised Dr. Archan Suman, Principal Scientist, ICAR-IARI, New Delhi regarding metagenome data analysis.
- Bishal Gurung advised (i) Dr. Dawa Tshering Tamang, Associate Lecturer, Department of Environment and Life Sciences, Sherubtse College, Bhutan on the use of ANOVA, correlation, and Z test for proportion for his data; (ii) Dr. Visalakshi Chandra C, Scientist, Genetics and Plant Breeding, Division of Crop Improvement, ICAR-Central Tuber Crops Research Institute (ICAR - CTCRI) on the use of boxplot and BLUP plot for experimental data on various parameters like tuber length, dry matter content, sugar content and yield for 76 different genotypes replicated 3 times and (iii) Dr. Gunjan Tiwari, Scientist, Plant breeding and Genetic Resource Conservation, CIMAP, Lucknow in her analysis related to correlation, Clustering using genotypic as well as phenotypic data and also criss-cross interaction study.
- Kaustav Aditya advised (i) Mrs. Tannistha Bardhan, Ph.D. Student, Agricultural Extension, GBPUAT, Pantnagar regarding the analysis of data using classification and regression tree analysis and random forest for data analysis; (ii) Dr. Shrila Das, Scientist, Division of Soil Science, ICAR-IARI, New Delhi regarding experimental design and factor analysis; (iii) Dr. Amol Ghosh, Principal Scientist, Division of Agronomy, ICAR-IARI, New Delhi regarding analysis of data of maize-green gram and cowpea cropping system generated using RCB design for performing Tukey's Honest Significant Difference Test; (iv) Mr. Gautam Parida, M.Sc., Division of Soil Science student, ICAR-IARI, New Delhi on analysis of experimental designs using Strip plot design in R software and (v) Mr. Jayprakash Ankhi Reddy Palli, M.Sc. student, Soil Science, ICAR-IARI, New Delhi on analysis of experimental designs using RCBD design in R software.
- Mohd. Harun advised Adil Raheem, M.Sc. Student from the discipline of Biotechnology of PG School, ICAR-IARI, New Delhi regarding analysis of data. The experiment was conducted in laboratory, where the roots of two varieties of wheat were treated with two different types of solution (water and steroid). The data was collected on various six growth parameters (root length, root surface area, root volume, root tips, root fork and root diameter). The objective of this study was to study the effect of treatments on root growth. One-way ANOVA and correlation analysis were performed along with the basic statistics.
- Sarika Sahu advised (i) Dr. Archan Suman, Principal Scientist, ICAR-IARI, New Delhi regarding metagenome

data analysis and (ii) Sh. Nikhil Chand, Ph.D. student from Sardar Vallabhbhai Patel University of Agriculture, Meerut for the bioinformatics analysis.

- Rajeev Ranjan Kumar advised (i) Mr. Shashikant Divakar, Assistant Professor, BAU, Sabour on the fitting of multiple regression equation in the data of socioeconomic indicators for different district of Bihar and (ii) Dr. Mahesh Rao, Scientist, ICAR-National Institute for Plant Biotechnology (NIPB), Pusa Campus, New Delhi-110012 on the principal component analysis and correlation analysis.
- Rahul Banerjee advised (i) Dr. Suddhasatwa Maitra Mazumdar, Scientist-C, Basic Tasar Multiplication & Training Centre (BSMTC), Dumka, Jharkhand under CSB, Ministry of Textiles, Bangalore for conducting ANOVA and Paired t test to study the exophilic distribution of Culicoides spp. (Diptera: Ceratopogonidae) and (ii) Mr. Rohit Mahto, Ph.D. student, (Genetics), BHU, Varanasi in carrying out the analysis of Factorial Experiments in CRD layout using SPSS software.

# AWARDS AND RECOGNITIONS

## Award

### Anil Kumar

- **Best research paper award** published in *Indian Journal of Soil Conservation* for the year 2021 during National Conference on Landscape Management for Preventing Flood and Reservoir Sedimentation (LMPFRS-2022) organized at BAU, Ranchi during September 22-24, 2022.
  - Suresh Kumar, D.R. Singh, B. Mondal and Anil Kumar (2021). Farm level investments and factors affecting adoption of multiple soil and water conservation technologies in semi-arid tropics of India. *Indian Journal of Soil Conservation*, **49(2)**, 130-138.

### Ramasubramanian V.

- **2nd Rank** in the oral presentation in the session "Global and Regional Policy Transformation" in the International Conference on Advances in Agriculture and Food System towards Sustainable Development Goals during August 22-24, 2022 organized by University of Agricultural sciences, Bangalore jointly with ICAR and All India Agricultural Students Association, New Delhi.
  - G. Avinash*, Ramasubramanian V., Mrinmoy Ray and Nitesh Sharma. Generative Adversarial Networks (GANs) for agricultural stock market prediction.

### Ratna Prabha

- **Best oral presentation award** for "Metagenomics insights into reproductive tract of White Pekin and Khaki Campbell ducks". International Conference on Biotechnological Trends and Prospects, organized by University of Agricultural Sciences, GKVK, Bangalore during September 13-15, 2022.

### Sneha Murmu

- **Best oral presentation award** in an International Conference on "Advances in Agricultural, Veterinary and Allied Sciences for Improved Livelihood and Environment Security" (AAVASILES-2022) jointly organized by ICAR-IGFR, RRS, Srinagar, ICAR-NAHEP, BAU, Ranchi and NADCL, Baramulla at University of Kashmir, Hazratbal in an online mode during September 30, 2022.

### Md Yeasin

- **Young Scientist Award** (2022) by Agricultural & Environmental Technology Development Society (AETDS) (Award received by Post).

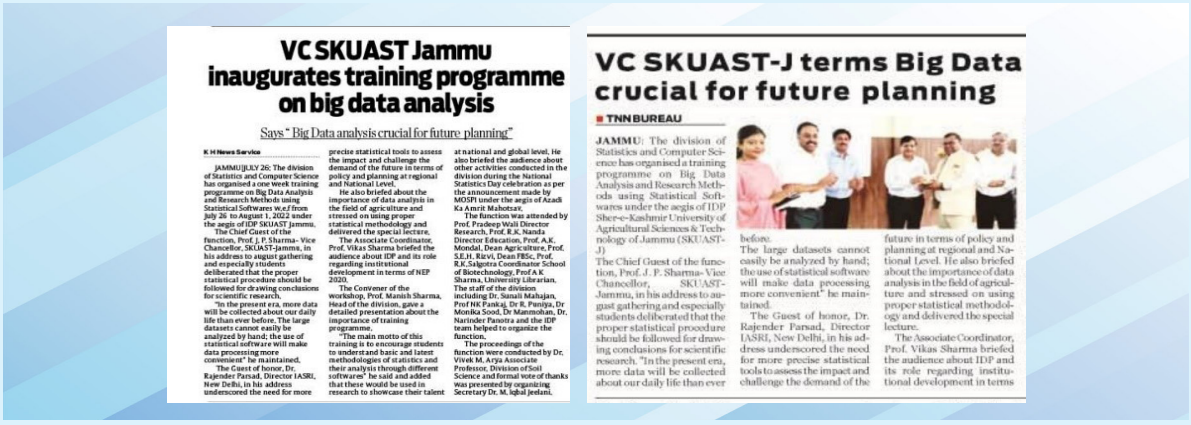
## Congratulations to our Alumni

- We congratulate Dr. Tanuj Mishra, Ph.D. student in the discipline of Computer Applications for receiving Jawaharlal Nehru Award for best thesis and Dr. AR Rao, former Faculty at ICAR-IASRI for receiving Rafi Ahmad Kidwai Award from ICAR on July 16, 2022.

## Recognitions

### Rajender Parsad

- **Guest of Honour** during inaugural function of the Training Programme on **Big Data Analysis and Research Methods using Statistical Softwares** organized by Division of Statistics and Computer Science under the aegis of IDP SKUAST-J, Jammu during July 26-August 01, 2022.
- **Member**, Committee constituted by ICAR for Conducting AgriTech Hackathon on Speed Breeding for Crop



VC SKUAST Jammu inaugurates training programme on big data analysis

Says "Big Data analysis crucial for future planning"

K H News Service

JAMMU JULY 26: The division of Statistics and Computer Science has organised a one week training programme on Big Data Analysis and Research Methods using Statistical Softwares w.e.f from July 26 to August 1, 2022 under the aegis of IDP SKUAST Jammu.

The Chief Guest of the function, Prof. J. P. Sharma - Vice Chancellor, SKUAST-Jammu, in his address to august gathering and especially students deliberated that the proper statistical procedure should be followed for drawing conclusions for scientific research.

"In the present era, more data will be collected about our daily life than ever before. The large datasets cannot easily be analyzed by hand; the use of statistical software will make data processing more convenient" he maintained.

The Guest of honor, Dr. Rajender Parsad, Director IASRI, New Delhi, in his address underscored the need for more precise statistical tools to assess the impact and challenge the demand of the future in terms of policy and planning at regional and National Level.

He also briefed about the importance of data analysis in the field of agriculture and stressed on using proper statistical methodology and delivered the special lecture.

The Associate Coordinator, Prof. Vikas Sharma briefed the audience about IDP and its role regarding institutional development in terms of NEP 2020.

The Convener of the workshop, Prof. Manish Sharma, Head of the division, gave a detailed presentation about the importance of training programme.

"The main motto of this training is to encourage students to understand basic and latest methodologies of statistics and their analysis through different softwares" he said and added that these would be used in research to showcase their talent at national and global level. He also briefed the audience about other activities conducted in the division during the National Statistics Day celebration as per the announcement made by MOSPI under the aegis of Azadi Ka Amrit Mahotsav.

The function was attended by Prof. Pradeep Wali Director Research, Prof. R.K. Nanda Director Education, Prof. A.K. Mondal, Dean Agriculture, Prof. S.E.H. Rizvi, Dean FBSc, Prof. R.K. Sajnotra Coordinator School of Biotechnology, Prof A K Sharma, University Librarian. The staff of the division including Dr. Sunali Mahajan, Prof NK Pankaj, Dr R. Puniya, Dr Monika Sood, Dr Manmohan, Dr. Narinder Pannira and the IDP team helped to organize the function.

The proceedings of the function were conducted by Dr. Vivek M. Arya Associate Professor, Division of Soil Science and formal vote of thanks was presented by organizing Secretary Dr. M. Iqbal Jeelani.

VC SKUAST-J terms Big Data crucial for future planning

TNN BUREAU

JAMMU: The division of Statistics and Computer Science has organised a training programme on Big Data Analysis and Research Methods using Statistical Softwares under the aegis of IDP Sher-e-Kashmir University of Agricultural Sciences & Technology of Jammu (SKUAST-J).

The Chief Guest of the function, Prof. J. P. Sharma- Vice Chancellor, SKUAST-Jammu, in his address to august gathering and especially students deliberated that the proper statistical procedure should be followed for drawing conclusions for scientific research. "In the present era, more data will be collected about our daily life than ever before.

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The Associate Coordinator, Prof. Vikas Sharma briefed the audience about IDP and its role regarding institutional development in terms

Improvement, ICAR.

- **Member**, Committee constituted by ICAR for ranking of the Agricultural Universities based on the information received in the prescribed Performa.
- **Member**, the Award Review Committee to review/rationalize the awards instituted by the Ministry of Statistics & Programme Implementation, Govt. of India.
- **Moderator** for Session on Best Practices followed by the States in Crop Estimation during the National Conference on Crop Estimation Methodology organized by Directorate of Economics and Statistics on July 13, 2022 at AP Shinde Symposium Hall, NASC Complex, Pusa, New Delhi.
- **Guest of Honour**, during inaugural function of **DST-SERB** sponsored Karyashala on Statistical and Machine Learning Techniques for Agricultural Systems Modelling and Forecasting Using R organized by ICAR-Indian Institute of Rice Research, Hyderabad during July 18-30, 2022.
- **Chaired**, Technical Session on **Education and Applied Sciences** organized as part of 2nd International Conference on Hospitality and Tourism - Revival Strategies organized by Institute of Hotel Management, Catering and Nutrition, Pusa, New Delhi during August 24-26, 2022. (the session was organized on August 25, 2022)
- **Member,** ICAR-NIPB Institute Management Committee.

### Anil Rai

- **Chairman** of Digital / Hi-Tech Agriculture Technical Working Groups for assisting the UT Level Apex Committee (UTLAC) to frame the comprehensive Agriculture Policy for holistic Development of Agriculture and Allied Sectors in UT of J&K.

### Tauqueer Ahmad

- Nominated as **Subject Matter Expert** by Ministry of Food Processing Industries (MoFPI), Govt. of India for attending meetings (online) for evaluation and suggestions for the RFP of the proposed study on Level of Processing under the Chairmanship of Sh. G. Bhujabal, Sr. Consultant and former AS&FA to be organized by MoFPI.

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

### Initiated

- 'A regression type estimator in dual frame surveys under two stage sampling' w.e.f. August 01, 2022. (**Bharti**, Kaustav Aditya, Deepak Singh, Rahul Banerjee)

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### MOU/LOA Signed

- MOU with a -IDEA (Association of Innovation Development for entrepreneurship in Agriculture), Centre of Agri-Innovation, ICAR-NAARM on July 08, 2022.

## PERSONNEL

### Congratulations on your Promotion/ New Assignment/ New Joining

| Name | Designation | Effective date |
|---|---|---|
| Sh. Surat Ram | Principal Private Secretary | 02.08.2022 |
| Smt. Umeeta Ahuja | Principal Private Secretary | 03.08.2022 (Joined after transfer from ICAR-NIAP, New Delhi) |
| Sh. Dinesh Kumar Ray | Technical Assistant (T-3) | 23.08.2022 w.e.f. 01.01.2021 |
| Sh. Akshay Dheeraj | Scientist (Computer Application) | 01.09.2022 (Joined after transfer from ICAR Indian Institute of Soil & Water Conservation, Dehradun) |
| Smt. Alka Nayar | Private Secretary | 08.09.2022 |

### Wish you a Happy Retired Life

| Name | Designation | Effective date |
|---|---|---|
| Sh. Surat Ram | P.P.S. | 31.08.2022 |
| Smt. Jyoti Gangwani | Chief Technical Officer | 01.09.2022 |

### Transfer/ Deputation/Resignation/Relieved

| Name | Designation | Effective date |
|---|---|---|
| Sh. Vishal Lakhanpal | A.A.O. | 30.07.2022 (on deputation to Minority Commission, CGO complex, New Delhi) |
| Dr. B.N. Mandal | Senior Scientist | 20.08.2022 (transferred to ICAR-Indian Agricultural Research Institute, Jharkhand) |
| Ms. Sapna Nigam | Scientist | 31.08.2022 (relieved for seven months study leave: 01.09.2022-31.03.2023) |
| Sh. Hanuman Sahay Meena | L.D.C. | 30.09.2022 (transferred to ICAR- Central Sheep and Wool Research Institute, Avikanagar, Rajasthan) |

**Compiled and Edited:**
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Neha Narang, Sunita, Anil Kumar and V. P. Singh
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