



- Research Achievements
- Papers presented/Lectures Delivered
- Consultancy/Advisory Services
- Copyrights/MOUs
- Panorama of Activities
- Participation in Conferences
- Awards and Recognitions
- Personnel
- Publications
- Human Resources 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 developed procedure of unbiased estimation of variance of finite population mean from Level-0 ranked set sampling. An improved co-integration based time delay neural network Model for price forecasting has also been developed. The module of Trademark repository has been developed as part of ICAR-IPR Repository. Information on 123 Trademarks of the Indian Council of Agricultural Research is available in this repository.

The Institute also developed web genomic resource of buffalo (BuffGR) in association with ICAR-CIRB, Hisar which is useful in buffalo improvement programs and disease/breed management. A novel method, MetaConClust, using coverage information for grouping of contigs and automatically finding the optimal number of clusters for binning of metagenomics data using a consensus-based clustering approach has also been developed.

Through 03 Training programmes on specialized topics including two for Indian Statistical Service Probationers sponsored by Ministry of Statistics and Programme Implementation, Govt. of India and 01 Hindi Workshop conducted by the Institute, a total of 390 participants were trained.

To celebrate Bharat Ki Azadi Ka Amrut Mahotsav, organized a brainstorming session of Mainstreaming Agricultural Curriculum in School Education to create greater sensitization among school goers at primary, secondary & higher secondary levels about the importance and scope of agriculture & allied sectors. This was inaugurated by Union Minister of Agriculture and Farmers Welfare. Experts from the ICAR, NCERT, CBSE along with the various School Principals and Teachers participated and deliberated on the need & process for the introduction of Agriculture as a Subject in the School Curriculum. The scientists of the Institute also interacted with farmers to create awareness about ICT in Agriculture and Digital Initiatives in the campaign किसान भागीदारी, प्राथमिकता हमारी।

Dr. GP Samanta, Chief Statistician of India and Secretary, Ministry of Statistics and Programme Implementation, Government of India during his visit to the Institute mentioned that the ICAR-IASRI is a reputed Institute and is a Centre of Excellence in multiple areas.

Institute also celebrated International Yoga Day on June 21, 2022 and 6th National Statistics Day on June 29, 2022. The Institute initiated 03 new projects and 01 research project was completed and received 09 copyrights. A total of 56 Research Papers and 01 R Packages were published. We congratulate Dr. Prabina Meher for receiving Associateship of National Academy of Agricultural Sciences.

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

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



Rajender Parsad

(Rajender Parsad)

RESEARCH ACHIEVEMENTS

Variance Estimation of Level-0 Ranked Set Sampling under Finite Population Framework

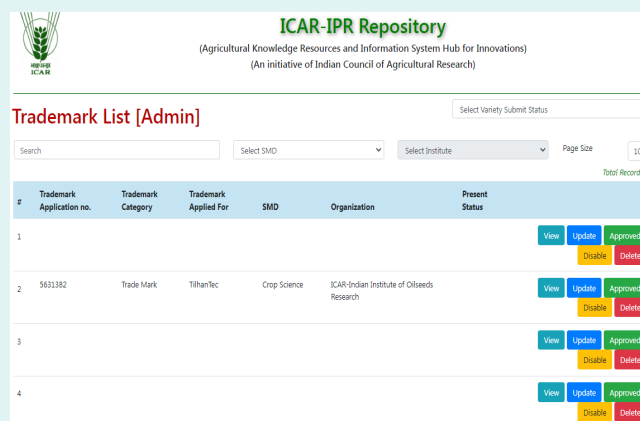
Ranked Set Sampling (RSS) is used for circumstances where any preliminary ranking of sampled units is possible for variable of interest using visual inspection or some other means without physically measuring the units. Further, the RSS has been classified into three sampling protocols named as Level-0, Level-1 and Level-2. The procedure of obtaining unbiased estimate of the variance of Level-0 RSS estimator of finite population mean has been developed using two distinct rescaling bootstrap with replacement methods known as Strata-based rescaling bootstrap with-replacement (SRBWR) method and Cluster-based rescaling bootstrap with-replacement (CRBWR) method. Rescaling factors are obtained for both the proposed methods to estimate the variance of the Level-0 RSS estimator unbiasedly. The results of the simulation analysis, together with real data application support, proposed methods are capable of estimating the variance of the Level-0 RSS estimator almost unbiasedly. The developed SRBWR method performed better than the CRBWR method considering Relative stability (RS) and percentage Relative Bias (%RB) for various combinations of set size (m) and several cycles (r).

Improved Co-integration based Time Delay Neural Network Model for Price Forecasting

Co-integration among the prices of different commodities plays a pivotal role in the price decision mechanism. The existing time delay neural network (TDNN) has been improved by incorporating the error correction term (ECT) as an auxiliary information in the model. The R package ?ECTTDNN? has been developed for carrying out the analysis using the proposed model. The empirical study using monthly wholesale price indices of fruit and crude oil for the period January 2005 to November 2020, clearly indicated the superiority in terms of forecasting ability of the proposed hybrid model as compared to the usual TDNN model.

Workflow based Application for Trademark: IPR Repository

The module of Trademark repository (<https://krishi.icar.gov.in/icaripdb/trademark-list>) has been developed and made functional in ICAR IPR Repository (<https://krishi.icar.gov.in/icaripdb/>) as Part of KRISHI Portal (<https://krishi.icar.gov.in>). Information on 123 Trademarks of the Indian Council of Agricultural Research is available in this repository.



#	Trademark Application no.	Trademark Category	Trademark Applied For	SMD	Organization	Present Status
1						View Update Approved Disable Delete
2	5631882	Trade Mark	TilhanTec	Crop Science	ICAR-Indian Institute of Oilseeds Research	View Update Approved Disable Delete
3						View Update Approved Disable Delete
4						View Update Approved Disable Delete

Methodology for Optimum Number of Clusters for Binning of Metagenomics Data

Developed a novel method, *MetaConClust*, using coverage information for grouping of contigs and automatically finding the optimal number of clusters for binning of metagenomics data using a consensus-based clustering approach. Performance of *MetaConClust* is compared with recent methods and tools using benchmarked low complexity simulated and real metagenomic datasets and is found better for unsupervised and comparable for hybrid methods.

Comparison of Best Linear Unbiased Prediction and Bayesian Methods for Genomic Prediction

Evaluated the performances of various BLUP and Bayesian methods for genomic prediction by using real and simulated datasets. The Bayesian alphabets performed better for the traits governed by a few genes/QTLs with relatively larger effects. On the contrary, the BLUP alphabets exhibited higher genomic prediction accuracy for the traits controlled by several small-effect QTLs. The genomic prediction accuracy increased with an increase in trait heritability, irrespective of the sample size, marker density, and the QTL type (major/minor effect).

Wavelet-ANN based Prediction Model for Spiders in Pigeon Pea

Influence of weather variables on occurrence of spiders in pigeon pea across locations of seven agro-climatic zones

of India was studied. Wavelet-ANN based prediction model has been developed that was found optimum in terms of Root Meran Square Error (RMSE) and Mean Absolute Prediction Error (MAPE) and hence its use to forecast spiders in conjunction with the values of pest-defender ratios, would not only reduce insecticidal sprays, but also add ecological and economic value to the integrated pest management of insects of pigeon pea.

Web Genomic Resources of Buffalo

Developed web genomic resource of buffalo (BuffGR) in association with ICAR-CIRB, Hisar and made accessible at <http://backlin.cabgrid.res.in/buffgr>. BuffGR is a first comprehensive web genomic resource of buffalo that catalogues 6028881 SNPs and 613403 InDels extracted from the set of 31 buffalo tissues while collectively a total of 7727122 SNPs and 634124 InDels were distributed in Murrah, Bangladesh, Jaffarabadi and Egyptian breeds with reference to Mediterranean breed. It also houses 4504691 SSR markers from all the breeds along with 1458 circRNAs, 37712 lncRNAs and 938 miRNAs.

This comprehensive web resource can be widely used by buffalo researchers across the globe for use of markers in marker trait association, genetic diversity among the different breeds of buffalo, use of ncRNAs as regulatory molecules, post-transcriptional regulations, and as biomarker in adultery and breed traceability, in various diseases and other stress conditions. This resource can also be useful in buffalo improvement programs and disease/breed management.

R Package Developed

“**mxkssd**” (Efficient Mixed-Level k-Circulant Supersaturated Designs) available at <https://cran.r-project.org/web/packages/mxkssd/index.html>. This package generates efficient balanced mixed-level k-circulant supersaturated designs by interchanging the elements of the generator vector.

PANORAMA OF ACTIVITIES

Azadi Ka Amrut Mahotsav Celebrations: Brainstorming Session and 03 Webinars

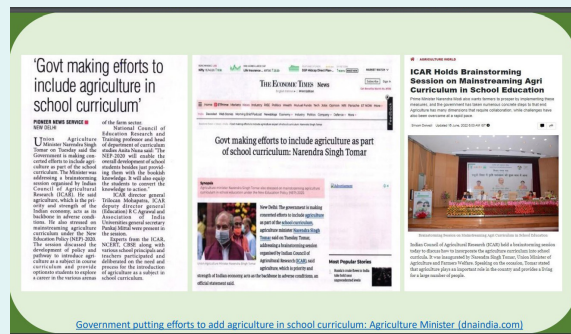
- Collaborated as Resource Person in the programme on किसान भागीदारी, प्राथमिकता हमारी organized by KVK Narayangaon, Pune, Maharastra on April 26, 2022 in which 188 farmers participated. The lecture was delivered on ICT in Agriculture and Digital Initiatives of ICAR-IASRI including Kisan-Sarathi, Kisan App, KVK Portal and App, ICAR Video Gallery, ICAR Mobile App Gallery. (Alka Arora)



- Webinar on **Digital Resources in Agriculture** including Kisan-Sarathi, KISAAN 2.0, KVK Portal and KVK App, ICAR Video Gallery, ICAR Mobile App Gallery etc. in the campaign “किसान भागीदारी प्राथमिकता हमारी” at Village: Patla, Tehsil: Modinagar, District: Ghaziabad on April 28, 2022. The webinar was attended by 35 farmers. (Soumen Pal and Deepak Singh)
- Brainstorming session of Mainstreaming Agricultural Curriculum in School Education:** PIU-NAHEP and ICAR-IASRI organized brainstorming session of MACE (Mainstreaming Agricultural Curriculum in School Education) on June 14, 2022 to create greater sensitization among school goers at primary, secondary & higher secondary levels about the importance and scope of agriculture & allied sectors. This was aimed to fulfil the requirement under the NEP - 2020 which focuses on redesigning the agricultural education system with a greater push towards



developing professional courses including the agricultural science to impart better education. This was inaugurated by Union Minister of Agriculture and Farmers Welfare. Experts from the ICAR, NCERT, CBSE along with the various School Principals and Teachers participated and deliberated on the need & process for the introduction of Agriculture as a Subject in the School Curriculum. (Anuradha Agrawal, Sudeep, Anshu Bharadwaj, Shashi Dahiya, and Alka Arora)



Government putting efforts to add agriculture in school curriculum: Agriculture Minister (daindia.com)



- Balanced Soil Nutrition through Soil Test Crop Response Approach** by Dr. Pradip Dey, Project Coordinator, AICRP on Soil Test Crop Response Correlation, IISS, Bhopal as part of National Level Campaign on Efficient and Balanced Use of Fertilizers (including nano fertilizers) was organized on June 21, 2022. The webinar was attended by 50 (Faculty Students of IASRI and Farmers) and 08 farmers (from Haryana, Punjab, Rajasthan and Bihar: Ganga Ram Sepat, Pravin, Ramji Sharma, Kapil, Sahil, Sandeep Sharma, Vikash Choudhary, SK Kakriya) expressed their views. The points emerged were: Balanced fertilization is helpful for soil health. Nano Fertilizers are good and helpful in maintaining soil health and increasing income. There is a labour shortage for application of spray of nano-fertilizers. Also more intensive programmes may be organized to reach to the farmers those who are not linked to Institutes/KVKs. (Ajit)

KisanGosthi under SC-Sub Plan Scheme: 02

- Kisan Gosthi I:** organized for SC community farmers on May 11, 2022 at Gram Panchyat-Pesri, Block- Dibai, District-Bulandshar, UP. In this gosthi, 150+ farmers participated. Sh. Udaivir Singh, ACTO brief about the programme and management of paddy crops. Dr. Mukesh Kumar highlighted the use of ICT in Agriculture and provided a brief about the ICAR Mobile App Gallery and ICAR Video Gallery. Dr. Soumen Pal shared the information about KVK App and other IT applications available for farmers. Paddy seeds and kharif vegetable kits have been distributed among SC community



farmers. (Mukesh Kumar, Soumen Pal and Udaivir Singh)

- **Kisan Gosthi-II:** organized for SC community farmers on May 21, 2022 at Village–Chirsi, District-Faridabad (Haryana). In this gosthi, 15+ farmers participated. Sh. Vijay Pal Yadav, Coordinator, KVK Bhopani Faridabad provided a brief of the programme. Dr. Rajender Kumar, SMS Agronomy, KVK Bhopani Faridabad shared information about the paddy crop management practices. Dr. Mukesh Kumar highlighted the use of ICT in Agriculture and provided a brief about the ICAR Mobile App Gallery and ICAR Video Gallery. Paddy seeds and kharif vegetable kits have been distributed among SC community farmers. (Mukesh Kumar)

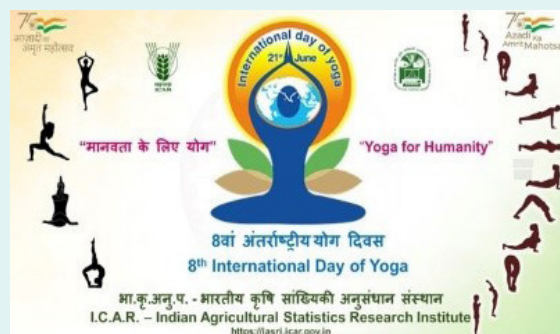


Dignitaries Visit

- **Dr. GP Samanta**, Chief Statistician of India and Secretary, Ministry of Statistics and Programme Implementation, Govt. of India on June 17, 2022 as Chief Guest and Dr. R.C. Agrawal, Deputy Director General (Agricultural Education) as Guest of Honour visited valedictory session of Training Programme on Data Analysis and Interpretation for ISS Probationers. While welcoming the dignitaries, Dr. Rajender Parsad outlined the genesis of establishment of the Institute. He elaborated the significant contributions made by the Institute in the areas of Design of Experiments, Sample Surveys, Statistical Modelling, Statistical Genetics, Computer Applications and Bioinformatics. He also elaborated about the various e-governance initiatives taken up by ICAR-IASRI to cater to the needs of ICAR. He appraised about the latest facilities available at IASRI, mainly about ICAR Data Centre and ASHOKA and its utility to the end users. He also mentioned the various accolades won by the Scientists of the Institute. During his valedictory Address, Dr. Samanta outlined about the importance of statistics and gave emphasis on applying it with reference to the context rather than implementing the subject in an abstract manner. He opined that data analysis is an art rather than a science and likened it with a metaphor of a three-year old kid who accomplishes her wish by persuading his or her parents even though the later may be far more knowledgeable than the former. He also discussed about origins of artificial intelligence (AI) and its off-shoots like machine learning which later combined with statistics can give the best of both worlds. He drew parallel between probability theory and possibility theory while discussing about fuzzy set theory. He also pointed out that while machines are no doubt insentient, as early as in 1950s, Turing test was proposed as to whether they can be made to perform intelligently which paved the way for AI. He concluded his talk by emphasizing of effective communication skills in putting forth one's viewpoint in the shortest possible attention span which only is usually available at our disposal to send our message across. Dr. R.C. Agrawal lauded about the initiatives taken by ICAR-IASRI to impart training and also stressed on yoga and meditation to be part of such training programmes for leading a stress free life both in the professional as well as personal fronts. He also opined that topics of professional ethics, morality etc. need be discussed at the beginning of the career itself to the young officers so that their aspirations in the office domain can be shaped accordingly.

International Yoga Day

- The Institute celebrated 8th International Yoga Day on June 21, 2022 with the theme **Yoga for Humanity** to achieve the objective of “Yoda for peace and Harmony”. (KK Chaturvedi)





16th National Statistics Day

- The Institute celebrated the 16th National Statistics Day online on June 29, 2022. Smt. R. Savithri, Additional Director General (Social Statistics Division) was the Chief Guest on the occasion and delivered the keynote address on the theme **Data for Sustainable Development**. Dr. S.D. Sharma, Former Director, ICAR-IASRI and Former Vice Chancellor, Dev Sanskriti Vishwavidyalaya, was the Guest of Honour. The event brought together the staff, students, and alumni of ICAR-IASRI and helped in creating awareness about the importance of Statistics in socio-economic planning and policy formulation. (Dr. Rajender Parsad, Dr. Cini Varghese and Students)





16वाँ राष्ट्रीय सांख्यिकी दिवस समारोह

29 जून, 2022 (3.30 अपराह)

विषय: “सतत विकास हेतु आँकड़े”

मुख्य अतिथि एवं वक्ता



श्रीमती आर. सावित्री
अतिरिक्त महानिदेशक, सामाजिक सांख्यिकी प्रभाग, सांख्यिकी और कार्यक्रम कार्यान्वयन मंत्रालय, भारत सरकार

विशिष्ट अतिथि



डॉ. सुखदेव शर्मा
पूर्व निदेशक, भा.कृ.अनु.प.-मा.कृ.सं.अ.सं., पूर्व कुलपति, देव संस्कृति विश्वविद्यालय, हरिद्वार

ZOOM link: <https://bit.ly/3ym7pB0>

भा.कृ.अनु.प.-भारतीय कृषि सांख्यिकी अनुसंधान संस्थान, नई दिल्ली

Please visit: <https://iasri.icar.gov.in>





16th NATIONAL STATISTICS DAY Celebrations

June 29, 2022 (3:30 pm)

Theme: “Data for Sustainable Development”

Chief Guest and Keynote Speaker



Smt. R. Savithri
Additional Director General,
Social Statistics Division,
Ministry of Statistics and Programme
Implementation, Govt. of India

Guest of Honour



Dr. S.D. Sharma
Former Director, ICAR-IASRI
Former Vice Chancellor,
Dev Sanskriti Vishwavidyalaya,
Haridwar

ZOOM link: <https://bit.ly/3ym7pB0>

ICAR-INDIAN AGRICULTURAL STATISTICS RESEARCH INSTITUTE, NEW DELHI

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WORKSHOPS/WEBINARS/MEETINGS ETC. ORGANIZED

Meetings

- Online Annual Review meeting of NIBPP activities for FY 2021-2022 was organized on June 24, 2022. (Chandan Kumar Deb, Md. Ashraful Haque, Sudeep, Sapna Nigam)
- Meeting of KVKs for all India launching of Kisan-Sarathi by Secretary, ICAR was organized on May 17, 2022. (Anil Rai)
- Joint meeting of Kisan-Sarathi 2.0 of senior officials from ICARDA&FW and DIC under the Joint Chairmanship of Secretary DARE and DG ICAR and Secretary DA&FW was organized on May 26, 2022. (Anil Rai)
- Meetings for the feedback, improvement, enrichment and resolving the issues of KVKs in Kisan-Sarathi were organized on April 07, 2023 and April 21, 2023. (Sanjeev Kumar)

Seminars Delivered

- A total of 22 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	3
	New Project Proposal	4
	Foreign Visit	
	General	
Student	Course	2
	ORW	10
	Thesis	3
Total		22

PUBLICATIONS

Research Papers

1. Adikary T and Das P (2022). Conventional and biotechnological approaches for enhancing shelf-life of horticultural crops. भारतीय अनुसंधान पत्रिका, **37(2)**, 114-120. <https://doi.org/10.18805/BKAP398>
2. Aggarwal R, Agarwal S, Sharma S, Gurjar MS, Bashyal BM, Rao AR, Sahu S, Jain P, and Saharan MS (2022). Whole-genome sequence analysis of Bipolarissorokiniana infecting wheat in India and characterization of ToxA gene in different isolates as pathogenicity determinants. *3 Biotech*, **12(7)**, 1-5.
3. Agrawal A, Ramasamy GG, Pathak J, Nayyar N, Muthugounder M, Maria P, Rai A, and Thiruvengadam V (2022). Deciphering the molecular mechanisms of insecticide resistance from the transcriptome data of field evolved spinosad resistant and susceptible populations of *plutellaxylostella* (Lepidoptera: Plutellidae). *Journal of Economic Entomology*, **115**, 391-397. <https://doi.org/10.1093/jee/toac072>
4. Ankita, Sarkar SK, Kumar A, Panwar S, Shekhar S and Kumar Ranjan (2022). Testing of Variance Components for Continuous Data from Nested Unbalanced Designs. *International Journal of Agricultural and Statistical Science*, **18(1)**, 391-397. <https://krishi.icar.gov.in/jspui/handle/123456789/73509>
5. Bala PM, Anu S, Chaturvedi KK, Bhardwaj R, Lal SB, Farooqi MS, Kumar S, Mishra DC and Singh M (2022). Machine learning algorithms for protein physicochemical component prediction using near infrared spectroscopy in Chickpea germplasm. *Indian Journal of Plant Genetics Resources*, **35(1)**, 44-48. <https://doi.org/10.5958/0976->

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6. Bana RS, Rana KS, Singh R, Godara S, Grover M, Yadav A, choudhary AK, singh T, choudhary, M, Bansal R, Singh N, Mishra V, Choudhary A and Yogi AK (2022). No-Tillage with Residue Retention and Foliar Sulphur Nutrition Enhances Productivity, Mineral Biofortification and Crude Protein in Rainfed Pearl Millet under Typic Haplusteps: Elucidating the Responses Imposed on an Eight-Year Long-Term Experiment. *Plants*, 11(7), 943.
 7. Banerjee Rahul, Das Pankaj, Bharti, Ahmad Tauqueer and Manish Kumar (2022). Modeling and Forecasting of Agricultural Commodity Production under Changing Climatic Condition: A Review. *भारतीय कृषि अनुसंधान पत्रिका* (Published Online). <https://doi.org/10.18305/BKAP362>
 8. Banerjee R, Jaggi S, Bhowmik A, Varghese E, Varghese C, Datta A (2022). Cost friendly experimental designs for product mixtures in agricultural research. *Journal of Community Mobilization and Sustainable Development*, 17(1), 129-133. <http://krishi.icar.gov.in/jspui/handle/123456789/73294>
 9. Behera BK, Sahu P, Rout AK, Parida PK, Sarkar DJ, Kaushik NK, Rao AR, Rai A, Das BK and Mohapatra T (2022). Exploring microbiome from sediments of River Ganga using a metagenomic approach. *Aquatic Ecosystem Health & Management*, 24(4), 12–22.
 10. Bhowmik A, Varghese E, Jaggi S and Varghese C (2022). On the generation of factorial designs with minimum level changes. *Communications in Statistics - Simulation and Computation*, 51(6), 3400-3409. <http://krishi.icar.gov.in/jspui/handle/123456789/31754>
 11. Biswakarma N, Pooniya V, Zhiipao RR, Kumar D, Shivay YS, Meena MC, Lama A, Das K, Jat RD, Puniya M and Babu S (2022). Designing resource efficient integrated crop management modules for direct seeded rice-zero till wheat rotation of north western India: Impacts on system productivity, energy-nutrient-carbon dynamics. *Archives of Agronomy and Soil Science*. <https://doi.org/10.1080/03650340.2022.2079635>
 12. Choudhary K, Jha GK, Kumar RR and Jaiswal R (2022). Agricultural price forecasting using decomposition-based hybrid model. *भारतीय अनुसंधान पत्रिका*, 37, 18-22. <https://doi.org/10.18805/BKAP435>
 13. Das P, Bharti and Banerjee R (2022). An insight of data analysis. *कृषि चेतना*, 5, 61-64. <http://krishi.icar.gov.in/jspui/handle/123456789/72363>
 14. Das P, Jha GK and Lama A (2022). An improved cointegration based time delay neural network model for price forecasting. *Journal of the Indian Society of Agricultural Statistics*, 75(3), 187-192. <http://krishi.icar.gov.in/jspui/handle/123456789/72361>
 15. Das P, Jha GK, Lama A and Bharti (2022). “EMD-SVR” hybrid machine learning model and its application in agricultural price forecasting. *भारतीय अनुसंधान पत्रिका*, 37, 1-7. <https://doi.org/10.18805/BKAP385>, <http://krishi.icar.gov.in/jspui/handle/123456789/71621>
 16. Dhillon MK, Jaba J, Mishra P, Iquebal MA, Jaiswal S, Tanwar AK, Bharat NK, Arora N, Mishra SP, Prasad GS, Hasan F, Rai A, Kumar D and Sharma HC (2022). Whole genome sequencing of spotted stem borer, *Chilopartellus* reveals multiple genes encoding enzymes for detoxification of insecticides. *Functional and Integrative Genomics*, 22, 611-624. <https://link.springer.com/article/10.1007/s10142-022-00852-w>, <http://krishi.icar.gov.in/jspui/handle/123456789/71654>
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 20. Gorai SK, Wason M, Padaria RN, Rao DUM, Paul S and Paul RK (2022). Factors contributing to the stability of the farmer producer organisations: a study in West Bengal. *Indian Journal of Extension Education*, 58(2), 91-96.
 21. Haque MA, Marwaha S, Deb CK, Nigam S, Arora A, Hooda KS, Soujanya PL, Aggarwal SK, Lall B, Kumar M, Islam S, Panwar M, Kumar P and Agrawal RC (2022). Deep learning-based approach for identification of diseases

- of maize crop. *Scientific Reports*, **12(1)**, 6334. <http://krishi.icar.gov.in/jspui/handle/123456789/71626>
22. Harishkumar HV, Raghavendra DV and Singh KN (2022). Land use dynamics across rural-urban transition of Bengaluru. *Economic Affairs*, **67(2)**, 63-68.
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- unsupervised binning of metagenomics data using consensus clustering. *Current Genomics*, **23(2)**, 137-146. <https://doi.org/10.2174/1389202923666220413114659>
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Book Chapters

- Avashthi H, Bhati J, Mittal S, Srivastava A, Budhlakoti N, Kumar A, Ramteke PW, Mishra DC and Kumar A. (2022). Transcriptome Data Analysis Using a De Novo Assembly Approach. In: *Genomics of Cereal Crops*. Eds. Wani, S.H., Kumar, A. Springer Protocols Handbooks. Humana, New York, NY, pp 195-209. https://doi.org/10.1007/978-1-0716-2533-0_8
- Bhati J, Avashthi H, Kumar A, Majumdar SG, Budhlakoti N and Mishra DC (2022). Protocol for Identification and Annotation of Differentially Expressed Genes Using Reference-Based Transcriptomic Approach. In: *Genomics of Cereal Crops*. Eds Wani, S.H., Kumar, A. Springer Protocols Handbooks. Humana, New York, NY, pp 175-193. https://doi.org/10.1007/978-1-0716-2533-0_7
- Budhlakoti N, Majumdar SG, Kushwaha AK, Maheshwari C, Hasan M, Mishra DC, Kumar A, Bhati J and Rai A (2022). Tools and Techniques for Genomic Imprinting pp. 335-346. In: Wani, S.H., Kumar, A. (eds). In : *Genomics of Cereal Crops*. Eds Wani, S.H., Kumar, A. Springer Protocols Handbooks. Humana, New York, NY, pp 335-346. https://doi.org/10.1007/978-1-0716-2533-0_18.
- Kumar A, Sharma M, Gautam T, Meher PK, Bhati J, Avashthi H, Budhlakoti N, Mishra DC, Angadi UB and Singh KP (2022). Protocol for Identification and Functional of Abiotic-Responsive in Plants, pp. 211-226. In: *Genomics of Cereal Crops*. Eds Wani, S.H., Kumar, A. Springer Protocols Handbooks. Humana, New York, NY, pp 211-226. https://doi.org/10.1007/978-1-0716-2533-0_9
- Kumar A, Sharma M, Gautam T, Meher PK, Bhati J, Avashthi H, Budhlakoti N, Mishra DC, Angadi UB and Singh KP (2022). Protocol for In Silico Identification and Functional Annotation of Abiotic Stress-Responsive MicroRNAs in Crop Plants. In: *Genomics of Cereal Crops*. Eds Wani, S.H., Kumar, A. Springer Protocols Handbooks. Humana, New York, NY, pp 211-226. https://doi.org/10.1007/978-1-0716-2533-0_9.
- Kumari M, Muduli L, Meher PK and Pradhan SK (2022). Genome-Wide Association Study (GWAS) for Trait Analysis in Crops. In: *Genomics of Cereal Crops*. Eds Wani, S.H., Kumar, A. Springer Protocols Handbooks. Humana, New York, NY, pp 295-307. https://doi.org/10.1007/978-1-0716-2533-0_15
- Meher PK, Kumar A and Pradhan SK (2022). Genomic Selection Using Bayesian Methods: Models, Software, and Application, pp. 259-269. In: *Genomics of Cereal Crops*. Eds Wani, S.H., Kumar, A. Springer Protocols Handbooks. Humana, New York, NY, pp 259-269. https://doi.org/10.1007/978-1-0716-2533-0_13

Popular Articles

- Alka Arora. (2022). Orientation of artificial intelligence in agricultural Science. In the Compendium on the 21 Days Training Programme on Holistic Development of Agricultural Students, pp 27-28. Published by Dean Student Welfare & NAHEP, JNKVV, Jabalpur, MP. Publication No. DSW/Pub/2021-22/03.
- Alka Arora, Mohit Godara, Preeti Dagar. (2022). Hands on training on image analysis using AI. In the Training Compendium on Application of Computer and IT Tools in Improving Learning and Research Efficacy of Students, pp 83-90. Published by Institutional Development Plan (IDP), SKUAST Jammu.
- Alka Arora, Tanuj Misra, Mohit Godara. (2022). AI application in image analysis: Case Study in phenomic parameter estimation. In the Training Compendium on Application of Computer and IT Tools in Improving Learning and Research Efficacy of Students, 41-48. Published by Institutional Development Plan (IDP), SKUAST

Jammu

- Pal, S. (2022). Computer skills in agriculture. In the Compendium on the 21 Days Training Programme on Holistic Development of Agricultural Students, pp 27-28. Published by Dean Student Welfare & NAHEP, JNKVV, Jabalpur, MP. Publication No. DSW/Pub/2021-22/03.
- Pal, S. (2022). Development of Android-based mobile application. In the Training Compendium on Application of Computer and IT Tools in Improving Learning and Research Efficacy of Students, pp 69-82. Published by Institutional Development Plan (IDP), SKUAST Jammu.

PAPERS PRESENTED/LECTURES DELIVERED

Paper presented /Invited talk delivered in Conferences

- ICAR Directors' Conference organized at NASC Complex on April 13, 2022
 - Anil Rai. ICT activities in ICAR
- किसान भागीदारी, प्राथमिकता हमारी under Azadi ka Amrit Mahotsav organized by KVK Narayangaon, Pune in online mode. Program was attended by 188 farmers in online mode on April 26, 2022.
 - Alka Arora. ICT in Agriculture and initiatives taken by ICAR-IASRI.
- International Conference on Agriculture Science and Technology: Challenges and Prospects (AST-2022), organized by the Rani Lakshmi Bai Central Agricultural University, CARI and IGFRI, Jhansi during May 06-08, 2022
 - D.C. Mishra. Informative genes prediction: concept and issues.
 - Neeraj Budhlakoti. Enhancing the genomic prediction accuracy by handling the influential observations.
- International Symposium on Advances in Plant Biotechnology and Nutritional Security-2022 organized by ICAR-NIPB, New Delhi, during April 28-30, 2022.
 - Prabina Meher. Machine learning driven prediction of multiple abiotic stress-responsive genes in plants: A novel computational model.
 - UK Pradhan. PIDBPred: An Artificial Intelligence-based generalized computational model for discovery of DNA binding proteins in Plants. National Seminar on Contemporary Issues in Fisheries and Aquaculture at Pantnagar during May 19-20, 2022.
- National Seminar on Contemporary Issues in Fisheries and Aquaculture at Pantnagar during May 19-20, 2022.
 - M. Krishnan* and Ramasubramanian V. Fish processing, marketing and trade performance: potential and perspectives.
- XII Biennial National KVK Conference -2022 organized at Dr. YSParmar University of Horticulture and Forestry, Solan, Himachal Pradesh organized during June 01-02, 2022
 - Anil Rai. Kisan_Sarathi in Technical Session-II on Precision Agriculture, Diversification & Intensification.
- 6th International Conference on Current Issues in Agricultural, Biological & Applied Sciences for Sustainable Development (CIABASSD-2022) held at Kalimpong Science Centre, Deolo, Kalimpong, Darjeeling, West Bengal on June 11-13, 2022
 - Bishal Gurung*, KN Singh and Achal Lama and Biwash Gurung. Application of beta regression in forewarning pest attacks in crops. (Oral Presentations)
 - Achal Lama. Modelling volatile agricultural price series using Bayesian time series models.
- V International Conference in Hybrid Mode on Innovative and Current Advances in Agriculture and Allied Sciences (ICAAAS-2022) held at Himachal Pradesh University, Shimla, Himachal Pradesh, organized by Society for Scientific Development in Agriculture and Technology during June 12-14, 2022
 - Sarika. Identification of long non-coding RNAs in pearl millet (*Pennisetum glaucum* L).
 - Priyanka Jain, Ankita Singh, Mir Asif Iquebal*, Anil Rai, Sundeep Kumar, Dinesh Kumar. Whole genome-

based identification of cytokinin dehydrogenase gene family in wheat (*Triticum aestivum* L.).

- Online Workshop of the Indonesian G20 Presidency, organized by the Ministry of Agriculture, Indonesia on Gap Analysis on Food Loss and Waste Indices for G20 countries supported by Food and Agriculture Organization of the United Nations (FAO), Rome, Italy on June 21, 2022
 - Tauqueer Ahmad. Food loss measurement in India: sampling methodology.
- useR! The R user conference. The annual meeting of the R Community (online) by Vanderbilt University Medical Centre, Department of Biostatistics, United States organized during June 20-23, 2022
 - Ashutosh Dalal*, Seema Jaggi, Eldho Varghese, Arpan Bhowmik, Cini Varghese and Anindita Datta. NBB Designs and rsdNE: R packages for the generation of designs and analysis of data incorporating neighbour effects. (Oral presentation in the session on Unique Applications and Methods on June 23, 2022)
 - Sayantani Karmakar*, Md. Ashraf Haque, Cini Varghese, Seema Jaggi, Eldho Varghese and Mohd Harun. An R-package for generating Incomplete row-column designs. (Poster presentation + elevator pitch (virtual) in the session Computing Frameworks on June 22, 2022).
- National webinar organized by the Department of Statistics, Mathematics & Computer Science under the aegis of NAHEP, SKN Agriculture University, Jobner on June 29, 2022
 - Rajender Parsad. Significance of experimental designs in agricultural research.
- National Webinar organized by Department of Agricultural Statistics, Faculty of Agriculture, Bidhan Chandra Krishi Viswavidyalaya, West Bengal to celebrate National Statistics Day on June 29, 2021
 - Rajender Parsad. Significance of experimental designs in agricultural research. (Keynote Address) (*denotes who has presented the paper)

Lecture Delivered (Outside institute)

- One lecture on **Multi-Dimensional Scaling** in the virtual training programme on Statistical Data Analysis organized by ICAR-NAARM, Hyderabad (organized during the periods April 06-08, 11-12, and 18-21, 2022) for the Faculty of PJTSAU, Hyderabad on April 21, 2022. (Ramasubramanian V.)
- Two invited lectures on **Statistical Models for Price Forecasting in Agriculture** and (ii) **Price forecasting using R** in the national webinar organized by Department of Statistics & Computer Applications, S.V. Agricultural College, Tirupati, Acharya N.G. Ranga Agricultural University on April 25, 2022. (Ranjit Kumar Paul)
- Two lectures on (i) **Classification using Decision Tree** and (ii) **Cluster Analysis in UGC-HRDC** sponsored Refresher Course on Research Methodology organized by Pondicherry University (Central University) on May 20, 2022. (Alka Arora)
- Four lectures on (i) **Bivariate Regression Analysis**; (ii) **Logistic Regression Analysis**; (iii) **Multinomial Logistic Regression Analysis** and (iv) **Case studies with Hands-on SPSS** were delivered on 24.05.2022 in the One Week Online International Workshop on Statistical Data Analysis using SPSS during 21-27 May, 2022 organized by Science Tech Institute, Lucknow. (Ranjit Kumar Paul)
- Training programme **Statistical Methods and Data Analysis through R-Software** organized by the Division of Forestry Statistics, ICFRE, Dehradun during May 23-27, 2022.
 - Three lectures (i) **Introduction to Data Analysis in R and R Studio**; (ii) **Data Management in R** on 23.05.2022 and (iii) **Drawing Graphs using R** on 24.05.2022. (Sudhir Srivastava)
 - Two lectures (i) **Design and Analysis of Experiments** on 24.05.2022 and (ii) **Applications of Mixed Effect Modelling in Quantitative Genetics** on 25.05.2022. (D.C. Mishra)

PARTICIPATION

International Conference/ Workshop/Symposium etc.

- International Symposium on **Advances in Plant Biotechnology and Nutritional Security-2022** organised by ICAR-NIPB, New Delhi, during April 28-30, 2022. (M.A. Iquebal, Sarika, PK Meher, UK Pradhan, Sanchita Naha)
- International conference on **Agriculture Science and Technology: Challenges and Prospects (AST-2022)**, organized by the Rani Lakshmi Bai Central Agricultural University, CARI and IGFRI, Jhansi during May 06-08, 2022. (D.C. Mishra and Neeraj Budhlakoti)
- 6th International conference on **Current Issues in Agricultural, Biological & Applied Sciences for Sustainable Development (CIABASSD-2022)** held at Kalimpong, West Bengal, India during 11-13, June, 2022. (Achal Lama)
- V International Conference in Hybrid Mode on **Innovative and Current Advances in Agriculture and Allied Sciences (ICAAAS-2022)** held at Himachal Pradesh University, Shimla, Himachal Pradesh organized by Society for Scientific Development in Agriculture and Technology during June 12-14, 2022 (M.A. Iquebal, Sarika and Prawin Arya)
- International symposium on **Emerging Trends in Deep Learning and Data Analytics (ET-DLDA'22)** organized by Laboratory for Data Science and Analytics (LDSA), Department of Computer Science, South Asian University, New Delhi, India on June 21, 2022 via online mode. (Sapna Nigam)

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

- Training Webinar for Ministries/Departments on **Data Governance Quality Index (DGQI)** dashboard by NITI Aayog on April 07, 2022. (Rajender Parsad and Anil Rai)
- Vice Chancellors Conference of Agricultural Universities on April 12, 2022. (Anil Rai)
- ICAR Directors' Conference on April 13, 2022. (Rajender Parsad and Anil Rai)
- 65th Annual Maize Workshop Hisar 2022 for a single session on **AI-Based Mobile App**. on April 21, 2022. (Sudeep and Chandan Kumar Deb)
- Workshop on **Fasal Bima Pathshala** organized under the campaign: Kisan Bhagidari Prathmikta Humari, by Ministry of Agriculture and Farmers Welfare, Govt. of India, under the Chairmanship of Shri Narendra Singh Tomar, Honourable Minister of Agriculture and Farmers Welfare, Govt. of India on April 27, 2022 at NAAS Complex Pusa, New Delhi. (Rajender Parsad and Tauqueer Ahmad)
- Workshop on **Computational Biology: Genomics, Proteomics, Metagenomics and Microbiome** organized at ICAR-IARI on April 29, 2022. (Ritwika Das)
- Workshop on **promotions of Kisan-Drone: Issues and Challenges and Way Forward** organized by DA&FW and Chaired by Honorable Minister of Agriculture and Farmers Welfare in NASC Complex on May 02, 2022. (Anil Rai)
- Workshop on **Some Quality Related Issues in Railway Track Maintenance & Timber Harvesting Management** organized by the Indian Association for Productivity, Quality & Reliability (IAPQR) in hybrid mode on May 6, 2022. (Ankur Biswas)
- Two-day National Seminar cum Webinar on **Climate Change Concerns: Challenges for Agriculture Sector and Food and Nutrition Security** jointly organized by ICAR-Indian Institute for Millets Research (IIMR), Hyderabad and Karnataka Agri-Professional Association (KAPA) during May 14-15, 2022. (Prakash Kumar)
- Workshop on **Bioinformatics and Genomic Annotation Ensembl and REST Application Programme Interfaces (APIs)** jointly organized by Ensembl Genome Browser, Nextgenhelper and European Bioinformatics Institute during May 16-27, 2022. (Ritwika Das and Soumya Sharma)
- Webinar on **Integrating Data from Probability Samples and Non-Probability Sample Sources: Can We Make Valid Inferences?** by Prof. J.N.K. Rao, organized by Society of Statistics, Computer and Applications on May 21, 2022. (Rajender Parsad, Ramasubramanian V, Kaustav Aditya and Rahul Banerjee)
- National Symposium on **Indian Agriculture after Independence** Chaired by Secretary DARE and DG ICAR,

New Delhi on May 24, 2022. (Anil Rai)

- “कृत्रिम बुद्धि मत्ता एवं इंटरनेट ऑफ थिंग्स का कृषि अभियांत्रिकी में योगदान” विषय पर भाकृअनुप-सीआईएई, भोपाल द्वारा हिन्दी में ऑन लाइन राष्ट्रीय अधिवेशन, मई 26-27, 2022 . (Prakash Kumar)
- Online Hindi workshop on ‘परीक्षणात्मक अभिकल्पनाएँ एवं विश्लेषण’ organized by Division of Design of Experiments from June 14-16, 2022 at ICAR-IASRI. (Sarika Sahu, Md.Yeasin and Soumya Sharma)
- **CGIAR Research Portfolio Introduction and Stakeholder Dialogue in South Asia**, at NASC, Pusa, New Delhi on June 14, 2022. (Susheel Kumar Sarkar)
- Brainstorming Session on **Mainstreaming Agricultural Curriculum in School Education (MACE)** under National Agricultural Higher Education Project (NAHEP) on June 14, 2022 at NASC Complex, Pusa. (Rajender Parsad, Sudeep, Alka Arora, Ramasubramanian V., Anshu Bharadawaj, Mukesh Kumar, SN Islam, Shashi Dahiya, Soumen Pal, Chandan Kumar Deb, Md. Ashraful Haque, Madhu, Sapna Nigam and Sanchita Naha)
- Workshop on **Planned Survey on Pulses in Rice based Cropping System** on June 24, 2022 via virtual mode. (Soumen Pal, Alka Arora, SN Islam, Ajit and Ranjit Kumar Paul)
- Online meeting organized by Ministry of Statistics and Programme Implementation (MoSPI) to deliberate on the **compilation of the Proposed Food Balance Sheets (FBS)** under the Chairmanship of Additional Director General (SSD), NSO, MoSPI on April 26, 2022 at ICAR-IASRI, New Delhi. (Tauqueer Ahmad)
- Online Meeting of **Information and Communications Technologies (ICTs)** had formed a Focus Group on “Artificial Intelligence (AI) and Internet of Things (IoT) for Digital Agriculture (FG-AI4A)” on May 09, 2022. (Anil Rai)

Meetings:

- Expert Committee meeting of the strategic area **Social Sciences and Policy in Agriculture** on April 5, 2022 in online mode. (Chandan Kumar Deb)

HUMAN RESOURCE DEVELOPMENT

Training Programmes/Workshops Organized: 4 (378 participants)

S.No.	Topic	Vennue	Dates	No of Participants
1	Data Analysis and Interpretation for 43 rd and 44 th batch of Indian Statistical Service (ISS) Probationers (Coordinators: B.N. Mandal and Ankur Biswas) Sponsored by: NSSTA, MoSPI, Government of India	ICAR-IASRI, New Delhi	April 18-29, 2022	30
2	Experimental Design and Analysis of data through Statistical Software (Coordinators: Anil Kumar, Susheel Kumar Sarkar, Sukanta Dash and SC Negi from CSKHPKV)	CSKHPKV, Palampur (jointly with ICAR-IASRI, New Delhi)	May 24-30, 2022	312
3	Data Analysis and Interpretation for 43 rd and 44 th batch of Indian Statistical Service (ISS) Probationers (Coordinators: Ramasubramanian V., Kaustav Aditya) Sponsored by: NSSTA, MoSPI, Government of India	ICAR-IASRI, New Delhi	June 06-17, 2022	29
हिन्दी कार्यशाला				
4	परिक्षणात्मक अभिकल्पना एवं विश्लेषण (Coordinators: Sukanta Dash, Anindita Datta, Mohd. Harun)	ICAR-IASRI, New Delhi (ऑन लाईन)	June 14-16, 2022	19

NSSTA: National Statistical Systems Training Academy,
MosPI: Ministry of Statistics and Programme Implementation



Training programme Data Analysis and Interpretation on April 18-29, 2022

Dr. P.S. Birthal, Director, ICAR-National Institute of Agricultural Economics and Policy Research as Chief Guest during Valedictory function on April 29, 2022



Training programme on Data Analysis and Interpretation during June 06-17, 2022

Dr. G.P. Samanta, Secretary and Chief Statistician of India, Ministry of Statistics and Programme Implementation, Government of India and **Dr. R.C. Agrawal**, DDG (Agricultural Education), ICAR during Valedictory Function on June 16, 2022

Training Programmes Attended

- Training Program on **Analytical Techniques for Impact Evaluation Methods** organized by International Food Policy Research (IFPRI), South Asia Regional Office, New Delhi at the Institute of Agricultural Sciences, Banaras Hindu University (BHU) during April 25-30, 2022. (Raju Kumar)

CONSULTANCY/ADVISORY SERVICES PROVIDED

- Bishal Gurung advised Sh. K. Srinivas, Ph.D. (Entomology) student of P.G. School, ICAR-IARI on Chi-square test using R software.
- Prakash Kumar advised Sh. Ganga Ram Kohar, Ph.D. student, Andhra University, Visakhapatnam in determining the levels of genetic diversity and relationships among the selected QPM lines and to evaluate the usefulness of microsatellites in diversity analysis of SSR marker and its scoring on Binary data of Quality Protein Maize hybrids data.
- Kaustav Aditya advised Dr. M.C. Meena, Senior Scientist, Division of Soil Science, ICAR-IARI, New Delhi, regarding soil sampling and experimental design.
- Kaustav Aditya advised Dr. Shrila Das, Scientist, Division of Soil Science, ICAR-IARI, New Delhi, regarding data analysis using PCA and Factor Analysis.
- M.A. Iquebal advised Dr. Rakesh Kumar, ICAR-NDRI, Karnal regarding SNP data analysis in cattle.
- Sarika advised Dr. Ambika Rajendran, Scientist, ICAR-IARI, New Delhi regarding genomic data generation and SSR marker data analysis in Soybean.
- Sarika Sahu advised Sh. Nikhil Chanda, Ph.D. student from Sardar Vallabhbhai Patel University of Agriculture Meerut on Bioinformatics analysis for Identification of Nitrogen use efficiency (NUE) and Phosphorus Use Efficiency (PUE) gene in wheat (*Triticum aestivum*) and Coexpression network analysis for identification of genes regulating NUE and PUE in wheat (*Triticum aestivum*).
- Sarika Sahu advised Shruti Sinha, Ph.D. student from PG school ICAR-IARI, New Delhi bioinformatics analysis for Mining of cold response pathway in major grain and legumes, identification of cold responsive genes: ICE, CBF and COR legumes. These genes were identified in pigeon pea using hidden Markov model profile. Further, domain analysis were performed. In silico validated candidate gene were used for wet lab validation.
- Prakash Kumar advised Dr. Mathew S. Baite, Scientist (Plant Pathology), ICAR- National Rice Research Institute, Cuttack, Odisha on analysis of data of in-vitro inhibition of *Ustilaginoidea virens* by biocontrol agents at 20 days after inoculation data provided by
- Kanchan Sinha advised Ms. Monika Chowdhury, Scientist, CCS Haryana Agricultural University in her research work related to co-integration analysis and the approaches to deal with seasonality adjustment procedure on her research time series dataset.
- Kaustav Aditya advised Mrs. Tannistha Bardhan, Ph.D. (Agricultural Extension), GBPUAT, Pantnagar regarding analysis of data using CART and random forest technique.
- Ankur Biswas advised Mr. Neelakanta Rajarushi Chava, Student, Division of Entomology, ICAR-IARI, New Delhi on the use of Probit Analysis and factorial experiments with multiple comparison test using LSD and Tukey's HSD.
- Kaustav Aditya advised Dr. Abir Dey, Scientist, Division of Soil Science and Agricultural Chemistry, ICAR-IARI, New Delhi, regarding data analysis and layout of design construction for his project.
- Kaustav Aditya advised Dr. Robin Gogoi, Professor, Division of Pathology, ICAR-IARI, New Delhi regarding data analysis using RCB design.
- Pankaj Das advised Dr. J.S. Brar Principal Scientist, PAU, Ludhiana and Dr. T. Adhikary, Assistant Professor, PAU, Ludhiana in data analysis.
- M.A. Iquebal advised Dr. Ravisankar, ICAR-IIHR, regarding transcriptome data analysis in mango.
- Sarika advised Dr. RK Solanki, Senior Scientist, ICAR-CAZRI regarding phylogenetic analysis.
- Bishal Gurung advised Dr. Yvonne Angel Lyngdoh, Scientist, Division of Vegetable Science, ICAR-IARI, New

Delhi on the use of ANOVA, regression analysis and correlation analysis for some morphological characters of French bean.

- Bishal Gurung advised 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 REML/BLUP for her research data.
- Harish Kumar H.V. advised Sh. Utkarsh Tiwari, Ph.D. scholar, Division of Agricultural Economics, ICAR-IARI, New Delhi in the Tobit analysis using NSSO data.
- Kanchan Sinha advised Mr. Sneha Devra, M.Sc. in Agricultural Statistics at Junagadh Agricultural University, Junagadh in his research work on time series forecasting by combining ARIMA and ANN model.
- Kaustav Aditya advised Mrs. Tannistha Bardhan, Ph.D. student from Ag. Extn, GPUAT, Pant Nagar regarding analysis of data using classification and regression tree analysis and random forest using CART and Random forest technique.
- Raju Kumar advised Dr. Chander Bhan Pannu, Assistant Professor (Horticulture), Agricultural Research Station (SKRAU), Sri Ganganagar for analysis of Guar gum and chitosan-based composite edible coating for extending the shelf life and preserving the bioactive compounds in stored Kinnow fruits.

AWARD AND RECOGNITIONS

Award

Sapna Nigam*, Sudeep Marwaha and Alka Arora

- **Best poster Presentation** for Image Based Wheat Rust Severity Estimation using Deep Learning by Advances in Plant Biotechnology and Nutritional Security (APBNSS-2022), organized at ICAR-NIPB, New Delhi during April 28-30, 2022.

Sanchita Naha

- **Best poster Presentation** for Ontology Driven Context Aware Recommender System for Maize Cultivation by Advances in Plant Biotechnology and Nutritional Security (APBNSS-2022), organized at ICAR-NIPB, New Delhi during April 28-30, 2022.

Mohammed Harun

- As co-author received Dr. R.K. Arora **Best Paper Award (2021)** from ISPGR for the paper Anil Patidar, Mahesh C Yadav, Jyoti Kumari, Shailesh Tiwari, Munesh K Kushwah, Mohammed Harun, Vijay Paul and BS Tomar (2021). Morphophysiological Characterization of Bread Wheat Accessions for Heat Stress Tolerance under Late Sown Conditions of North Western Plain Zone of India. *Indian Journal of Plant Genetic Resources*, **34(2)**, 258-273.



Recognitions

Rajender Parsad

- **Member**, Programme Steering and Monitoring Committee (PSMC) under the Biotech-Krishi Innovation Science Application Network (Biotech-KISAN) programme.
- **Eminent Speaker** in the National webinar on Significance of Experimental Designs in Agricultural Research organized by the Department of Statistics, Mathematics & Computer Science under the aegis of NAHEP, SKN Agriculture University, Jobner on June 29, 2022.
- **Keynote Speaker** during Webinar organized by Department of Agricultural Statistics, Faculty of Agriculture, Bidhan Chandra KrishiViswavidyalaya, West Bengal to celebrate National Statistics Day on June 29, 2022.

Anil Rai

- **Chairman**, Technical Session in International Workshop on Smart Farming/Precision Agriculture organized by Shastri Indo-Canadian Institute on April 05, 2022.

- **Chairman**, Technical Session on Genome Sequencing, Bioinformatics in 43rd Annual Meeting of Plant Tissue Culture Association (India) & International Symposium on Advances in Plant Biotechnology and Nutritional on April 30, 2022.

Ramasubramanian V.

- **Invited Speaker** in the Webinar on Applications of Classification and Regression Tree (CART) models and Self-Organizing Map (SOM) in agriculture organized by ANGRAU Agricultural College, Bapatla as part of National Statistics Day-2022 celebrations and commemoration of 129th birth anniversary of Prof. P.C. Mahalanobis on June 29, 2022.

Prabina Kumar Meher

- Received NAAS Associateship on June 05, 2022.

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

Initiated

1. 'Genomic prediction for micro-nutritional traits in bread wheat: a study on machine learning algorithm' w.e.f. April 01, 2022. Funded by Lal Bahadur Shastri Outstanding Young Scientist Award (**P.K.Meher**)
2. 'Development of Artificial Intelligence and Big Data Analytics based Framework for Predicting Protein-Ligand Interaction' w.e.f. May 11, 2022. (**Sneha Murmu**, Soumya Sharma, Bharati Pandey, Md Samir Farooqi)
3. 'Modelling of proportional data for forewarning pest attacks in crops' w.e.f. May 21, 2022. (**Bishal Gurung**, Achal Lama, KN Singh)

Completed:

1. Machine Learning Approach for Binning of Metagenomics Data completed on May 13, 2022. (Anu Sharma, S.B. Lal, Sanjeev Kumar, D.C. Mishra)

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S.No.	Name	Registration Number	Granted and (Received Date)
1.	BrassicaSatDb: Brassica Microsatellite Database	SW-15347/2022	06.04.2022 (07/12/2022)
2.	SmCarTDB: Small Cardamom Transcriptome database	SW-15348/2022	06.04.2022 (07/12/2022)
3.	Online generation of Incomplete Block Design	SW-15545/2022	30.06.2022 (07/12/2022)
4.	Online generation of Orthogonal and Nested Orthogonal Latin Hypercube Designs	SW-15546/2022	30.06.2022 (07/12/2022)
5.	DARE-ICAR Foreign Visit Management System	SW-15526/2022	28.06.2022 (19/05/2023)
6.	Online construction and analysis of Incomplete Split Plot Designs	SW-15337/2022	06.04.2022 (19/05/2023)
7.	ICAR - Personnel Management System (PMS)	SW-15338/2022	06.04.2022 (19/05/2023)
8.	TpGBNVDb: ThripsPalmi transcriptome database in response to groundnut bud necrosis virus	SW-16146/2023	13.04.2022 (19/05/2023)
9.	ICAR Education Portal 1.0	SW-15339/2022	06.04.2022 (19/05/2023)

MOU/LOA signed

- MOU with University of Agricultural Sciences, GKVK Campus Bengaluru and Punjab Agricultural University Ludhiana on May 26, 2022 to establish and maintain an Augmented Reality (AR)/Virtual Reality(VR) Experience Centres

PERSONNEL

Congratulations on your Promotion/ New Assignment/ New Joining

Name	Designation	Effective date
Sh. Trilok Saini	Assistant Administrative Officer (On Deputation)	08.04.2022 (deputation to ICAR-NIASM, Baramati)
Sh. Piyush Shukla	Chief Administrative Officer	09.05.2022
Ms. Nikita	Technical Officer (T-6)	21.06.2022 (Joining)
Sh. Ratan Singh	U.D.C. (on Deputation)	24.06.2022
Sh. Dinesh Kumar	U.D.C. (On Deputation)	24.06.2022
Dr. Mir Asif Iquebal	Senior Scientist	07.01.2020
Dr. Sarika	Senior Scientist	07.01.2020
Dr. Susheel Kumar Sarkar	Senior Scientist	26.06.2021
Dr. B.N. Mandal	Senior Scientist	10.02.2021
Dr. Ranjit Kumar Paul	Senior Scientist	23.06.2021
Dr. Soumen Pal	Senior Scientist	20.04.2020
Dr. Bishal Gurung	Senior Scientist	27.04.2020
Dr. Kaustav Aditya	Senior Scientist	27.04.2020
Dr. Sukanta Dash	Senior Scientist	15.09.2020
Dr. Arpan Bhowmik	Senior Scientist	02.07.2021
Dr. Ankur Biswas	Senior Scientist	02.07.2021
Dr. Prabina Kumar Meher	Senior Scientist	02.07.2021
Dr. Prakash Kumar	Scientist	01.07.2019
Dr. Anindita Datta	Scientist	01.01.2020
Dr. Himadri Shekhar Roy	Scientist	05.07.2020
Dr. Achal Lama	Scientist	05.07.2020
Dr. Vandita Kumari	Scientist	01.07.2020
Dr. Ravindra Shekhawat	Scientist	01.07.2020
Dr. Anuja AR	Scientist	05.01.2021
Dr. Shivaswamy GP	Scientist	05.01.2021
Dr. Rajesh T	Scientist	05.01.2021
Dr. Harish Kumar HV	Scientist	05.07.2021

Wish you a Happy Retired Life

Name	Designation	Effective date
Sh. Surinder Kumar Gupta	Senior F.& A.O.	30.06.2022

Transfer/ Resignation

Name	Designation	Effective date
Dr. Samarendra Das	Scientist	02.04.2022 (transferred to ICAR-Directorate of Foot and Mouth Disease, Bhubaneswar)
Dr. Arpan Bhowmik	Scientist	08.04.2022 (transferred to ICAR-IARI, Assam)



Azadi Ka Amrit Mahotsav

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Published by:

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