



ICAR-IASRI



NEWS

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October-December, 2017

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From Director's desk.....

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

A team of scientists from Junagarh Agricultural University, Gujarat and ICAR-IASRI, New Delhi has successfully sequenced, for the first time in the world, stem not fungal genome (~73Mb) and identified 16830 genes (Published in <https://www.nature.com/articles/s41-017-05478-8>). This finding will pave the way of genome based solution especially in new generation fungicide designing for stem not disease management leading to better productivity of groundnut crop in tropical region of world.



An attempt was made to investigate the structure of long memory in daily wholesale price of mustard in Mumbai market. Estimation of long memory parameter of ARFIMA model were modelled and forecasted using ANN. Finally, forecasted values obtained from ARFIMA model and forecasts of residuals obtained from ANN were combined and forecasting accuracies were compared between ARFIMA and hybrid model. Experimental study justified the superiority of the proposed hybrid model over ARFIMA model in terms of several measurement indices.

A Mobile App for Animal Reproduction (*PashuPrajananApp*) has been designed and developed in collaboration with ICAR-IVRI. The Mobile App additionally provides information for proper heat detection and Artificial Insemination (AI) so as to promote AI among farmers. The Mobile App helps in creating awareness and educating Livestock owners/ Entrepreneurs to deal with various reproductive problems of large animals.

Scientists of the Institute have received various awards e.g. Netaji-Subhas-ICAR International Fellowship, G R Seth Memorial Young Scientist Award and Krishi Vigyan Gourav Award of 2017. One scientist visited Myanmar for FAO consultancy. An International training programme was organized at the Institute during 22 November - 12 December, 2017 for the participants from African-Asian Rural Development Organization (AARDO) member countries. Four other training programmers and one Hindi Workshop were also organized.

During the period under report, the Institute have received two Copyrights viz. MAPI-android-App (Mobile Assisted Personal Interview) and Data Entry Software for estimation of harvest and post-harvest losses of crop/commodities. 71st Annual Conference of the Indian Society of Agricultural Statistics was organized at ICAR-Directorate of Rapeseed-Mustard Research, Bharatpur during 25-27 November, 2017.

The Institute team participated in ICAR Central Zone Sports meet held at ICAR-CIAE, Bhopal during November 09-13, 2017. Scientists of the Institute have provided Consultancy/Advisory services and participated in different Conference/Symposia/Workshop etc. in various capacities and also delivered invited lectures.

It is hoped that the contents of the document would be informative and useful. Any suggestion for improving the contents of the newsletter further would be highly appreciated.

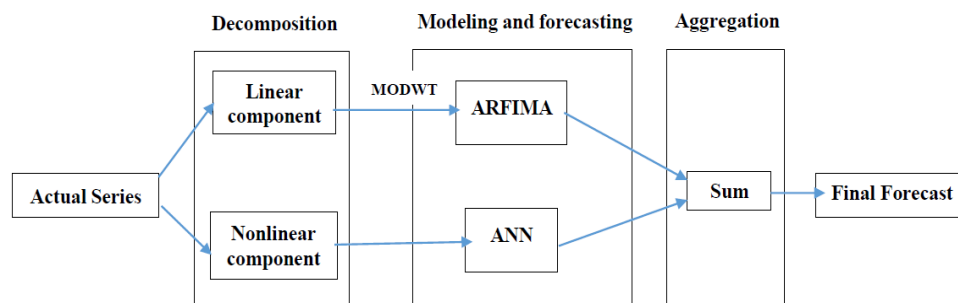
(A.K. Choubey)

RESEARCH ACTIVITIES

Hybrid ARFIMA Model for Forecasting Long Memory Time Series Data

Santosha Rathod, K N Singh, Ranjit K. Paul and Mrinmoy Ray

The autocorrelation among the time series is expected to disappear rapidly as the observations are distance apart in time. Some times in ARMA model the ACF exhibit short range dependence or decreases exponentially as the time lag increases and in some series the decay can occur at much slower hyperbolic rate and the correlations remain positive for long lags. Such series are said to have long memory and commonly prevail in stock market prices, economic growth rate, inflation rate, oil price and GDP figures etc. Classical time series models namely ARIMA models cannot describe such long memory phenomenon. Therefore, to overcome this difficulty set of models has been established, among which most popular one is autoregressive fractionally integrated moving average (ARFIMA) model. Sometimes the time series often contain both linear and nonlinear components, rarely they are pure linear or nonlinear. Under such condition neither ARFIMA nor Artificial Neural Network (ANN) are adequate in modeling and forecasting of long memory time series. ANNs are nonlinear model that are able to capture various nonlinear structures present in the data set. ANN model specification does not require prior assumption of the data generating process, instead it is largely depending on characteristics of the data. Single hidden layer feed forward network is the most popular for time series modeling and forecasting. The ANN model is characterized by a network of three layers of simple processing units, and thus termed as multilayer ANNs. The first layer is input layer and the last layer is output layer of dependent variable. Since the ARFIMA model cannot deal with nonlinearity, while the ANNs are alone not able to capture both linear and nonlinear behavior equally. To overcome these difficulties, hybrid methods were evolved. Applications of hybrid methods in the literature shows that combining different methods can be an effective and efficient way to improve forecasts. Schematic representation of proposed methodology is expressed as follows;



Proposed methodology

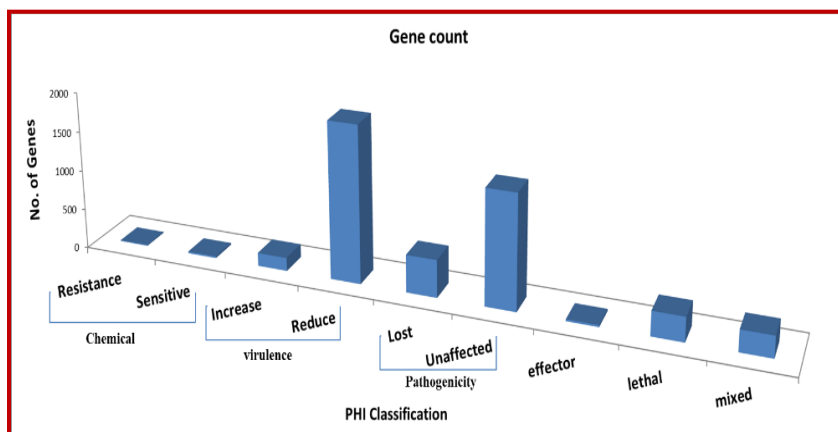
In this study, attempt has been made to investigate the structure of long memory in daily wholesale price of mustard in Mumbai market, India during the period 1st January, 2009 to 31st December, 2012. The data was collected from Ministry of Consumer's Affairs, Government of India. Estimation of long memory parameter of ARFIMA model is done by wavelet method using MODWT and daily wholesale price of mustard in Mumbai market are forecasted. In the next step; the residuals obtained from ARFIMA models are tested for nonlinearity using BDS test and are found to be significant, the same residuals are

modelled and forecasted using ANN. Finally, forecasted values obtained from ARFIMA model and forecasts of residuals obtained from ANN are combined and forecasting accuracies are compared between ARFIMA and hybrid model. Experimental study justified the superiority of the proposed hybrid model over ARFIMA model in terms of several measurement indices. This approach can be further extended by using some other machine learning techniques for varying autoregressive and moving average orders so that practical validity of the model can be well established.

Cracking of Genetic Code of Groundnut Stem Rot Disease Causing Fungus *Athelia rolfsii* -ICAR-IASRI, New Delhi: Dr. Mir Asif Iquebal, Dr. Sarika, Dr. Deepak Singla, Mr. Neeraj Kumar, Dr. Anil Rai and Dr. Dinesh Kumar; JAU, Junagadh: Rukam S. Tomar, M. V. Parakhia, V. M. Rathod, S. M. Padhiyar

Groundnut (*Arachis hypogaea* L.) is an important oil seed crop. Due to stem rot fungal disease there is loss in productivity (25–80%). Chemical and biological control is not very affective, thus new fungicide development and disease combating strategy requires whole genome sequencing and identification of genes responsible for virulence and pathogenicity.

A team of scientists from Junagadh Agriculture University, Gujarat and ICAR-Indian Agricultural Statistics Research Institute, New Delhi has successfully sequenced this fungal genome (~73Mb) and identified 16830 genes. This study has also revealed insight of evolution of pathogenicity and virulence. This fungal genome has been sequenced for the first time in



the world. This has been published in Nature Publishing Group of Journals, Scientific Reports 7, Article number 5299 (2017) (<https://www.nature.com/articles/s41598-017-05478-8>). This finding will pave the way of genome based solution especially in new generation fungicide designing for stem rot disease management leading to better productivity of groundnut crop in tropical region of world.

AWARDS AND RECOGNITIONS

Awards

- Dr. Santosha Rathod received G R Seth Memorial Young Scientist Award of Indian Society of Agricultural Statistics for a paper entitled “An improved space time autoregressive moving average model for Mmdeling and forecasting spatio-temporal time series Data” at 71st Annual National Conference of Indian Society of Agricultural Statistics at ICAR-DRMR, Bhartapur held during 25-27 November, 2017.
- Dr. Kaustav Aditya received the “Krishi Vigyan Gourav” Award of 2017 from Bhartiya Krishi Anusandhan Samiti and Krishi Anusandhan Sanchar Kendra (ARCC), Karnal.
- Dr. K.K. Chaturvedi Received Distinguished Scientist Award, in International Conference on Global Research Initiatives Sustainable Agriculture and Allied Sciences (GRISAAS-2017) held during 02-04 Dec. 2017 at MPUA&T Udaipur by Society for Scientific Development in Agriculture and Technology, Meerut (SSDAT).
- Shri Prakash Kumar was awarded Netaji Subhas-ICAR International Fellowship.

Recognitions

- Dr Hukum Chandra acted as International Consultant, FAO of United Nations under Global Strategy to Improve Agricultural and Rural Statistics in Myanmar during 15-21 November, 2017.
- Dr. Hukum Chandra was Coordinator of training visit of the participants of the International Statistical Education Centre (ISEC) regular course on Official Statistics & Related Methodology from National Statistical Systems Training Academy (NSSTA), Ministry of Statistics & Programme Implementation, Govt. of India, at ICAR-IASRI, New Delhi on December 26, 2017.
- Dr. Hukum Chandra was a resource person, one week training programme on Advanced Sampling Techniques for ISS officers from 04-08 December 2017, the National Statistical Systems Training Academy (NSSTA), Ministry of Statistics & Programme Implementation, Govt. of India, at Greater Noida, India on 05 December, 2017.
- Dr. Arpan Bhowmik, Dr. Eldho Varghese, Dr. Cini Varghese and Dr. Seema Jaggi received copyright on Web Generation of Factorial Experiments with Minimum Level Changes in Run Sequences (webFMC). [Copyright registration number: SW-9312/2017]
- Dr. Cini Varghese, Dr. Seema Jaggi, Dr. Eldho Varghese and Dr. Arpan Bhowmik received copyright on Web Generation of Polycross Designs (webPD). [Copyright registration number: SW-9311/2017]
- Dr. Wasi Alam Chaired a technical session No. 13C (Cochin Hall) on Dec. 16, 2017 at 10:45 AM to 12:15 PM in 3rd international conference on *Statistics for Twenty-First Century* held during Dec. 14-16, 2017 at Department of statistics, University of Kerala, Trivandrum, Kerala.
- Dr. K.K. Chaturvedi chaired a session in GRIAAS-2017 at MPUA&T Udaipur on 3rd December 2017.
- Dr. K.K. Chaturvedi was a Member of Technical Program Committee, International Conference on Infocom Technologies and Unmanned Systems (ICTUS'2017) during December 18-30, 2017.
- Dr. Tauqueer Ahmad was nominated as External Examiner by AMU, Aligarh for Conducting viva voce examination of M.Sc. students of Department of Interdisciplinary Remote Sensing and GIS, AMU, Aligarh on 14 December, 2017.
- Dr. Tauqueer Ahmad was nominated as External Examiner by AMU, Aligarh for Conducting viva-voce examination of M.Sc. students of Department of Statistics and Operations Research, AMU, Aligarh on 16 December, 2017.
- Dr. Hukum Chandra was Expert, Advisory Committee of All India Financial Inclusion Survey (NAFIS), National Bank for Agriculture and Rural Development (NABARD), Mumbai on 27 December, 2017.
- Dr. Anu Sharma co-chaired a session on National Conference on Future Innovations in Computing Technology and Machine Learning (FICTML-17) held at the Department of Computer Science and Applications, Maharishi Dayanand University, Rohtak on 21 November, 2017.
- Dr. Soumen Pal was an External Examiner for question setting of the course entitled 'Agri-informatics & Computer Applications' of the Faculty of Agriculture and Horticulture of Uttar Banga Krishi Viswavidyalaya, West Bengal.

71th Annual Conference of the Indian Society of Agricultural Statistics held at Bharatpur, Rajasthan during November 25-27, 2017.

- Dr Hukum Chandra chaired a contributed paper session.
- Dr. Rajender Parsad acted as chairman of an Invited Paper session on Rapeseed-Mustard Cultivation in India.
- Dr. Susheel Kumar Sarkar and Dr. Sukanta Das chaired a contributory paper session on Design of Experiments.
- Dr. Susheel Kumar Sarkar acted as Rapporteur in a plenary session.
- Anindita Datta and Mohd Harun acted as Rapporteur for the session on Crop Insurance in India.
- Dr. Mukesh Kumar convened a session on E-Learning and E-Initiative in Farmers Outreach.

International Indian Statistical Association Conference held at Hyderabad during December 28-30, 2017.

- Dr. Rajender Parsad chaired two sessions of invited talks on (i) Contributions to optimality issues in real life statistical designs and (ii) Advances in Design of Experiments.
- Dr. K.K. Chaturvedi chaired a session.
- Dr. Hukum Chandra was an invited speaker,

- Dr. Hukum Chandra convened invited technical sessions on (i) Small Area Estimation and (ii) Advances in Survey Methodology.
- Dr. Hukum Chandra chaired an invited technical session on Recent Advances in Analysis of Complex Survey Data.

Visits Abroad

Nothing to report.

HUMAN RESOURCE DEVELOPMENT

Training programs organized

S.N.	Title	Venue	Date	Number of participants
1.	Advanced Statistical Tools and Techniques for Modeling and Forecasting Agricultural Data. <i>Course Director: Dr. Santosha Rathod</i> <i>Co-Director: Dr. Ravindra Singh Shekhawat</i>	ICAR-IASRI, New Delhi	08-28 November, 2017	25
2.	Recent Advances in Agricultural Surveys: Remote Sensing and GIS Applications. <i>Programme Director: Dr. Prachi Misra Sahoo</i>	ICAR-IASRI, New Delhi.	22 November - 12 December, 2017	9
3.	Recent Advances in Sample Surveys and Survey Data Analysis using Statistical Software <i>Course Coordinator: Dr. Kaustav Aditya</i> <i>Co-coordinator: Dr. Ankur Biswas</i>	ICAR-IASRI, New Delhi.	01-21 December, 2017	25
4.	ICAR-ERP for ICAR Technical/Administrative Personnel <i>Course Coordinators : Dr. Anshu Bharadwaj</i> <i>Dr. Shashi Dahiya</i>	ICAR-IASRI, New Delhi.	22- 27 December, 2017	25

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

- Identification of defence genes/QTLs associated with rust resistance in wheat Parameter estimation of time series models using Bayesian technique. (AGEDIASRISIL201702200108) (Dr. M. Grover)
- Efficiency of micro irrigation in economizing water use in India-learning from potential and unexplored states. (AGEDIASRICOP201702300109) (Ravindra Singh Shekhawat).

PANORAMA OF ACTIVITIES

Conferences/ Workshops/ Seminars/ Symposia/Meetings etc. Organized

- Organized an invited paper session on Statistical Designs, Genetics and Bioinformatics for Farmers' Welfare during 71st Annual Conference of the Indian Society of Agricultural Statistics held at ICAR-Directorate of Rapeseed-Mustard Research, Sewar, Bharatpur, Rajasthan during November 25-27, 2017. (Conveners: Rajender Parsad and Amrit Kumar Paul).
- Organized a Hindi workshop on "Multivariate statistical analysis using SAS" as Coordinators during 30 November - 04 December. (B N Mandal and Sukanta Dash)

- Organized an invited paper session on Advances in Design of Experiments in IISA International Conference on Statistics held at Hyderabad during December 28-30, 2017. (Rajender Parsad)

PUBLICATIONS

Research Papers

- Mugaonkar, P, Kumar, NR, Shelar, G, Polanco, JF, Ramsubramanian, V and Biradar, RS (2017). Case study on the non-price factors and consumer behavior for Pangasius (*Pangasianodon hypophthalmus*) (Valenciennes, 1840) consumption in Pune city, India, *Fishery Technology*, **54**, 279 – 286.
- Kaur, RP, Chaudhary, B and Alam, W (2017). Associations among yield and yield contributing traits of potato in North-western Plains of India. *The Indian Journal of Agricultural Sciences*, **87(10)**: 1409–1411.
- Choudhary, P, Malhotra, S, Bharadwaj, C, Gaikwad, K, Kaur, S, Chopra, M, Tandon, G, Jaiswal, S, Iquebal, MA, Rai, A, Kumar, D, Jain, S and Pradeep K. (2017). Transcriptomic signature of fusarium toxin in chickpea unveiling wilt pathways and marker discovery. *Physiological and Molecular Plant Pathology*, **100**, 163-177.
- Tandon, G, Singh, S, Kaur, S, Sarika, Iquebal, MA., Rai, A and Kumar, D (2017). In silico identification of the genes related to biotic stresses in *Solanum lycopersicum*. *Genomics Data*, **14**, 82-90.
- Iquebal, MA, Jaiswal, S, Mahato, AK, Jayaswal, PK, Angadi, UB, Kumar, N, Sharma, NS, Srivastav, A, Praksh, M, Singh, J Sanjay, K, Khan, K, Mishra, RK, Shailendra, R, Bajpai, A, Sandhya, BS, Nischita, P, Ravishankar, KV, Dinesh, MR, Rai, A, Kumar, D, Sharma, T, Singh, R, Nagendra, K (2017). MiSNPDb: A web based genomic resources of tropical ecology fruit mango (*Mangifera indica* L.) for phylogeography and varietal differentiation. *Nature Scientific Reports* 7, Article number: 14968(2017)
- Dey, SK, Chakrabarti, B, Prasanna, R, Singh, SD, Purakayastha, TJ, Datta, A and Pathak, H (2017). Productivity of mungbean (*Vigna radiata*) with elevated carbon dioxide at various phosphorus levels and cyanobacteria inoculation. *Legume Research*, **40(3)**, 497-505.
- Ziar, YK, Das, TK, Hakimi, AR, Shekhawat, K and Paul, AK (2017) Chemical weed management in wheat (*Triticum aestivum*) under semi-arid conditions of Kandahar, Afghanistan. *Indian Journal of Agronomy*, **62** (3), 359-362.
- Defo, C, Kaur, R, Bharadwaj, A, Lal, K and Kumar, P (2017): Modelling approaches for simulating wetland pollutant dynamics, *Critical Reviews in Environmental Science and Technology*, DOI: 10.1080/10643389.2017.1350126.
- Saxena, R, Singh, NP, Choudhary, BB, Balaji, SJ, Paul, RK, Ahuja, U, Joshi, D, Kumar, R and Khan, MA (2017). Can livestock sector be the game changer in enhancing the farmers' income? Reinvesting thrust with special focus on dairy sector. *Agricultural Economics Research Review*, **30**, 59-76.
- Singh, I, Smita, S, Mishra, DC, Kumar, S, Singh, BK and Rai, A (2017) Abiotic stress responsive miRNA-target network and related markers (SSR and SNP) in Brassica juncea. *Frontiers in Plant Science*. <https://doi.org/10.3389/fpls.2017.01943>
- Singh, A and Sharma, A (2017). MAICBR: A multi-agent intelligent content-based recommendation system. *Springer Lecture Notes in Networks and Systems*, **10**, 399-411.
- Jaiswal, S, Sonia, S, Arora, V, Angadi, UB, Iquebal, MA, Aneja, R, Bharti, N, Kumar D, Khokar, RS, Sharma, P, Singh, GP, Rai, A, Tiwari, R and Kumar, D (2017). Putative microsatellite DNA marker-based wheat genomic resource for varietal improvement and management. *Frontiers in Plant Sciences*.
- Gaikwad, NN, Pal, RK, Suryawanshi, S, Babu, KD, Maity, A and Sarkar, SK (2017). Effect of extraction method and thermal processing on retention of bioactive compounds of pomegranate (*Punica granatum*) (cv. Bhagwa) juice. *Ind. Jour. Ag. Sci.* **87(11)**, 1445–1452
- Datta, A, Jaggi, S, Varghese, E, Varghese, C, Bhowmik, A and Mohd. H (2017). Robustness of generalized row-column designs against missing observation (s). *Biometrical Article*. <https://www.biotecharticles.com/Biotech-Research-Article/Robustness-of-GRC-Designs-Against-Missing-Observation-s-4228.html>.
- Ramasubramanian, V, Ananthan, PS, Krishnan, M and Vinay, A (2017). Technology forecasting in fisheries sector: Cross impact analysis and substitution modeling. *Journal of the Indian Society of Agricultural Statistics*, **71(3)**, 231-239.
- Vinay, A, Ramasubramanian, V, Azeez, PA, Kumar, R and Kumar, DK (2017). Economic analysis of troll line fisheries in androth, Lakshadweep. *Int. J. Curr. Microbiol. App. Sci.*, **6(11)**, 3172-3179.
- Ray, M, Rai, A, Singh, KN and Ramasubramanian, V (2017). Modeling and forecasting of hybrid rice yield using a grey model improved by the genetic algorithm. *International Journal of Agricultural and Statistical Sciences*. **13(2)**, 563-566.

- Rathod, S, Singh, KN, Arya, P, Ray, M, Mukherjee, A, Sinha, K, Kumar, P and Shekhawat, R S (2017). Forecasting maize yield using ARIMA-Genetic Algorithm approach. *Outlook on Agriculture*. **46**(4), 265-271.
- Rathod, S, Singh, KN, Arya, P Ray, M, Mukherjee, A, Sinha, K and Kumar, P (2017). Forecasting maize yield using ARIMA-Genetic Algorithm approach. *Outlook on Agriculture*. **46**(4), 265-271.
- Rathod, S, Mishra, GC and Singh, KN (2017). Hybrid time series models for forecasting banana production in Karnataka state. *Journal of the Indian Society of Agricultural Statistics*. **71**(3), 193-200.
- Ghosh, H (2017). Nonorthogonal optimal partial diallel cross designs for consistent estimation of heritability. *J. Japan Statist. Soc.*, **47**(1), 37-58.
- Roy, HS, Paul, RK, Bhar, LM and Kumar, A (2017). Modelling binary data by Bayesian logistic regression with random intercepts. *Journal of the Indian Society of Agricultural Statistics*, **71**(3), 207-215.
- Dahiya, S, Handa, SS and Singh, NP (2017). A feature selection enabled hybrid-bagging algorithm for credit risk evaluation, *Expert System-The Journal of Knowledge Engineering*. 34 (6)
- Mittal, S, Mallikarjuna, MG, Rao, AR, Jain, PA, Dash, PK and Nepolean, T (2017). Comparative analysis of CDPK family in maize, Arabidopsis, rice and sorghum revealed potential targets for drought tolerance improvement. *Frontiers in Chemistry: Agricultural Biological Chemistry*, 5, 115, doi: 10.3389/fchem.2017.00115.
- Faisal, S, Mani, I, Gupta, RK, Sahoo, PK, Jha, SK, Singh, B, Sarkar, SK and Khura, TK (2017). Response surface analysis and process optimization of twin screw extrusion of apple pomace blended snacks. *Ind. Jour. Ag. Sci.*, **87**(11), 1499–1506
- Krishna kumar P, Mani, I, Gupta, RK, Kumar, A, Jha, SK Singh, B, Sarkar, SK and Lande, SD (2017). Development of barnyard millet based nutri-functional snack food: A response surface methodology approach. *Ind. Jour. Ag. Sci.*, **87**(11), 1430–1436
- Sundaram, PK, Mani, I, Kumar, A, Lande, SD Susheel K Sarkar, K M Manjaiya, R N Sahoo And Sandeep K Lal (2017). Effect of liquid urea ammonium nitrate application at varying depths on root and shoot growth in wheat (*Triticum aestivum*). *Ind. Jour. Ag. Sci.*, **87**(11), 1288–1294.
- Singh, A, Dass, A, Singh, CV, Dhar, S, Sudhishri, Das, K and Sarkar, SK (2017). Growth, productivity and nutrient concentration of aerobic rice (*Oryza sativa* L.) under different planting methods, irrigation schedules and soil adjuvant applications. *Ann. Ag. Res.* **38**(4), 368-374.
- Kumar, S, Sisodia, BVS, Kumar, S, Singh, D and Basak, P (2017). On various approaches for estimating finite population total in survey sampling under ratio super population model. *International Journal of Agricultural and Statistical Sciences*, **13**(2), 677-682.
- Kumar, S, Sisodia, BVS, Singh, D and Basak, P (2017). Calibration approach based estimation of finite population total in survey sampling under super population model when study variable and auxiliary variable are inversely related. *Journal of Reliability and Statistical Studies*, **10**(2), 83-93.

Book Chapters

- Deb, CK, Marwaha, S, Arora, A and Das, M (2018). A Framework for Ontology Learning from Taxonomic Data. In: Aggarwal V., Bhatnagar V., Mishra D. (eds) *Big Data Analytics. Advances in Intelligent Systems and Computing*, vol 654, pp 29-37 Springer, Singapore.
- Sharma A, and Singh A. Intelligent Semantics Approaches for Adaptive Web in forthcoming book "Multidisciplinary Approaches to Service-Oriented Engineer" by IGI Global. (Communicated)
- Mishra DC, Lal SB, Sharma A, Kumar S, Budhlakoti N, Rai A (2017). Strategies and Tools for Sequencing and Assembly of Plant Genomes. In: Kumar Chakrabarti S., Xie C., Kumar Tiwari J. (eds) *The Potato Genome. Compendium of Plant Genomes*. Springer, Cham. page no. 81-94 DOI: https://doi.org/10.1007/978-3-319-66135-3_5. Publisher Name: Springer, Cham. Print ISBN: 978-3-319-66133-9. Online ISBN: 978-3-319-66135-3. eBook Packages: Biomedical and Life Sciences.

Popular Article

- अनु शर्मा, ज्योतिका भाटी, एस. बी. लाल, के. के. चतुर्वेदी, एम. एस. फारुकी और अनिल राय के द्वारा लिखित शोध पत्र "संगणनात्मक विधियों के द्वारा अरहर में माइक्रो आर.एन.ए. की पहचान" को विज्ञान प्रकाश में जमा किया गया

Reference Manual /Manual/ E-manual/Pamphlet

- Advanced Statistical Tools and Techniques for Modeling and Forecasting Agricultural Data. Training Manual-I, ICAR-IASRI, New Delhi. (Santosh R and Shekhawat RS)
- एस ए एस द्वारा बहुचर सांख्यिकीय विश्लेषण। हिन्दी कार्यशाला ई-मेनुयल। (बी एन मंडल एवं सुकान्त दाश (2017)
- Recent Advances of Bioinformatics in Agriculture: A Practical Perspective. Volume I and Vol. II of reference manual sponsored by HRM unit of ICAR, New Delhi. (Mishra DC and Bhudhalkoti N)
- Recent Advances of Bioinformatics in Agriculture: A Practical Perspective e-manual (CD) sponsored by HRM unit of ICAR, New Delhi.
- Recent Advances in Sample Surveys and Survey Data Analysis Using Statistical Software. Vol. I and Vol. II of reference manual for CAFT Training Programme. (Kaustav Aditya and Ankur Biswas)
- Recent Advances in Sample Surveys and Survey Data Analysis Using Statistical Software Published E-manual for CAFT Training Programme. (Kaustav Aditya and Ankur Biswas)
- Recent Advances in Agricultural Surveys: Remote Sensing and GIS Applications. Reference Manual for International Training Programme held during 22 November - 12 December, 2017 for the participants from African-Asian Rural Development Organization (AARDO) member countries at ICAR-IASRI, New Delhi Publication. (Prachi Misra Sahoo and Tauqueer Ahmad)
- Recent Advances in Agricultural Surveys: Remote Sensing and GIS Applications. E-manual on of the International Training Programme. (Prachi Misra Sahoo and Tauqueer Ahmad).

E-Book

- Rathod, Santosha and R S Shekhawat (2017). Advanced Statistical Tools and Techniques for Modeling and Forecasting Agricultural Data, ICAR-IASRI, New Delhi.

Leaflet Brochure

- Advanced Statistical Tools and Techniques for Modelling and Forecasting Agricultural Data (8-28, November, 2016) (Santosh Rathod and R S Shekhawat)

R package

- B.N. Mandal, Sukanta Dash and Rajender Parsad (2017). R Package Aoptbdtvc on CRAN <https://cran.r-project.org/web/packages/Aoptbdtvc/index.html>

LECTURES DELIVERED

Outside Institute

- Application of ARCH and GARCH in social science research in the CAFT training on “Technology and Policy Options for Enhancing Farmers’ Income” conducted at Division of Agricultural Economics, ICAR-IARI, New Delhi during September 23- October 13, 2017. (Dr. Achal Lama)
- Invited lecture on i) Genome Assembly i) Allele mining and its application in agriculture and iii) Metagenome analysis in a training programme on “Harnessing NGS data for genetic enhancement in crops” conducted during October 3-12, 2017 organized by ICAR-IIWBR, Karnal. (Dr. M. A. Iquebal)
- Invited lecture on i) Data cleaning and pre-processing ii) miRNA identification and its target prediction iii) Transcriptome analysis in a training programme on “Harnessing NGS data for genetic enhancement in crops” conducted during October 3-12, 2017 organized by ICAR-IIWBR, Karnal. (Dr. Sarika)
- Invited lecture on i) Why computational agri-genomics is needed ii) Genome annotation in a training programme on “Harnessing NGS data for genetic enhancement in crops” during October 3-12, 2017 organized by ICAR-IIWBR, Karnal. (Dr. Dinesh Kumar)
- Invited lecture on Principles of Field Experimental Designs to the participants of the Training Programme on layout and maintenance of Field Experiments and Recording Observations organized at Division of Agronomy, ICAR-IARI, New Delhi during October 03-12, 2017. (Dr. Rajender Parsad)

- Invited lecture on Modeling approaches for pest-weather relations in the workshop on Real Time Pest Dynamics on 13th October, 2017 at NCIPM, New.(Delhi R.K. Paul)
- Invited talk on “KVK Mobile App for Krishi Vigyan Kendra: Knowledge Dissemination and Farmers’ Query Resolution” in the session on “E-Learning and E-initiative in Farmers Outreach” in 71st Annual Conference of the Indian Society of Agricultural Statistics during 25th to 27th November, 2017 at ICAR-DRMR, Bharatpur, Rajasthan. (Dr. Soumen Pal)
- Invited talk on ICT intervention for enhancing farmers income” in the session “E-Learning and E-initiatives for Farmers outreach” in the 71st Annual Conference of ISAS. (Dr. K.K. Chaturvedi)
- Invited lectures as Resource Person on Exploratory Data Analysis, SPSS for Testing of Hypothesis under the Faculty Development Programme on SPSS, R and Excel at MMU, Mullana-Ambala, Haryana on 17th and 18th Nov 2017. (Dr. Anindita Datta)
- Invited lectures as Resource Person in the Faculty Development Programme on SPSS, R and Excel at MMU, Mullana-Ambala, Haryana on 20 Nov 2017 on i) Correlation, regression and regression diagnostics and ii) Logistic regression (Dr. Arpan Bhowmik)
- Invited lectures as Resource Person in the Faculty Development Programme on SPSS, R and Excel at MMU, Mullana-Ambala, Haryana on 21 Nov 2017 on i) R software: An Introduction and ii) Data analysis using R. (Dr. B N Mandal)
- Lecture as Resource Person on SPSS for correlation, Regression and Diagnostics, Multiple Regression analysis with Qualitative Information: Binary or Dummy Variables under the FDP on SPSS, R and Excel at MMU, Mullana-Ambala. (Mohd. Harun)
- Invited lectures on Multivariate Data Analysis: Dimension Reduction and Classificatory Techniques to the participants of the Faculty Development Programme on Advanced Data Analysis using SPSS, Excel, R and MatLab organized during 17-22 November 2017 at Maharishi Markandeshwar University, Mullana-Ambala. (Dr. Rajender Parsad)
- Lectures as a Resource Person on (i) SPSS: An Overview, (ii) Testing of Hypothesis and (iii) Analysis of Variance in a Faculty Development Programme on SPSS, R, Excel and MatLab at MMU, Mullana-Ambala, Haryana during 17-18 November, 2017. (Dr. Seema Jaggi)
- Lectures as a Resource Person on (i) Levels of measurements and descriptive statistics, (ii) MS Excel: An overview and (iii) MS Excel for data analysis under the Faculty Development Programme on SPSS, R and Excel at MMU, Mullana-Ambala, Haryana during 17-18 November, 2017. (Dr. Cini Varghese)
- Invited talk on “Comparison of Metagenome Assemblers” in International Conference on Statistics held Hyderabad International Convention Centre-HICC, Kavuri Hills, Kondapur, Hyderabad by International Indian Statistical Association-IISA on 28th December, 2017 to 30th December, 2017. (Dr. Anu Sharma)
- Invited talk on “Internet of Things (IoT) for Sustainable Agriculture” in GRIAAS-2017 at MPUA&T Udaipur on 3rd December 2017.(Dr. K.K. Chaturvedi)
- Invited talk on “Genomic Data Warehousing: Issues and Challenges” in the IISA-2017 International Conference on Statistics at Hyderabad International Convention Centre, Hyderabad on 29th December 2017 (Dr. K.K. Chaturvedi)
- Invited talk on “Application of Machine Learning Techniques: End User Perspectives in the UGC sponsored National Workshop “Machine Learning: Techniques and Applications” held at DDU college (University of Delhi), Dwarka during 26 December to 1st January 2018.(Dr. K.K. Chaturvedi)
- Four Lectures on “Advanced Sampling Techniques” to trainee ISS officers from 04-08 December 2017, in the National Statistical Systems Training Academy (NSSTA), Ministry of Statistics & Programme Implementation, Govt. of India, Greater Noida, India on 05 December 2017. Lectures topics are: (i) Overview Probability/Random Sampling, (ii) Importance of survey data/ survey weights, (iii) Analysis of survey data using R, and (iv) Small Area Estimation Techniques. (Dr. Hukum Chandra)
- Lecture in one day International training programme organised at ICAR-IASRI on behalf of NSSTA, MoSPI, Govt. of India for participants from various countries on 26 December, 2017. (Dr. Tauqueer Ahmad).
- Invited talk on "Statistical Issues and Challenges of Genomic Selection" in a technical session entitled "Recent Development in Bioinformatics" in International Conference on Statistics organised by International Indian Society of Statistics held at International Convention Center, HICC, Kavuri Hills, Kondapur, Hyderabad, India during 28-30, December, 2017. (Dr. D.C. Mishra)
- Md. Samir Farooqi attended 71st Annual Conference of Indian Society of Agricultural Statistics (ISAS) held at ICAR-Directorate of Rapeseed-Mustard Research, Sewar, Bharatpur-321 303, Rajasthan, India during 25-27 Nov,

2017 and delivered a contributed talk on “Gene Expression analysis for RNASeq data using order statistics based mixture model”.

- Dr. S.B. Lal attended 71st Annual Conference of Indian Society of Agricultural Statistics (ISAS) held at ICAR-Directorate of Rapeseed-Mustard Research, Sewar, Bharatpur-321 303, Rajasthan, India during 25-27 Nov, 2017 and presented an invited paper on “Internet of Things (IoT) for E-Learning” in the Technical Session: E-Learning and E-Initiative in Farmers Outreach.
- Dr. D.C. Mishra attended 71st Annual Conference of Indian Society of Agricultural Statistics during 25-27, November, 2017 held at Directorate of Rapeseed Mustard Research, Bharatpur. Also presented an invited talk on "Genomic Markers and Its Application in Brassicas" in a technical session entitled "Statistical Designs, Genetics and Bioinformatics for Farmers Welfare".

OTHER SCIENTIFIC ACTIVITIES

Statistical and Geographic Information System/ Data Bases/Mobile Apps Developed

- Fungus SSR database and web portal has been completed and ready for publication. (U.B. Angadi, M.A. Iquebal, Sarika and Dinesh Kumar)

Papers presented in Conferences

71st Annual Conference of the Indian Society of Agricultural Statistics organized at ICAR-Directorate of Rapeseed-Mustard Research, Bharatpur during 25-27 November, 2017.

- Rajender Parsad, A. Dhandapani, Mukesh Kumar*, Jai Kumar, and Anshu Bhardwaj. Digital institutional publications repository for knowledge management.
- Santosha Rathod. An improved space time autoregressive moving average model for Modeling and Forecasting spatio-temporal time series Data for G R Seth Memorial Young Scientist Award.
- Ramasubramanian V., Ananthan, P.S. and K.N. Singh. Invited Talk on ICT and extension technologies for doubling farmers' income in aquaculture and fisheries in Symposium Session on Role of Statistics and Informatics.
- K.N. Singh, Ramasubramanian V. and Bishal Gurung. Invited talk on “Risk Assessment Modeling and Forecasting for Crop Insurance” in Symposium Session on Role of Statistics and Informatics in Doubling the Farmers' Income.
- Wasi Alam. Improved ARIMAX model based on ANN and SVM: An application for forecasting rice yield using weather variables.
- Mrinmoy Ray. Modified Sieve based prediction intervals for Neural Network Forecasting.
- Rajeev Ranjan. Application of artificial neural network model for prediction of drought index.
- Anindita Datta, Mohd. Harun, Seema Jaggi and Cini Varghese. Neighbour balanced generalized row-column designs.
- Mohd. Harun, Cini Varghese, Anindita Datta and Seema Jaggi. Three-way cross designs for hybrid production.
- Sumeet Saurav, Cini Varghese, Eldho Varghese and Seema Jaggi. Designs for sensory trials involving foods of animal origin.
- Akhilesh Jha, Cini Varghese, Seema Jaggi, Eldho Varghese and Mohd. Harun. Affine resolvable block designs with unequal block sizes.
- Rahul Banerjee, Seema Jaggi, Eldho Varghese, Arpan Bhowmik, Cini Varghese, Anindita Datta and Shwetank Lall. Efficient designs for mixture experiments using non-linear models.
- Rajender Parsad. Importance and applications of Design of Experiments in Agricultural Research: Case studies. (Invited Talk)
- Rajender Parsad, A. Dhandapani, Mukesh Kumar, Jai Kumar, and Anshu Bhardwaj. Digital institutional publications repository for knowledge management. (Invited Talk)
- Sukanta Dash. Designs for consecutive crop sequence
- Sunil Kumar Yadav. $2 \times 3 \times 3$ Factorial experiments with Gompertz Error Distribution
- Kaustav Aditya and Hukum Chandra. Mobile assisted personal interview-Implementation in the state of Gujarat.
- Hukum Chandra. Role of small area statistics for the welfare of farmers. (Invited talk)

- Kaustav Aditya and Hukum Chandra. MAPI software for data collection using smart phones-A way forward for fast, cost effective and quality data.
- S. Guha, Hukum Chandra and U.C. Sud. Calibrated chain ratio-product type estimator using two auxiliary variables in two phase sampling.
- S. Kumar and Hukum Chandra. Small area estimation of counts under unit level generalised linear mixed model.
- P. Anjoy, Hukum Chandra and P. Basak, P. Hierarchical bayes approach for small domain inference.
- V. Kumari, U.C. Sud and Hukum Chandra. Calibration approach based estimation of regression coefficient using multi auxiliary variables.
- Ankur Biswas, Kaustav Aditya and U.C. Sud. Calibration estimators under two stage sampling design when auxiliary variable is inversely related with study variable”
- Estimation of Hedge ratio using Kalman filter” in the Statistical Modelling session. (Dr. Bishal Gurung)
- Dr. Achal Lama participated in the 71st Annual conference of ISAS held at ICAR-DRMR, Bharatpur and presented a paper entitled “A comparative study between classical and Bayesian structural time series models” by Achal Lama, KN Singh and Bishal Gurung.
- Dr. Achal Lama participated in the 71st Annual conference of ISAS held at ICAR-DRMR, Bharatpur and presented a paper entitled “A comparative study between classical and Bayesian structural time series models” by Achal Lama, KN Singh and Bishal Gurung.
- Himadri Ghosh Participated in 71st annual conference of Indian society of agricultural statistics (ISAS) held at ICAR-Directorate of rapeseed-mustard research, Bharatpur sewar,Rajasthan and presented the paper “Stochastic Differential Equation Gompertz growth model and its application”
- Himadri Shekhar Roy Participated in 71st annual conference of Indian society of agricultural statistics (ISAS)held at ICAR-Directorate of rapeseed-mustard research, Bharatpur sewar, Rajasthan and presented the paper ”Detection of outliers in factorial experiment.”

INTERNATIONAL CONFERENCES

Twenty Fifth Annual Conference of Agricultural Economics Research Association (AERA) at ICAR-NAARM, Hyderabad during 07-09 November, 2017.

- R. K. Paul, Raka Saxena and Deepika Joshi. Integration, Causality and Prediction of Agricultural Commodity Outputs in India.
- Raka Saxena, N. P. Singh, B. B. Choudhary, S.J. Balaji, R. K. Paul, U. Ahuja, D. Joshi, R. Kumar and M.A. Khan. Can Livestock Sector be the Game Changer in Enhancing the Farmers’ Income? Reinvesting Thrust with Special Focus on Dairy Sector.

Third International Conference on Statistics for Twenty-First Century-2017 (ICSTC-2017) organized by Department of Statistics, University of Kerala, during 14-16th December 2017 at Technopark, Trivandrum, Kerala.

- Mrinmoy Ray presented a research paper entitled Modified Sieve Bootstrap Approach for Constructing Prediction Interval in Vector Autoregressive Model in
- Bishal Gurung. Bayesian technique for forecasting crop yield using weather indices.
- Rajeev Ranjan Kumar. A study on co-movement between crude oil and agricultural commodity prices in India.
- Achal Lama. Comparative study between ARIMA and Bayesian ARIMA model.
- Wasi Alam. Artificial neural network and support vector machine approaches for improving the performance of ARIMA model for forecasting crop yield.
- Santosha Rathod. An improved STARMA model using evolutionary techniques for modeling and forecasting spatio-temporal time series data.
- R.K. Paul. Time Series Models Predicting Jassids and Thrips on Groundnut at Kadiri of Andhra Pradesh.
- Prakash Kumar. Simultaneous stability measure for yield stability based on existing stability measures by using TOPSIS technique.
- H.S. Roy. INARX model for forecasting pest population in agriculture: An application.
- Sunil Kumar Yadav*. $2 \times 3 \times 3$ Factorial experiments with logistic error distribution. (Contributed talk)

IISA International Conference on Statistics held at Hyderabad during December 28-30, 2017)

- Rajender Parsad, Sukanta Dash, Pratheesh P. Gopinath and B.N. Mandal. Row-column designs with factorial treatment structure, during the Session on Experimental Designs and Data Analysis. (Invited Talk)
- Bhowmik, Arpan, Varghese, Eldho, Jaggi, Seema and Varghese, Cini. Factorial experiments and response surface designs with hard-to-change factors. (Invited Talk)
- B. N. Mandal, Rajender Parsad and Sukanta Dash. A-optimal designs for test vs controls comparison—an algorithmic approach during the session on Advances in Design of Experiments. (Invited talk)
- Chandra, H. Small area prediction of counts under a spatial dependent generalized linear mixed model. (invited paper).
- Aditya, K. and Chandra, H. District level crop yield estimation using calibration approach. (invited paper)
- Aditya, Kaustav, Gupta, A.K. and Chandra, Hukum. Crop yield estimation using calibration approach.

Thirty Eighth Asian Conference on Remote Sensing "Space Applications: Touching Human Lives" held during 23-27 October, 2017 in New Delhi on the following topics.

- Sahoo, Prachi M., Ahmad, Tauqueer and Krishna, Gopal. "Species-wise discrimination of area under Agroforestry using satellite data in Ludhiana district".
- Krishna, Gopal, Sahoo, Rabi N., Bajpai, Vaishangi, Patra, Himesh, Kumar, S., Raju, D., Viswanathan, C., Ahmad, Tauqueer, Sahoo, Prachi M. and Singh, Prafull "Evaluation of Spectral Indices, Multivariate and ANN Techniques for Monitoring of Crop Water Deficit Stress".
- Paul, Nobin Chandra, Rai, Anil, Krishna, Gopal and Sahoo, P M. "Pseudo Invariant Features Normalization and Multispectral Image Classification for Spatio-Temporal Change Detection".
- (iv) Udgata, AR, Sahoo, PM, Ahmad, Tauqueer and Rai, Anil. "Acreage Estimation of Mango by Integrating Survey Data and Satellite Data in West Godavari District".

PARTICIPATION

Participation in International Conference/ Workshop etc.

1. Organized of a session on "Recent Development in Bioinformatics" Chaired two sessions on "Statistical Modelling and Learning for Contemporary Data Analysis" and a "Special session" in International Conference on Statistics organized by International Indian Statistical Association (IISA) held during 28-30 December, 2017 at Hyderabad. (Dr. S.B. Lal)
2. International Conference on Statistics organised by International Indian Society of Statistics during 28-30, December 2017 at Hyderabad. (Dr.D.C. Mishra, Dr. K.K.Chaturvedi, Dr. Anu Sharma, Dr. Arpan Bhowmik, Dr. BN Mandal, Dr. Hukum Chandra, Dr. Kaustav Aditya and Dr. Rajender Parsad)
3. Third International Conference on Statistics for Twenty-First Century-2017 (ICSTC-2017) organized by Department Of Statistics, University Of Kerala during 14-16th December 2017 at Techno Park, Trivandrum, Kerala. (Sunil Kumar Yadav)
4. Training cum Workshop on Methodological framework for implementation of FFP jointly organized by NAARM, NIAP, IASRI and DKMA at ICAR-CISH, Lucknow during 03-06 Oct., 2017; TANUVAS, Chennai during 10-13 Oct., 2017 and ICAR-IARI, New Delhi during 23-26 Oct., 2017 (Dr. Mukesh Kumar, Dr. Anshu Bhardwaj and Dr. Soumen Pal)
5. Training cum workshop for studies on Real Time Pest Dynamics under NICRA on 13th October, 2017 at NCIPM, New Delhi. (R.K. Paul)
6. 71st Annual Conference of the Indian Society of Agricultural Statistics organized at ICAR-Directorate of Rapeseed-Mustard Research, Bharatpur during 25-27 November, 2017. Dr. Kaustav Aditya chaired a session on Contributory paper Session on sample surveys on 27 November, 2017 as a Rapporteur. (Dr.Tauqueer Ahmad, Dr Hukum Chandra, Dr. K. N. Singh, Dr. Kaustav Aditya, Dr. Mukesh Kumar, A.K. Paul, Dr. Soumen Pal and Dr. Ankur Biswas)

7. Participated in Training cum Workshop on Methodological framework for implementation of FFP jointly organized by NAARM, NIAP, IASRI and DKMA during 6th -9th November, 2017 at ICAR-IISWC, Dehradun. Dr. Mukesh Kumar and Dr. Anshu Bharadwaj
8. Estimation of Hedge ratio using Kalman filter” in the Statistical Modelling session. (Dr. Bishal Gurung)
9. Dr. Bishal Gurung acted as a rapporteur in the 71st Annual Conference of the Indian Society of Agricultural Statistics (ISAS), at DMR, Bharatpur Rajasthan in the session “Role of Statistics and Informatics in Doubling the Farmers Income”.
10. Dr. K.K. Chaturvedi attended the seminar by Dr. Ivo Grobe, Martin-Luther-Universitat Halle-Wittenberg, Germany on 30th November 2017.
11. Rajender Parsad attended 5th Edition of Global Conference on Cyber Space (GCCS 2017) organized by the Ministry of Electronics and Information Technology, Government of India November 23-24, 2017 (attended through Webinar/Webcast).
12. Cini Varghese attended (first day) in the Annual group meet of AICRP on Integrated Farming Systems organized at Rajasthan Agriculture Research Institute (SKN Agriculture University), Durgapura-Jaipur during November 03-05, 2017 and made a presentation on “progress on statistical analysis of on-farm farming system experiments (OFR 2 & 3)”.
13. Anil Kumar attended Annual Group Meeting of AICRP on IFS during 03-05, November, 2017 held at Rajasthan Agriculture Research Institute, Durgapura (SKN University of Agriculture and Technology, Jobner), Rajasthan and presented progress of the project "Planning, designing and analysis of experiments planned ON STATION under AICRP on IFS" .
14. Susheel Kumar Sarkar presented 71st Annual Conference of Indian society of Agricultural Statistics as Member, Organizing Committee at ICAR-Directorate of Rapeseed-Mustard Research, Bharatpur (Rajasthan) on Statistics and Informatics for Farmers Welfare during 25-27 November, 2017.
15. Neeraj Budhlakoti attended guest seminar of Professor Ivo Grobe, Martin-Luther-Universitat Halle-Wittenberg, Germany.
16. Dr. D.C. Mishra attended guest seminar of Professor Ivo Grobe, Martin-Luther-University, Halle-Wittenberg, Germany held on 30 November, 2017 at IASRI, New Delhi.
17. Dr. Anu Sharma attended National Conference on Future Innovations in Computing Technology and Machine Learning (FICTML-17) held at Department of Computer Science and Applications, Maharishi Dyanand University, Rohtak on 21 November, 2017.
18. Dr. Anu Sharma attended the guest seminar by Professor Ivo Grobe, Martin-Luther-Universitat Halle-Wittenberg, Germany on 30th November, 2017.
19. Dr. Wasi Alam attended pre-conference workshop entitled “recent trends in distribution theory” held during Dec. 11-13, 2017 at Department of Statistics, University of Kerala, Trivandrum, Kerala.

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1. Data Entry Software for estimation of harvest and post harvest losses of crop/commodities. Copyright Registration Number : [SW-9295/2017](#)
(Tauqeer Ahmad, Anil Rai and Prachi Misra Sahoo)
2. Mobile Assisted Personal Interview version 1 (MAPI ver. 1). Copyright Registration Number : [SW-9378/2017](#)
(Kaustav Aditya, Hukum Chandra, AK Gupta, Ankur Biswas, Anshu Bhardwaj, Anil Kumar, Ajit, Vandita Kumari and Raju Kumar)

Consultancy/Advisory services provided:

- Mr. Mukesh Patel, Assistant Professor, Navsari Agricultural University to carry out path analysis and stability analysis in SAS on Assessment of genetic diversity and stability of African marigold (*Tagetes erecta* L.) under the south Gujarat conditions. (Santosh Rathod)

- Mr. Hemaraj Bhandari, Scientist, ICAR to carry out group of experiment data analysis in SAS on stability analysis of different genotypes over different locations and year on. (Santosha Rathod)
- Evaluation of the database and tool under process with data of 8 districts from various zones and regions of Ethiopia. (Dr. U.B. Angadi)
- Mr. Devendra Pratap Singh, Research Scholar, IGKV, Raipur regarding analysis of paddy data using different nonlinear growth models.(Dr. Soumen Pal)
- Dr. Mukesh Patel , Assist. Professor, NAU, Navsari, Gujarat, in the analysis to Merigold data provided by him. (Prakash Kumar)
- Dr. Harendra Verma, Scientist, Indian Council of Agricultural Research, RC – NEH in the analysis and layout of Lattice Design. (Himadri Shekhar Roy).
- Consultancy to FAO of United Nations under Global Strategy to Improve Agricultural and Rural Statistics in Myanmar during 15-21 November, 2017. (Dr. Hukum Chandra)
- Evining Stone, Scientist, ICAR - National Research Centre on Litchi, Muzaffarpur, in cluster analysis and control vs treatment in split plot to data provided by him. (Sh. Prakash Kumar).
- Sukhdeep Kaur Brar – RRS, Bathinda in anlysis of RCBD of the data Provide by her. (Sh. Prakash Kumar)
- Shabnam Mehta. Ph.D. Scholar, Department of Soil Science, CSK Himachal Pradesh Agriculture University about the analysis. (Himadri Shekhar Roy).
- consultancy in a project with International Livestock Research Institute (ILRI) is in progress. (Dr. U.B. Angadi)
- Mr. Sajal Tamang, PhD student of BCKV, Mohanpur in SAS using Factorial RBD design. (Sh. Achal Lama)
- Hanumantya, Ph.D. Scholar, IAS, BHU, Varanasi wavelet neural network analysis of black pepper data of Karnataka. (Sh. Santosh Rathor)
- Consultancy works and principal component analysis and draw byplot for study of heavy metal removal by some waste water plant data provided by Paritosh Kumar, Scientist (Environmental Science), ICAR-NIBSM, Baramati. (Sh. Prakash Kumar)
- Sandeep Kumar, Scientist, Environmental Sciences, Centre for Environment Science and Climate Resilient Agriculture (CESCRA) on principal component analysis of a dataset using R software. (Dr. B.N. Mandal)
- Lalita Rana, Ph.D. student of BCKV, on analysis of data of factorial experiment conducted using split plot design with three replications, three varieties, three plant spacing and three 3 DOS. (Mohd. Harun)

PERSONNE

Appointment(s)

- Shri Sushil Kumar joined the institute as Scientist in the division of Sample Survey on 05.10.2017 vide office order No. 19(1280)/2017-Admn.-I dated 13.10.2017.
- Shri Harish H.V. joined the institute as Scientist in the division of Forecasting and Agricultural System Modelling on 16.10.2017 vide office order No. 19(1281)/2017-Admn.-I dated 25.10.2017.

Study Leave

- Smt. Vandita Kumari Choudhary, Scientist has proceeded on study leave for a period from 05.10.2017 to 04.03.2019 having been granted the study leave vide office order No. 19(1259)/2014-Admn.-I dated 04.10.2017.



एक कदम स्वच्छता की ओर



हर कदम, हर उमर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

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