



# ICAR-IASRI



## NEWS

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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.

Irrigation has a significant impact on the level of agricultural growth and development of any district. Under the project "Growth and Decomposition of Agricultural Production in Rajasthan", it is observed that the proportion of irrigated area to net sown area is very small, which is a major obstacle in agricultural development in the state. Therefore, efforts are needed to intensify by the Government to increase the irrigation facilities. Efforts should be made to increase productivity of crops, area under forest and livestock rearing.



Under the project "Discovery of Herbicide resistance genes for Better Chickpea Variety Development", candidate genes and pathways of herbicide tolerance in chickpea has been reported for the first time in the world by the ICAR scientists and has been published in reputed Journal (<http://journal.frontiersin.org/article/10.3389/fpls.2017.009581full>). Two chickpea varieties viz. herbicide susceptible (ICC5434) and tolerant (ICC1205) genotypes were exposed to imidazoline (Imazethapyr). It is found that reported differentially expressed genes (EDGs) can be used as genomic resources for future discovery of candidate genes associated with herbicide tolerance and reported markers can be used for future association studies in order to develop marker assisted selection (MAS) for refinement. This can improve productivity of chickpea germplasm with better ecology and food safety.

Annual Day of the Institute was celebrated on 3<sup>rd</sup> July, 2017 in which Dr. NS Rathore, DDG (Education), ICAR delivered the Nehru Memorial Lecture on Agriculture Education in India. Teachers Day was celebrated on 5<sup>th</sup> September, 2017 in which Dr. R.K. Pandey, Ex-Director, IASRI was honored. Hindi Pakhwada (01 to 14 Sept., 2017) and Swatches Bharat Abhiyan were also celebrated. Many scientists of the Institute have received various awards e.g. ICAR Lal Bahadur Shastri Outstanding Young Scientist Award, MK Bose Award, Young Scientist Award, SERS Computational Biologist Award, Nehru Memorial Gold Medals for 2014-16. Some scientist have visited Addis Ababa, Ethiopia; Cali, Colombia and Rome, Italy.

Seven training programmes and one Hindi Workshop have been organized. Under the period under report, 6 new projects were initiated and the scientists of the Institute have published 32 research papers, 11 popular articles. One Agricultural Research Data Book, 03 research project report, 07 manuals/e-manuals/pamphlets, 01 Brochures and developed 3 packages. 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 to scientists in NARES. Any suggestion for improving the contents of the newsletter further would be highly appreciated.

(A.K. Choubey)

## RESEARCH ACHIEVEMENTS

### Growth and Decomposition of Agricultural Production in Rajasthan

*Ravindra Singh Shekhawat, and Bishal Gurung*

There are two way relationships between development and change; that is development influences as well as is influenced by change. Change implies physical, technological, economical, social, cultural, attitudinal, organizational and political change. A change may be either good (development) or bad (retrogression). Generally development is identified with the level of per capita real income. Thus, underdeveloped country is one “in which the per capita real income is low when compared with the per capita real income of the USA, Canada, Australia and Western Europe (UNO, 1952). Indian Planning Commission defined underdeveloped country as one “which is characterized by the co-existence in greater or less degree of unutilised or underutilised manpower on the one hand and of unexploited natural resources on the other” (Planning commission, GOI, 1952). Rajasthan was the largest producer (38.39 lakh tonnes) and occupied maximum acreage (39.56 lakh hectare) under Bajra crop in the year 2012-13. It is also good producer of rapeseed & mustard, gram and wheat with 37.59, 12.77 and 107.67 lakh tonnes production, respectively. But, average food grains yield of Rajasthan is 9.3 quintal per hectare, which is about half of national average *i.e.* 18 quintal per hectare. (Statistical Abstract of Rajasthan, 2012). Agricultural development is directly or indirectly related to the yield of major crops and development of livestock sector. Rajasthan state is the largest state of India and has various agro-climatic situation and very diverse nature of soil and vegetation characteristics. Therefore, there is a need of inter-district study. To estimate the growth rate in area, production and productivity of major crops (bajra, gram, rapeseed and mustard) and major inputs (gross irrigated area, fertilizer use, bank credit, area under high yielding varieties and net cropped area) annual compound growth rate was worked out and “t-test” was used to know the significance of calculated growth rate. The contribution of various components to the growth of aggregate agricultural output of the districts was estimated by using a seven factor decomposition model developed by Minhas and Vaidyanathan. Overall, Rajasthan state as a whole and districts as well showed significant improvement in the yield of the major crops of Rajasthan. Jaisalmer district showed significant improvement in the acreage under different crops by which production was increased significantly. It was mainly possible due to extension of Indira Gandhi Nahar Project (IGNP) by which barren land came under cultivation. Rajasthan is a major producer of gram, but acreage under gram in the state as a whole decreased significantly, but in desert districts (Bikaner, Churu, Jaisalmer, Nagaur) acreage had increased. Overall, acreage under gram crop has decreased across almost all the districts. It is an alarming situation because gram is an important pulse crop and is rich source of protein and suitable for dry agro-climatic condition. Rajasthan state as a whole showed positive and significant growth rate in all the major agricultural inputs except net cropped area. Desert districts *i.e.* Jaisalmer, Barmer, Bikaner, Jodhpur and Churu showed significant increase in irrigated area and other major agricultural inputs, which was a great achievement for

Rajasthan state. Overall, almost all the districts showed increasing pattern in major agricultural inputs which is a good sign of agricultural development of Rajasthan. Desert districts of Rajasthan performed very well in term of productivity of various crops because of availability of irrigation water from IGNP. Decomposition analysis revealed that Rajasthan state as a whole showed that all three effects *i.e.* area, yield and interaction contributed positively to change in crop output for all selected crops except bajra which indicated that area and yield affect production of crops positively in the state of Rajasthan. Seven factor decomposition analysis indicated that there is a further scope for increasing output in the state through enhancing the productivity of crops and necessary changes in cropping pattern. Further it was observed that change in output growth in the districts or state as a whole was brought by increase in yield and change in cropping pattern, while area expansion did not play a major role.

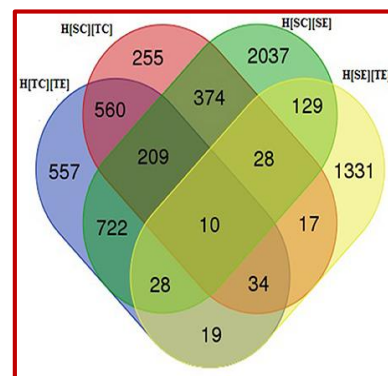
Irrigation has a significant impact on the level of agricultural growth and development of any district. As Rajasthan is dry state, the proportion of irrigated area to net sown area is very small, which is major obstacle in agricultural development in the state as a whole in general and western districts in particular. Therefore, efforts needed to intensify by the government to increase the irrigation facilities in the desert districts of Rajasthan. In desert district like Jaisalmer, change in production was mainly due to area expansion but productivity was declined so concentrated efforts should be made to increase productivity of crops. Acreage and productivity of pulses should be increased as pulses is an important source of protein for vegetarian people. Area under forest should be increased as forest has indirect impact on agricultural development. Livestock rearing should be encouraged in all the districts particularly in desert districts.

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## Discovery of Herbicide Resistance Genes for Better Chickpea Variety Development

ICAR-IASRI, New Delhi: Mir Asif Iquebal, Sarika, Deepak Singla, Rahul S. Jasrotia, Anil Rai and Dinesh Kumar;  
 ICAR-IIPR, Kanpur: Khela R. Soren, Priyanka Gangwar, P. S. Shanmugavadevel, K. Aravind, Sushil K. Chaturvedi,  
 Narendra P. Singh;  
 ICRISAT, Hyderabad: Rajeev K. Varshney.

Chickpea is important pulse crop as it represents three-fourth of the world pulse production. Being cheaper dietary protein than animal protein it becomes more important for all developing countries for nutritional point of view also. Weed lowers the crop yield of chickpea in the field. Through transgenic herbicide tolerant crop has given successful result but often serious concerns are raised over ecological safety and issue of biomagnification in food chain. Thus there is a need to look for an alternative approach. Since large variability in tolerance



limit of herbicide already exists in chickpea varieties of India, thus if genes offering herbicide tolerance are identified, it can be further used in variety improvement programme. If such genes efficiently degrade the herbicide then it would be much safer for health also. A mega team of ICAR scientists from ICAR-IIPR, Kanpur, ICAR-IASRI, New Delhi and ICRISAT, Hyderabad has successfully reported candidate genes and pathways of herbicide tolerance in chickpea for the first time in the world. This has been published in May, 2017 in a reputed top cited international journal of the world *Frontiers in Crop Sciences*. <http://journal.frontiersin.org/article/10.3389/fpls.2017.00958/full>).

In this research two chickpea varieties *viz* herbicide susceptible (ICC5434) and tolerant (ICC1205) genotypes were exposed to imidazoline (Imazethapyr). Approximately 90 million paired-end reads transcriptomic data were generated from four samples. These were processed and assembled into 30,803 contigs using reference based assembly. This investigation reports 6,310 differentially expressed genes (DEGs), of which 3,037 were regulated by 980 mi RNAs, 1,528 transcription factors associated with 897 DEGs, 47 Hub proteins, 3,540 putative Simple Sequence Repeat-Functional Domain Marker (SSR-FDM), 13,778 genic Single Nucleotide Polymorphism (SNP) putative markers and 1,174 Indels. Randomly selected 20 DEGs were validated using qPCR. Pathway analysis suggested that xenobiotic degradation related gene, glutathione S-transfers (GST) were only up-regulated in presence of herbicide. Down-regulation of DNA replication genes and up-regulation of abscisic acid pathway genes were observed. Study further reveals the role of cytochrome P450, xyloglucan endotransglucosylase/hydrolase, glutamate dehydrogenase, methyl crotonoyl carboxylase and of thaumatin-like genes in herbicide resistance.

Reported DEGs can be used as genomic resource for future discovery of candidate genes associated with herbicide tolerance. Reported markers can be used for future association studies in order to develop marker assisted selection (MAS) for refinement. In endeavour of chickpea variety development programme, these findings can be of immense use in improving productivity of chickpea germ plasm with better ecological and food safety.

## AWARDS & RECOGNITIONS

- Dr. R.K. Paul received ICAR Lal Bahadur Shastri Outstanding Young Scientist Award in Social Sciences for 2016 in ICAR Foundation Day on 16th July, 2017.
- Dr. Pradip Basak received M.K. Bose Award for being the best student in Ph.D. (Agricultural Statistics) at ICAR-IASRI during 2013-2016 at the Annual Day of the Institute on 03 July, 2017.
- Dr. M.A. Iquebal received Young Scientist Award in 5th Faculty Branding Award 2017 by EET-CRS Research Wing for Excellence in Professional Education and Industry.
- Dr. Sarika received SERS Computational Biologist Award for 2017 from Society for Educational and Scientific Research.

- Mr. Shwethank Lall, Ph.D. research scholar, Agricultural Statistics received Diversity scholarship for the paper entitled "minimal RSD and FMC: R packages to construct cost efficient experimental designs" by Shwethank Lall, Seema Jaggi, Eldho Varghese, Arpan Bhowmik and Cini Varghese.
- Sh. Gopal Saha received Nehru Memorial Gold Medal to the best M.Sc.(Agricultural Statistics) student for the session 2014-16.
- Sh. Ashrafal Haque received Nehru Memorial Gold Medal to the best M.Sc. (Computer Application) student for the session 2014-16.
- Ms. Soumya Sharma received Nehru Memorial Gold Medal to the best M.Sc. (Bioinformatics) student for the session 2014-16.

## VISITS ABROAD

- Dr. U.B. Angodi, Senior Scientist visited Addis Ababa, Ethiopia for participating in Workshop to introduce their key staff to ideas and approach of the Project "Development of Database and Package for Data Analysis and Feed Research in Ethiopia" at Addis Ababa, Ethiopia during 31 July to 04 August, 2017.
- Dr. Sudeep for participating in First Annual Convention of CGIAR Big Data Analytics, Cali, Colombia during 18-22 Sept. 2017.
- Dr. Tauqueer Ahmad was invited by the Food and Agriculture Organization of the United Nations (FAO) as an Expert for Expert Consultation meeting on "SDG 12.3 - Measurement and action to meet the target on reducing food losses and food waste" held at FAO Headquarters, Rome, Italy during September 28-29, 2017.

## NEW PROJECTS INITIATED

- Two step calibration for estimation of finite population total under two-stage sampling design. (AGEDIASRISIL201701600102) (Pradip Basak, Kaustav Aditya, Hukum Chandra, Ajit: 29.07.2017-28.01.2020)
- Development and assessment of educational mobile apps for improving livestock health and production. (Collaboration with IVRI, Izzatnagar) (AGEDIASRICIP201701700103) IVRI: Rupasi Tiwari, Triveni Dutt, Mahesh Chander, Sanjay Kumar, Amarpal, Putan Singh, JK Prasad, Bina Mishra, BHM Patel, Bablu Kumar, Mahendran, IASRI: Sudeep, Mukesh Kumar, Soumen Pal: 28.06.2017-31.03.2019)
- Performance Assessments of Universities in Agriculture Education: A comparative analysis. Funded by ICAR-Extramural. (AGEDIASRISOL201701800104) (Sukanta Dash, Anil Kumar: 02.08.2017-31.03.2018)
- Planning, designing and analysis of experiments planned on stations under All India Coordinated Research Project on Integrated Farming Systems. Funded by AICRP on IFS, IIFSR, Modipuram. (AGEDIASRISOL201701900105) (Anil Kumar, Md. Harun, Susheel Kumar Sarkar: 01.04.2017-31.03.2020)

- Designing and Analysis of ON FARM Research Experiments Planned under AICRP on IFS. Funded by AICRP on IFS, IIFSR, Modipuram. (AGEDIASRISOL201702000106)(Cini Varghese, Sukanta Dash, Arpan Bhowmik: 01.04.2017-31.03.2020)
- Planning, designing and analysis of data relating to experiments for AICRP on Long Term Fertilizer Experiments. Funded by AICRP on Long Term Fertilizer Experiments, IISS, Bhopal. (AGEDIASRISOL201702100107) (B.N. Mandal, Anindita Datta, Sunil Kumar Yadav: 01.04.2017-31.03.2018)

## HUMAN RESOURCE DEVELOPMENT

### *Training Programmes Organised*

S.N.	Title	Venue	Date	Number of participants
1.	Experimental Data Analysis for Technical Personnel. Course Coordinators: Dr. Cini Varghese and Mr. Harun Mohd	ICAR-IASRI, New Delhil.	26 July to 08 August, 2017	20
2.	ERP System at ICAR-IASRI. Course Coordinators: Dr. Alka Arora and Dr. Anshu Bharadwaj	ICAR-IIWBR, Karnal	17 to 22 July, 2017	25
3.	Supervision of Data Collection for Technical Officers and SRF under the project "An Investigation of Causes of Divergence Between Official and Trade Estimates of Jute Production". Co-coordinator: Dr. Man Singh	ICAR-IASRI, New Delhil.	24 to 25 July, 2017	18
4.	CAFT training programme on Advanced Statistical Techniques in Biometrics. Course Coordinator: Dr. A.K. Paul Co-Coordinator: Dr. Prakash Kumar	ICAR-IASRI, New Delhil.	10 to 30 August, 2017	25
5.	Experimental Designs and Statistical Data Analysis. Course Coordinator: Dr. Seema Jaggi Co-Coordinator: Dr. Arpan Bhowmik	I.A.S.R.I., NEW DELHI	11 to 20 September, 2017	16
6.	Networking: Basics and Management. Course Coordinator: Dr. Mukesh Kumar Co-Coordinator: Dr. Soumen Pal	ICAR-IASRI, New Delhil.	4 to 8 September, 2017	19
7.	Computer Application (Design and Development of Website/Portal). Course Coordinator : Mr. Pal Singh Co-Coordinator: Dr. Sudeep Marwaha	ICAR-IASRI, New Delhil.	22 to 27 September, 2017	22
8.	कृषि में प्रतिदश सवेक्षण तकनीकों का उपयोग आयोजक: श्रीमती वन्दिता कुमारी चौधरी सह-आयोजक : श्री दीपक सिंह तथा डा. प्रदीप बसाक	ICAR-IASRI, New Delhil.	25 to 27 सितम्बर, 2017	12

## PANORAMA OF ACTIVITIES

### Annual Day Celebrations

The Annual Day of the Institute was celebrated on July 3, 2017. On this occasion Dr.N.S. Rathore, Deputy Director General (Education), Indian Council of Agricultural Research, delivered the Nehru Memorial Lecture on Agriculture Education in India. Dr.Kirti Singh Ex-Chairman ASRB & Advisor, Govt. of Nepal for Establishment of Agricultural University presided over the function and Dr.R.B. Singh, Ex-Vice Chancellor, Central Agricultural University, Imphal, was the Guest of Honour.

### Teachers' Day Celebration

The Teacher's Day was celebrated on September 05, 2017 in which Dr. S.K. Raheja, Ex-Director presided over the function and Dr. R.K. Pandey, Ex-Director IASRI was honored on this occasion.



### Hindi Pakhwada

संस्थान में 01 से 14 सितम्बर 2017 के दौरान हिन्दी पखवाड़े का आयोजन किया गया। दिनांक 01 सितम्बर, 2017 को हिन्दी पखवाड़े का उद्घाटन संस्थान के निदेशक, डॉ. अंजनी कुमार चौबे जी द्वारा किया गया। हिन्दी उद्घाटन के पश्चात काव्य-पाठ का आयोजन किया गया। हिन्दी पखवाड़े के दौरान 'डॉ. दरोगा सिंह स्मृति व्याख्यान' के साथ-साथ वैज्ञानिक प्रभागों में हिन्दी में सर्वाधिक वैज्ञानिक कार्य करने के लिए प्रभागीय चल-शील्ड तथा काव्य-पाठ, वाद-विवाद, प्रश्न-मंच, अन्ताक्षरी, काव्य-गोष्ठी, डिजिटल हिन्दी शोध-पत्र प्रस्तुति, हिन्दीतर कर्मियों के लिए हिन्दी श्रुतलेख एवं शब्दार्थ लेखन प्रतियोगिता आयोजित की गयी। प्रश्न-मंच एवं अन्ताक्षरी प्रतियोगिता के संचालकों द्वारा इन प्रतियोगिताओं को ऑडियो विजुअल रूप में प्रस्तुत किया गया जिससे ये प्रतियोगिताएँ अत्यन्त ही रोचक रहीं। सभी प्रतियोगिताओं में छात्रों सहित संस्थान के विभिन्न वर्गों के कर्मियों ने बढ़-चढ़कर हिस्सा लिया। संस्थान में प्रत्येक वर्ष हिन्दी दिवस के अवसर पर डॉ. दरोगा सिंह स्मृति व्याख्यान का आयोजन किया जाता है। इस वर्ष इस कड़ी का छब्बीसवाँ व्याख्यान संस्थान के पूर्व प्रोफेसर (कृषि सांख्यिकी), डॉ. रणधीर सिंह जीद्वारा दिया गया और इस कार्यक्रम की अध्यक्षता आई.सी.एम.आर. के पूर्व अपर महानिदेशक एवं राष्ट्रीय सांख्यिकीय आयोग के सदस्य, डॉ. पदम सिंह जी द्वारा की गयी। दिनांक 14 सितम्बर, 2017 को हिन्दी पखवाड़े के समापन समारोह के अवसर पर इस दौरान आयोजित प्रतियोगिताओं के सफल प्रतियोगियों को पुरस्कृत करने के साथ-साथ



वर्ष 2016-17 के दौरान "सरकारी कामकाज मूल रूप से हिन्दी में करने के लिए प्रोत्साहन योजना" के अन्तर्गत भी नकद पुरस्कार प्रदान किये गये । इसके अतिरिक्त, इस अवसर पर जुलाई 2016 से जून, 2017 तक की अवधि के दौरान संस्थान में अयोजित हिन्दी कार्यशालाओं के वक्ताओं को भी सम्मानित करने के साथ-साथ संस्थान द्वारा प्रकाशित हिन्दी पत्रिका : सांख्यिकी विमर्श 2016-17 के सम्पादक मंडल के सदस्यों को भी प्रशस्ति-पत्र प्रदान किये गये ।

## **Swachhha Bharat Abhiyan**

- Sewa Divas was celebrated on 17<sup>th</sup> September, 2017 under the Swachh Bharat Abhiyan and sweeping & cleaning activities were undertaken by the employees.
- Samagtra Swachhhta Divas was celebrated on 24<sup>th</sup> September, 2017 under which employees performed Shramdaan.
- Sarwatra Swachhhta celebration was organized on 25<sup>th</sup> September, 2017 for cleaning of public toilets by the employees of the office.

## **CONFERENCES/WORKSHOPS/SEMINARS/SYMPOSIUMS/MEETINGS ETC. ORGANIZED**

- A meeting organized with CABIn scheme collaborating centre ICAR-Indian Institute of Wheat and Burley Research, Karnal to discuss the progress of ongoing project and development of new project on July 29, 2017 at ICAR-IASRI, New Delhi (Dr. Anil Rai, Dr. Dinesh Kumar, Dr. U. B. Angadi, Dr. Sarika and Dr. MA. Iquebal)
- Organized a PMC meeting of the project entitled "Pilot study for developing State level estimates of crop area and production on the basis of sample sizes recommended by Professor Vaidyanathan Committee report" as member secretary of the organizing committee on 11 July, 2017. (Dr Kaustav Aditya)
- Organized meeting with CIRC, Meerut Scientists regarding Genomic Portal development on September 23, 2017. (Dr. Dinesh Kumar, Dr. U.B. Angadi, Dr. Sarika and Dr. MA. Iquebal)

## **PUBLICATIONS**

### **Research Papers**

1. Prakash, A, Singh, HN, Shekhawat, RS and Sandu S (2017). Comparative analysis on economic efficiency of hybrid and inbred rice production in Udham SinghNagar district of Uttarakhand. *J. Eco. Manage. Trade*, **18(4)**, 1-7.
2. Das, S, Paul, AK, Wahi, SD and Pradhan, UK (2017). Comparative performance of imputation methods for different proportions of missing data in classification of crop genotypes. *J. Ind. Soc. Agril. Statist.*, **71(2)**, 147-153.
3. Samanta, S, Paul, RK and Roy, A (2017). Modelling repeated measures with multiple endpoints. *J. Ind. Soc. Agril. Statist.*, **71(2)**, 113-120.
4. Rathod, S, Singh, KN, Paul, RK, Meher, SK, Mishra, GC, Gurung, B, Ray, M and Sinha, K (2017). An improved ARFIMA model using maximum overlap discrete wavelet transform (MODWT) and ANN for forecasting agricultural commodity price. *J. Ind. Soc. Agril. Statist.*, **71(2)**, 103-111.
5. Ghosh, H (2017). Nonorthogonal optimal partial diallel cross designs for consistent estimation of heritability, *J. Japan Statist. S.*, **47(1)**, 37-48.
6. Ghosh, H and Prajeshu (2017). Richards stochastic differential equation growth model and its application. *J. Ind. Soc. Agril. Statist.*, **71(2)**, 127-137.



7. Singh, ON, Singh, GN, Paul, AK, Kumar, S and Gangmei, S (2017). Modelling of population growth for seasonal incidence of mustard aphid. *Lipaphis erysimi*. *J. Ind. Soc. Agril. Statist.*, **71(2)**, 155-157.
8. Meher, PK and Rao, AR (2017). A non-parametric regression based computational approval for prediction of donor splice sites. *J. Ind. Soc. Agril. Statist.*, **71(2)**, 159-166.
9. Prakash, A, Singh, HN and Shekhawat, RS (2017). Resource use efficiency in hybrid and inbred rice production in uttarakhand. *Asian J. Agril. Ext., Eco. & Socio.*, **18(1)**, 1-7.
10. Anjoy, P, Paul, RK, Sinha, K, Paul, AK and Ray, M (2017). A hybrid wavelet based neural networks model for predicting monthly WPI of pulses in India. *Ind. J. Agril. Sc.*, **87(6)**, 834-839.
11. Rathod, S, Singh, KN, Paul, RK, Meher, SK, Mishra, GC, Gurung, B, Ray, M and Sinha, K (2017). An improved ARFIMA model using maximum overlap discrete wavelet transform (MODWT) and ANN for forecasting agricultural commodity price. *J. Ind. Soc. Agril. Statist.*, **71(2)**, 103-111.
12. Bhowmik, A, Varghese, E, Jaggi, S and Varghese, C (2017). Minimally changed run sequences in factorial experiments. *Comm. in Statist.: Theory Methods*, **46(15)**, 7444-7459.
13. Saurav, S, Varghese, C, Varghese, E and Jaggi, S (2017). Experimental designs for sensory trials in two sessions. *J. Ind. Soc. Agril. Statist.*, **71(2)**, 121-126.
14. Jerome, A, Srivastava, SK, Sharma RK, Sarkar, SK and Kumar, R (2017). Follicular dynamics, hormonal and biochemical profile across seasons in buffaloes. *Ind. J. Anim. Sc.* **87(7)**, 824-828.
15. Gaikwad, NN, Yedle, VH, Yenge, G, Suryavanshi, S, Babu, KD, Pal, RK and Sarkar, S (2017) Effect of microwave pretreatment on extraction yield of pomegranate seed (cv. Bhagwa) oil. *International J. Chem. Studies.*, **5(4)**, 1291-1294.
16. Jana, C, Dahiya, S, Mahajan, VK, Das, TK and Alam, NM (2016). A Web-based System on herbicide recommendation for field crops in India. *J. Ind. Soc. Agril. Statist.*, **70(3)**, 287-294.
17. Kumar, D and Farooqi, MS (2017). The type I generalized half logistic distribution based on generalized order statistics, *International J. Agril. Stat. Sc.*, **13(1)**, 337-344
18. Iquebal, MA, Tomar, RS, Parakhia, MV, Jaiswal, SD, Sarika, Rathod, VM, Padhiyar, SM, Kumar, N, Rai, A and Kumar, D (2017) Draft whole genome sequence of groundnut stem rot fungus *Athelia rolfsii* revealing genetic architect of its pathogenicity and virulence. *Nature Scientific Reports, Scientific Reports*.
19. Kumar, DK, Ramasubramanian, V, Krishnan, M, Ananthan, PS, Vinay, A and Kumar, RS (2017). Socio-economic status of fishers of coastal India. *Int. J. Curr. Microbiol. App. Sci.*, **6(9)**, 2267-2280.
20. Bhattarai, M, Joshi, PK, Shekhawat, RS and Takeshima, H (2017). The evolution of tractorization in india's low-wage economy: key patterns and implications. *Discussion Paper, IFPRI, Washington, USA*.
21. Prajneshu, Ghosh, H and Pandey NN (2017). Fitting of von Bertalanffy growth model: Stochastic differential equation approach. *Ind. J. Fish.*, **64(3)**, 24-28.
22. Paul, RK and Anjoy, P (2017). Modeling fractionally integrated maximum temperature series in India in presence of structural break. *Theo. and App. Climatology*.
23. Paul, AK, Paul, RK, Prabhakaran, VT, Singh, I and Singh, NO (2017). Study of different parametric stability measures when the basic data/variables are non-normal. *Ind. J. Agril. Sc.*, **87(9)**, 1252-1256.

24. Mitra, D and Paul, RK. (2017). Hybrid time-series models for forecasting agricultural commodity prices. *Model Assist. Statist. and Appl.*, **12**, 255-264.
25. Bhowmik, A, Jaggi, S, Varghese, E and Varghese, C (2017). Optimal block designs with non additive mixed effects interference, *Comm. Statist.: Theory Methods*.
26. Jaggi, S, Pateria, DK, Varghese, C, Varghese, E and Bhowmik A (2017). A note on circular neighbour balanced designs, *Comm. Statist.: Simul. comput.*
27. Jaggi, S (2017). *Agricultural Statistics. Post Graduate Research and Human Resource Development IARI: 2007-2016 Volume II, Post-Graduate School, Indian Agricultural Research Institute, New Delhi, 367-444 (ISBN: 978-93-83168-30-9).*
28. Krishna, G, Sahoo RN, Pradhan, S, Ahmad, T and Sahoo, PM (2017). Hyperspectral satellite data analysis for pure pixels extraction and evaluation of advanced algorithms for LULC classification. *Earth Science Informatics*.
29. Parihar, AK, Basandrai, AK, Saxena, DR, Kushwaha, KPS, Chandra, S, Sharma, K, Singha, KD, Singh, D, Lal, HC and Gupta, S (2017). Biplot evaluation of test environments and identification of lentil genotypes with durable resistance to fusarium wilt in India. *Crop and Pasture Science*.
30. Moury, PK and Ahmad, T (2017). Estimation of cotton yield at tehsil level using double sampling approach under stratified two stage sampling design framework. *International J. Agril. Sc. and Res.*, **7(5)**, 249-256.
31. Arora, K, Panda, KK, Mittal, S, Mallikarjuna, MG, Rao, AR, Dash, PK and Thirunavukkarasu, N (2017). RNAseq revealed the important gene pathways controlling adaptive mechanisms under waterlogged stress in maize. *Scientific Reports*, **7**, 1090,1-12.
32. Jasrotia, RS, Iquebal, MA, Yadav, PK, Kumar, NJ, Sarika, Angadi, UB., Rai, A and Kumar, D (2017). Development of transcriptome based web genomic resources of yellow mosaic disease in *Vigna mungo*. *Physio.and Mole. Bio. Plants*.

## Popular Articles

- बनर्जी, राहुल, जग्गी, सीमा, वर्गीस, एल्दो, वर्गीस, सिनी, भौमिक, अर्पण एवं गहलौत, बी. जे. (2017)। डिस्क्रीट चयन समुच्चय परीक्षणों के लिए अभिकल्पनायें। भारतीय कृषि अनुसंधान पत्रिका, **32(1)**, 57-61।
- Ravindra Singh Shekhawat (2017). Rural marketing in India: An Emerging Issue. Published online at bioarticle.
- Ravindra Singh Shekhawat and Neelam Shekhawat (2017). Climate change: Challenges for food security. Published online at bioarticle.

## सांख्यिकी-विमर्श (2016.17), संस्थान की हिन्दी पत्रिका में प्रकाशित लेख.

- भौमिक, अर्पण, जग्गी, सीमा, वर्गीस, एल्दो एवं सिंह उदयवीर .पशु परीक्षणों के लिये प्रवृत्ति मुक्ति पंक्ति स्तम्भ परिकल्पनाएं ।12ए 40.42ए
- दत्ता, अनिदिता, जग्गी, सीमा, वर्गीस, सिनी, वर्गीस, एल्दो, भौमिक, अर्पण एवं मोहम्मद, हारुन ;2016.17ए। जनरेलाइज्ड कनफाऊंडेड रो-कालम अभिकल्पनाओं का एस.ए.एस. द्वारा विश्लेषण ।17.21ए
- कुमार राजीव रंजन, सिंह के. ऐन., बुढ़लाकोटी नीरज, राठोड़संतोष, रायमृन्मय, गुरुंग बिशाल और यादव सुनील कुमार। आकड़ों में संरचनात्मक परिवर्तन के लिए परीक्षण। सांख्यिकी विमर्श। 66.68ए
- बुढ़लाकोटी नीरज, कुमार राजीव रंजन, मिश्रा द्विजेश चंद्र, चतुर्वेदी के. के., लाल एस. बी., राठौर संतोष और यादव सुनील कुमार । कृषि में जीनोमिक सलेक्शन के सांख्यिकीय मॉडल्स। 28.32ए

- सरकार सुशीलकुमार, दाश सुकान्त, कुमार प्रकाश एवं मौर्य ओ.पी. - एस.ए.एस. द्वारा लेखाचित्र |47-51
- तोमर राजेन्द्र सिंह एवं प्रसाद राजेन्द्र (2017). इन्डियन एन.ए.आर.एस. सांख्यिकीय संगणना पोर्टल द्वारा सांख्यिकीय विश्लेषण, सांख्यिकी विमर्श | 77-86.
- लाल एस. बी., शर्मा अनु, चतुर्वेदी के. के., अंगाडी यू. बी., फारुकी एम. एस. और राय अनिल - इंटरनेट ऑफ थिंग्स (आई. ओ. टी.) और कृषि: एक अवलोकन, प्रथम अंतर्राष्ट्रीय विज्ञान संगोष्ठी, विज्ञान प्रकाश, राष्ट्रीय प्रौद्योगिकी संस्थान, कुरुक्षेत्र दिनांक, 22 अगस्त, 2017.
- लाल, श्वेतांक, जग्गी, सीमा, वर्गीस, सिनी, वर्गीस, एल्दो एवं भौमिक, अर्पण (2017)। द्विचर एक्सपोनेन्सियल मॉडेल हेतु डी-ओप्टिमल संतृप्त अभिकल्पनाएँ। भारतीय कृषि अनुसंधान पत्रिका, 32(2), 146-148।

## *Agricultural Research Data Book*

- Ahmad, T., Sahoo, P.M., Biswas, A., Kumar, R. and Singh, D. (2017). Agricultural Research Data Book 2017. ICAR-IASRI, New Delhi Publication.

## *Project Reports*

- Varghese, C., Dash, S., Bhowmik, A. and Sharma, N.K. (2017). Designing and Analysis of ON FARM Research Experiments Planned under All India Co-ordinated Research project on Integrated Farming System. SIX1207, I.A.S.R.I./P.R.-06/2017, IASRI, New Delhi.
- Kumar A, Varghese E, Parsad R, Panwar AS, Gangwar B, Singh JP (2017). Statistical Analysis of On-station Research Experiments Planned under AICRP on IFS. Submitted after revision.
- Ahmad, T., Sud, U.C., Biswas, A. and Singh, M. (2017). Pilot study on private food grains stock estimation at farm level aligned with Input Survey of Agriculture Census in India. Final draft project report. ICAR-IASRI, New Delhi Publication.

## *Manual/e-Manual/Pamphlet*

- Paul, A.K. and Kumar, P. (2017). Advanced Statistical Techniques in Biometrics (Volume - I and II). Training Manual for Centre for Advanced Faculty Training (CAFT) programme organized at IASRI during 10.08.2017-30.08.2017.
- Sarika, Iquebal, M.A., Angadi, U.B., Kumar, D. and Rai, A., in collaborative work jointly done by ICAR-IASRI and Junagadh Agricultural University, Junagadh on drought transcriptome of Pearl Millet crop, the transcriptome data has been submitted to NCBI, USA Bioproject: PRJNA385901 Biosamples: SAMN06920424, SAMN06920426, SAMN06920432, SAMN06920433 SRA accession number: SRR5839373, SRR5839374, SRR5839375, SRR5839376.
- Cini Varghese and Harun Mohd. (2017). Reference manual on Experimental Data Analysis prepared under the Training Programme (for Technical Personnel) on Experimental Data Analysis during 26.07.2017-08.08.2017.
- Cini Varghese and Harun Mohd. (2017). E-manual on Experimental Data Analysis for the Training Programme on Experimental Data Analysis organized during 26.07.2017-08.08.2017.
- Seema Jaggi and Arpan Bhowmik (2017). Reference manual on Experimental Designs and Statistical Data Analysis. An ICAR-IASRI Publications.
- A Hindi workshop Reference Manual on कृषि में प्रतिदर्श सर्वेक्षण तकनीकों का उपयोग organized during 25-27 September, 2017.

- A catalogue of weighted A-optimal BTIB design published at <http://iasri.res.in/design/WAoptBTIB/WAoptBTIB.html>

## Leaflets and Brochures

- Paul, AK and Kumar, P (2017). Training Brochure on Advanced Statistical Techniques in Biometrics for Centre for Advanced Faculty Training (CAFT) programme.

## PACKAGES DEVELOPED

Packages on

- *Pearl Millet Drought Transcriptome Database*,
- *Small Cardamom Transcriptomic Database for Cardamom Mosaic vVirus and*
- *Rohu Transcriptome Database*

Were developed by Dr. MA Iquebal, Dr. Sarika, Dr. U.B. Angadi, Dr. Anil Rai and Dinesh Kumar.

## INVITED LECTURES DELIVERED

- Data analysis using excel, GARCH models and Hybrid time series models in ICAR-Summer school training on Advanced Analytical Tools for Decision Making in Agriculture at ICAR-National Institute of Agricultural Economics and Policy Research, New Delhi. (R.K. Paul)
- Nonparametric tests and their applications in training on Advanced Analytical Tools for Decision Making in Agriculture at ICAR-National Institute of Agricultural Economics and Policy Research New Delhi. (Dr. Wasi Alam)
- SPSS: An overview and correlation and regression using SPSS in Summer School on Advanced Analytical Tools for Decision Making in Agriculture organized by ICAR-NIAP. (Dr. Seema Jaggi)
- Testing of hypothesis and basic design of experiments in Faculty Development Programme on Biostatistics and Bioinformatics Tools in Research at Manav Rachna International University, Faridabad during 25-29 July, 2017.(Dr. Seema Jaggi)
- Introduction to SAS to the participants of Summer School on Advanced Analytical Tools for Decision Making in Agriculture organized by ICAR-NIAP, New Delhi during July 10-30, 2017. (Dr. Rajender Parsad)
- Statistics introduction & concepts and Web-Resources to the participants of the first National Faculty Development Programme organized at Shaheed Rajguru College of Applied Sciences for Women, Delhi during July 12-27, 2017. (Dr. Rajender Parsad)
- (i) Combined analysis of experimental data; (ii) Web resources on designed experiments and (iii) Indian NARS statistical computing portal to the participants of the training programme on Stability/combined analysis methodology for NPOF experimental data organized at ICAR-IIFSR, Modipuram during July 25-26, 2017. (Dr. Rajender Parsad)
- Random control design in social science in summer school on Advanced Analytical Tools for decision making in agriculture organized at National Institute of Agricultural Economics and Policy Research during July 10-30, 2017.(Dr. Anil Kumar)
- Farmers' field trials data analysis in IFS in a summer school on Integrated Farming Systems for Farmers Empowerment and Entrepreneurial Development organized during 23 June to 13 July, 2017 at the Division of Agronomy, ICAR-IARI, New Delhi. (Dr. Cini Varghese)

- OFR Data processing and analysis and statistical tools and techniques for data pooling and analysis in a summer school on Modern Concepts And Practices of Organic Farming for Safe, Secured and Sustainable Food Production organized during 14 July to 3 August, 2017 at ICAR- IIFSR, Modipuram. (Dr. Cini Varghese)
- (i) PCA and (ii) Cluster Analysis to the participants of ICAR- Summer school training on "Advanced Analytical Tools for Decision Making in Agriculture" from July 10-30, 2017 at NIAP, New Delhi. (Dr. Susheel Kumar Sarkar)
- Data analysis using R in the National Faculty Development Program on "Recent Trends in Applied Science Teaching" organized at Shaheed Rajguru College of Applied Sciences for Women, Delhi University, New Delhi during July 12-27, 2017.(Dr. B N Mandal)
- Overview of R at ICAR-NIAP in ICAR-Summer school training on "Advanced Analytical Tools for Decision Making in Agriculture". (Dr. B N Mandal)
- Application of conjoint analysis: Theory and practical on 29 July,2017 in ICAR- Summer school training on " Advanced Analytical Tools for Decision Making in Agriculture" organized by CAR-National Institute of Agricultural Economics and Policy Research New Delhi from July 10-30, 2017. (Dr. Sukanta Dash)
- (i) Basics of Regression analysis and (ii) diagnostic tests in a training programme on Advanced Analytical Tools for Decision Making in Agriculture during 10-30 July, 2017 at ICAR-NIAP, New Delhi on.(Dr. Arpan Bhowmik)
- Overview of recent developments of Bioinformatics in Research in the training Biostatistics & Bioinformatics Tools in Research during 25-29, July, 2017 at Manav Rachna International University, Faridabad on July 26, 2017.( Dr. Dinesh Kumar).
- Ashoka: Super Computing in Agriculture in ICAR sponsored summer school "Advanced Analytical Techniques for Decision Making in Agriculture" organized at NIAP, New Delhi during 10th to 30th July 2017. (Dr. K.K. Chaturvedi).
- Genome assembly and annotation in FDP on 'Biostatistics & Bioinformatics Tools in Research' held from 25th July to 29th July, 2017 in Department of Biotechnology, FET, MRIU. (Sh. Sanjeev Kumar)
- Next generation sequencing techniques and genome assembly: concept and challenges in the training "Biostatistics & Bioinformatics Tools in Research" during 25-29, July, 2017 at Manav Rachna International University, Faridabad. (Dr. D.C. Mishra)
- Advanced Analytical Techniques for Decision Making in Agriculture in ICAR Summer School held during July 10-30, 2017 at National Institute of Agricultural Economics and Policy Research (NIAP), New Delhi. (Dr Ankur Biswas)
- Overview and hands on SAS in a training programme sponsored by the Centre of Advanced Faculty Training scheme of ICAR on "Technological and Policy Options for Enhancing Farmer's Income" during 26th September, 2017 organized by Division of Agriculture Economics ICAR-IARI, New Delhi. (Sukanta Dash)
- Overview and Hands on SPSS in the CAFT training on "Technology and Policy Options for Enhancing Farmers' Income" being conducted at Division of Agricultural Economics, ICAR-IARI, New Delhi during September 23- October 13, 2017. (Ramasubramanian V.)
- Time Series Models for Forecasting Agricultural Commodity Prices in the National Meeting of Experts on Agriculture Markets, Price Data Visualization and Early Warning System at Hotel Taj Mahal, Mansingh Road, New Delhi, during 11-12 September 2017 organized by FAO. (R.K. Paul)

- Statistical techniques using R organized by Dept. of Mathematics & Statistics, Banasthali University, Rajasthan on 03 September 2017. (Dr. Hukum Chandra)
- (i) Impact of Survey weights in analysis of survey data, and (ii) R-software for survey data analysis in the training programme on Use of Statistical Software for Analysis of Life Science Data, University of Agricultural Science & Technology of Kashmir, Sher-e-Kashmir on 26 September, 2017. Topics of lectures were. (Dr Hukum Chandra)
- Initiative of Agricultural Bioinformatics in NARES on September 14, 2017 at 106th FOCARS at NAARM Hyderabad. (Dr. Anil Rai)
- (i) Global status of agricultural bioinformatics and (ii) Molecular markers discovery and its application in ICAR Winter School on "Genomic, proteomic and metabolomic application in crop improvement" on 8th and 9th September, 2017. (Dr. Dinesh Kumar)
- (i) Genome assembly (ii) Transcriptome analysis (iii) Metagenome analysis in ICAR Winter School on "Genomic, Proteomic And Metabolomic Application In Crop Improvement" on 8th and 9th September, 2017 (Dr. Mir Asif Iquebal)
- Introduction of PHP and MYSQL connectivity in the training programme "Computer Application" to Technical personnel of ICAR/SAUs/CAUs/KVKs on 23rd Sept 2017. (Dr. U. B. Angadi)

## PAPERS PRESENTED IN CONFERENCES

*Poster Papers presented in the National Conference on "Breaking Barriers Through Bioinformatics and Computational Biology" at IIT, Delhi during 31-07-2017 to 01-08-2017.*

- Mittal, S., Mallikarjuna, M.G., Jain, P.A., Rao, A.R., Thirunavukkarasu, N. (2017) Genome-wide identification, characterisation and validation of drought responsive CDPK gene family in Arabidopsis, maize, rice and sorghum.
- Sahu, S., Dixit, R., Singh, I., Kumar, H., Pandey, J. and Rao, A.R. (2017). Amaranthus Microsatellite Database (AMD): Genome level information on frequency and distribution of SSRs.
- Gahoi, S., Meher, P.K., Sahu, T.K. and Rao, A.R. (2017). Improved recognition of heat shock proteins, their families and sub-types based on g-spaced di-peptide features and support vector machine.
- Singh, I., Patra, B., Chakraborty, H.J., Behera, B.K. and Rao, A.R. (2017). Metagenomics analysis of microbial community in riverine ecosystem of northern India.
- Supriya, P., Sarika, S., Rao, A.R. and Bhatt, K.V. (2017). Genome wide identification and functional annotation of genes in sesame (*Sesamum indicum* L.)
- Varshney S., Bhati J, Chaturvedi K.K., Rai A., Kumar R.R., Goswami S., Chinnusami V. and Mishra D.C. (2017) Identification of heat related SSRs in wheat (*Triticum Aestivum*).
- शर्मा अ. और सिंह आ. (2017). सिमेंटिक्स और सॉफ्टवेयर एजेंट आधारित वेबपर्सनलाइज़्ड सूचना बहाली. शोध-पत्र प्रस्तुति भारतीय भाषाओ में प्रथम विज्ञान संगोष्ठी, २२ अगस्त, २०१७, राष्ट्रीय प्रौद्योगिकी संस्थान |
- लाल एस. बी., शर्मा अ., चतुर्वेदी के. के., अंगाडीयू. बी., फारुकी एम. एस. और राय अ. (2017). इंटरनेट ऑफ थिंग्स (आई. ओ. टी.) और कृषि: एक अवलोकन, शोध पत्र प्रस्तुति भारतीय भाषाओ में प्रथम विज्ञान संगोष्ठी, २२ अगस्त, २०१७, राष्ट्रीय प्रौद्योगिकी संस्थान |
- Chandra, H. (2017). Disaggregate Level estimation and spatial mapping of Incidence of Indebtedness in rural households by combining survey and census data- an application of

small area estimation technique, the National Seminar on the survey results relating to the subjects covered during NSSO 70th & 71st rounds, Goa, India during 10-13 September, 2017.

## PARTICIPATION

### *Conference/Workshop/Seminar/Symposium/Training/Foundation Course*

1. Regional Dialogue on 'Agricultural Mechanization in South Asia during July 20-21, 2017 in New Delhi, India organized by IFPRI, New Delhi at NASC, New Delhi. (Dr. Ravindra Singh Shekhawat)
2. A training programme on ArcGIS 1: Introduction to GIS and ArcGIS 3: Performing Analysis from 10th to 14th July, 2017 at ESRI India Limited, Noida. (Dr. Mukesh Kumar & Dr. Anshu Bharadwaj)
3. Presented the progress of KVK Portal in the review meeting on 17th July, 2017 at Krishi Bhawan. (Dr. Soumen Pal, Dr. Sudeep Marwaha and Dr. A.K. Choubey)
4. Directors' Conference on 16th July in NASC Complex. (Dr.A.K. Choubey and Dr. Sudeep Marwaha)
5. A review workshop of CRP-Genomics under the Chairmanship of DDG (Fisheries), ICAR New Delhi at ICAR-NBFG, Lucknow from July 26-27, 2017. (Dr. Anil Rai)
6. USDA-India Agricultural Outlook Forum 2017 organized by the Directorate of Economics & Statistics, Department of Agriculture & Cooperation and Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India, New Delhi on 31 August, 2017. (Dr. Tauqueer Ahmad and Dr. Hukum Chandra)
7. Workshop on "Development of yield models for horticultural crops under CHAMAN Project" organized by the MNCFC, Ministry of Agriculture & Farmers Welfare, Government of India, New Delhi held at MNCFC, ICAR-IARI Campus, New Delhi on 18 August, 2017. (Dr. Tauqueer Ahmad and Dr. Prachi Misra Sahoo)
8. National Workshop on Reshaping Agricultural Research, Education and Extension Systems Management for 2030 held at ICAR-NAARM, Hyderabad on August 31, 2017.( Dr. Seema Jaggi and Dr. Rajender Parsad)
9. Workshop on Digitalization of Breeding Database through Breeding Management System (BMS) of Integrated Breeding Platform (IBP) on 4th August, 2017 at NASC Complex, New Delhi. (Dr. Susheel Kumar Sarkar)
10. Workshop on Agricultural Markets, Prices and Market Integration in India-Conceptual and Methodological Issues on 21<sup>st</sup>August 2017 at Taj Mansigh Hotel, New Delhi, organized by FAO. (R.K. Paul)
11. NAHEP workshop on 23rd August, 2017 at NASC complex. Dr. Sudeep Marwaha presented the structure of component 2 IT for NARES to all the officials of the AUs.(Dr. Sudeep Marwaha and Dr. Anshu Bharadwaj)
12. National Workshop on Reshaping Agricultural Research Education and Extension Systems Management for 2030 on August 31, 2017 at NAARM, Hyderabad.(Dr. Anil Rai)
13. अंतर्राष्ट्रीय भारतीय भाषाओं में प्रथम विज्ञान संगोष्ठी, २२ अगस्त, २०१७, राष्ट्रीय प्रौद्योगिकी संस्थान, Kurukshetra (Dr. Anu Sharma)
14. Workshop "Developing a Roadmap for Agricultural Knowledge Management in India" during 27-28th September, 2017 held at NASC Complex, New Delhi. (Dr. Wasi Alam)
15. Participated in Hindi workshop organized during 25-27 Sept, 2017 on "Use of sample survey techniques in agriculture". (Rajeev Ranjan Kumar)

16. Training programme on 'Experimental Designs and Statistical Data Analysis' organized under Human Resource Management unit of ICAR at ICAR-IASRI during 11-20 September, 2017. (Anindita Datta and Sunil Kumar Yadav)
17. National Workshop on Developing a Roadmap for Agricultural knowledge management in India organize by ICAR-DKMA.(Dr. Rajender Parsad, BN Mandal and Dr. Sukanta Dash)
18. Training cum Workshop on Methodological framework for implementation of FFP organized at ICAR-IISS, Bhopal on 18th September, 2017. (Dr. Soumen Pal)
19. National Workshop on "Developing a Roadmap for Agricultural Knowledge Management in India" 27-28 September, 2017 at NASC complex, New Delhi. (Dr. Alka Arora, Dr. Anshu Bharadwaj, Ms. Shashi Dhaiya and Mr. Pal Singh)
20. Training on Government E-Market Place at DGS&D, Jeevan Tara Building, Parliament Street, New Delhi on 28th September 2017. (Dr. Anshu Bharadwaj)
21. Workshop on Statistical Techniques Using R organized by Department of Mathematics & Statistics, Banasthali University, Rajasthan on 03 September 2017. (Dr. Hukum Chandra)
22. National Seminar on the survey results relating to the subjects covered during NSSO 70th & 71st rounds, organized by the NSSO, Ministry of Statistics and Programme Implementation, Govt of India, at Goa University, Goa during 10-13 September, 2017. (Dr. Hukum Chandra)
23. National Conference on Agriculture for Rabi Campaign during 19-20 September, 2017 at Vigyan Bhawan, New Delhi. (Dr. Prachi Misra Sahoo)
24. National Workshop on Developing a Roadmap for Agricultural Knowledge Management in India at NAAS complex during 27-28 September, 2017. (Dr. Hukum Chandra)
25. National workshop on Developing a Roadmap for Agricultural Knowledge Management in India from 27-28 September, 2017 at NASC complex, New Delhi organized by ICAR-DKMA. (Neeraj Budhlakoti, Mohd Samir Farooqi, Dr. K.K. Chaturvedi Dr. Anu Sharma and Dr. D.C. Mishra)

### *Participation in International Conference/Workshop etc.*

- Presented the paper MinimalRSD and FMC: R packages to construct cost efficient experimental designs in the International Conference on User!2017 during July 4 to 7, 2017 at Brussels, Belgium. (Shwetank Lall, Seema Jaggi, Eldho Varghese, Arpan Bhowmik and Cini Varghese.
- Delivered lecture on "Experience and implementation of assessment of animal feed resource in India" in workshop to introduce their key staff to ideas and approach of the project "Development of Database and Package for Data Analysis and Feed Resources in Ethiopia", at Addis Ababa, Ethiopia probably on 17 and 18 July 2017 under the approved consultancy service and as resource person I have. (Dr. U. B. Angadi)
- Daniel, M., Patil, A., Pramanik, S., Basak, P., Hira, S. and Balasubramaniam, P. (2017). Malaria management as a bellwether for efficient urban governance: Findings from a western Indian megacity, in 14th International Conference on Urban Health "Health Equity: The New Urban Agenda and Sustainable Development Goals" organized in Coimbra, Portugal during 26-29 September 2017.

### *Participation in meetings*

1. Attended meeting on "contents for ICAR-IASRI new website (GIGW compliance)" on 11th July, 2017 at CaBin, IASRI. New Delhi. (Santosh Rathod)



2. Attended meeting on “collection of contents for the website and presentation of the new website as per GIGW” on 28th July, 2017 at CaBin, IASRI, New Delhi.( Santosha Rathod)
3. Attended executive council meeting of FSRDA at IIFSR, Modipuram on 27.7.17(Dr.Anil Kumar)
4. Participated in meeting with Head, CABin to discuss the issue related to GIGW standard and compliance for website(s) on July 25, 2017. (Dr. M.A. Iquebal)
5. Participated in meeting of Institute website development committee to discuss the issue related to GIGW standard and compliance for website(s) on July 11 and 28, 2017. (Dr. M.A. Iquebal)
6. Participated and chaired the meeting to discuss the tender document for “Housekeeping Services” on 18th and 19th July 2017. (Dr. K.K. Chaturvedi)
7. Participated in course allocation with Prof. (CA) and other faculty member of CA discipline on 21st July 2017. (Dr. K.K. Chaturvedi)
8. Participated in meeting with Head to discuss the issue related to GIGW standard and compliance for website(s) on 25th July 2017. (Dr. K.K. Chaturvedi)
9. Attended meeting under the Chairmanship of Director, DES, Govt. of Assam related to the project entitled “An Investigation of Causes of Divergence between Official and Trade Estimates of Jute Production” held at DES, Guwahati on 07 July, 2017. (Dr Tauqueer Ahmad and Prachi Misra Sahoo)
10. Attended PMC meeting of the project entitled “Pilot study for developing State level estimates of crop area and production on the basis of sample sizes recommended by Professor Vaidyanathan Committee report” held on 11 July, 2017 at ICAR-IASRI, New Delhi. Dr Tauqueer Ahmad, Dr. Hukum Chandra, Dr. Kaustav Aditya and Dr. Ankur Biswas
11. Attended meeting under the Chairmanship of Director, DES, Govt. of Bihar related to the project entitled “An Investigation of Causes of Divergence between Official and Trade Estimates of Jute Production” held at DES, Patna on 25 July, 2017. (Dr Tauqueer Ahmad and) Prachi Misra Sahoo
12. Attended Technical Committee of Direction (TCD) meeting for improvement of Animal Husbandry Statistics and Dairying Statistics for the year 2016 organized by Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture and Farmers Welfare, Govt. of India held at Indian Institute of Public Administration, ITO, New Delhi on 26 July, 2017. (Dr Tauqueer Ahmad)
13. Attended meeting under the Chairmanship of Additional Chief Secretary, Govt. of West Bengal related to the project entitled “An Investigation of Causes of Divergence between Official and Trade Estimates of Jute Production” held at New Secretariat, Nabanna, Kolkata on 27 July, 2017. (Dr Tauqueer Ahmad and Prachi Misra Sahoo)
14. Attended ITMU meeting held on 29 July 2017 at ICAR-IASRI, New Delhi as member, ITMU. (Dr Tauqueer Ahmad)
15. Attended Technical Committee of Direction (TCD) meeting for improvement of Animal Husbandry Statistics and Dairying Statistics for the year 2016 organized by Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture and Farmers Welfare, Govt. of India held at Indian Institute of Public Administration, ITO, New Delhi during 25-26 July, 2017.(Dr Hukum Chandra)
16. Attended meetings under the Chairmanship of Director, ICAR-IASRI related to organization of visit of Princess of Thailand to Agricultural Science Museum, NASC Complex, New Delhi on 12 July 2017 and 14 July 2017 at ICAR-IASRI, New Delhi. (Dr Tauqueer Ahmad)

17. Attended a meeting at Barrackpore, North 24 Parganas, West Bengal (W.B.) to discuss the activities to be carried out in order to supervise the implementation of Crop Cutting Technique for Jute crop in W.B. State under the project "Investigation of Causes of Divergence between Official and Trade Estimates of Jute Production" on 08 August, 2017. Mr. Samaresh Kumar Haldar, Additional Director of Agriculture (Evaluation), Directorate of Agriculture, Govt. of W.B. co-chaired the meeting. (Dr Tauqueer Ahmad chaired)
18. Attended a meeting at DES, Guwahati, Assam to discuss the activities to be carried out in order to supervise the implementation of Crop Cutting Technique for Jute crop in Assam State under the project "Investigation of Causes of Divergence between Official and Trade Estimates of Jute Production" on 22 August, 2017. Mr. Ranjan Dutta, Joint Director, DES, Govt. of Assam co-chaired the meeting. (Dr Tauqueer Ahmad)
19. Attended a meeting with Dr. Sachi Swain, Senior Scientist and PI of the project from ICAR-CIARI, Port Blair, Andaman and Nicobar Islands and project team at ICAR-IASRI, New Delhi on 19 August, 2017 to discuss the activities to be carried out under the project "Assessment of post harvest losses in fruits and vegetables and strategies for their reduction in Andaman and Nicobar Islands" and provided technical guidance. Dr (Tauqueer Ahmad chaired)
20. Attended a meeting with Mr. Samaresh Kumar Haldar, Additional Director of Agriculture (Evaluation), Directorate of Agriculture, Govt. of W.B., Technical Officer, Agril. Census Division, Govt. of W.B. and project team members at ICAR-IASRI, New Delhi to discuss about the survey conducted by the ICAR-IASRI officials in W.B. State and other activities of the project "Investigation of Causes of Divergence between Official and Trade Estimates of Jute Production". (Dr Tauqueer Ahmad)
21. Attended a meeting with Scientist, Consultant, other officials of MNCFC, New Delhi and project team members of CHAMAN project at ICAR-IASRI, New Delhi to discuss about the work to be carried out in common districts and research work to be carried out in future under CHAMAN project by both the organizations. (Dr Tauqueer Ahmad)
22. Attended BOS meeting held on 17 August, 2017 at ICAR-IASRI, New Delhi as member, BOS. (Dr Tauqueer Ahmad)
23. Attended HDs meeting held on 29 August, 2017 at ICAR-IASRI, New Delhi under the Chairmanship of Director, ICAR-IASRI. (Dr Tauqueer Ahmad)
24. Attended fifth meeting of the Local Office Bearers (LOB) of the Society of Statistics, Computer and Applications, held on 18 August, 2017 at ICAR-IASRI, New Delhi. (Dr Hukum Chandra)
25. Participated in a meeting at Barrackpore, North 24 Parganas, West Bengal (W.B.) to discuss the activities to be carried out in order to supervise the implementation of Crop Cutting Technique for Jute crop in W.B. State under the project "Investigation of Causes of Divergence between Official and Trade Estimates of Jute Production" on 08 August, 2017. (Dr Prachi Misra Sahoo and Dr Ankur Biswas)
26. Participated in a meeting at DES, Guwahati, Assam to discuss the activities to be carried out in order to supervise the implementation of Crop Cutting Technique for Jute crop in Assam State under the project "Investigation of Causes of Divergence between Official and Trade Estimates of Jute Production" on 22 August, 2017. (Dr Prachi Misra Sahoo)
27. Attended meeting regarding "Mera Gaon Mera Gaurav" programme with the group members at ICAR-IARI on 31 August, 2017. (Dr Ankur Biswas)

28. Attended the meeting as an expert member, of APEDA funded project "Effect of Buffaloes Slaughter and Meat Export Policy on Livestock, Milk, Draught, Power and Eco-Balance in India" on 9th August, 2017 at ICAR-NRC Meat, Hyderabad to finalise the final report. (Dr. A.K. Choubey)
29. Attended the meeting as a Member of Research Advisory Committee of Agricultural Economics Research Centre, Directorate of Economics & Statistics, on 5th August and 21st August 2017 organised at Institute of Economic Growth, University Enclave, New Delhi to discuss the methodology of projects identified. ( Dr. A.K. Choubey)
30. Attended the meeting as a member of Technical Advisory Committee of PMFBY/RWBCIS on 18th August in the Department of Agriculture & Cooperation and Farmers Welfare to discuss the settlement of claims of Gujarat for Kharif 2016 season under PMFBY. (Dr. A.K. Choubey)
31. Attended the professors meeting on 19th August, 2017 at IARI Library central hall chaired by Dean IARI. (Dr. Sudeep Marwaha)
32. Attended the meeting on 28th August, 2017 at IARI Library central hall chaired by Dean IARI to discuss about the CAAST proposal to be submitted in NAHEP. (Dr. Sudeep Marwaha and Ms. Shashi Dahiya)
33. Attended the meeting chaired by Director IASRI on 4th August, 2017 to discuss the guidelines for the recruitment of IT professionals in line with young professionals. Director DKMA and NIC representative attended the meeting. (Dr. Sudeep Marwaha)
34. Empowered Committee project review meeting, NASF on August 8th, 2017 as a capacity of CO-PI of the project "Phenomics of Moisture Deficit Stress Tolerance and Nitrogen Use Efficiency in Rice and Wheat - Phase II". (Dr. Anil Rai)
35. Meeting at ILRI, ICRISAT, Hyderabad, Telangana on 29/8/2017 under consultancy service "Development of Database and Package for Data Analysis and Feed Resources in Ethiopia". (Dr. U.B. Angadi)
36. Participated and chaired the meeting to discuss the tender document for "Housekeeping Services" on 8th, 17th and 18th August 2017 and in Orientation program of newly admitted students on 26th August 2017. (Dr. K.K. Chaturvedi)
37. Empowered Committee project review meeting, NASF on August 8th, 2017 as a capacity of CO-PI of the project "Phenomics of Moisture Deficit Stress Tolerance and Nitrogen Use Efficiency in Rice and Wheat - Phase II". (Mr. Sanjeev Kumar).
38. National Meeting of Experts on Agriculture Markets, Price Data Visualization and Early Warning System at Hotel Taj Mahal, Mansingh Road, New Delhi, during 11-12 September 2017 organized by FAO. (R.K. Paul)
39. Rajbhasha karyavayan samite meeting on 23 Sept, 2017. (Dr. Prawin Arya)
40. National Family Health Survey meeting held at Nirman Bhawan, New Delhi on 07 September, 2017. (Dr. Tauqueer Ahmad)
41. ISAS meeting held at ICAR-IASRI, New Delhi on 14 September, 2017. (Dr. Tauqueer Ahmad)
42. Meeting CAFT on "Recent Advances in Sample Survey and Survey Data Analysis using Statistical Software" as a member core committee on 16 September, 2017. Dr. Hukum Chandra
43. ICAS VIII (International Conference on Agricultural Statistics VIII) 2019 one day meeting to discuss its organizational aspects in India held at ICAR-IASRI, New Delhi on 19 September, 2017. (Dr. Tauqueer Ahmad and Dr. Hukum Chandra)

44. Discussion on the organization of International Conference on Agricultural Statistics 2019 on 21 September, 2017 at NASC complex, New Delhi. (Dr Hukum Chandra)
45. Expert Consultation meeting organized by the Food and Agriculture Organization of the United Nations (FAO) on "SDG 12.3 - Measurement and action to meet the target on reducing food losses and food waste" held at FAO Headquarters, Rome, Italy during 28-29 September, 2017 as an Expert. (Dr Tauqueer Ahmad)
46. CPC meeting held at ICAR-IASRI, New Delhi on 22 September, 2017 and presented a new project proposal to be funded by FAO, Rome, Italy. (Dr Tauqueer Ahmad)
47. Hindi committee meeting held at ICAR-IASRI, New Delhi on 23 September, 2017. (Dr Tauqueer Ahmad)
48. Executive Council Meeting of the Indian Society of Agricultural Statistics held at IASRI on 14/09/2017.(Mohammad Samir Farooqi)
49. Meeting with CIRC, Meerut Scientists regarding Genomic Portal development on September 23, 2017. (Dr. Dinesh Kumar, Dr. U.B. Angadi, Dr. Sarika and Dr. MA. Iquebal.

## CONSULTANCY/ADVISORY SERVICES PROVIDED

- Advised a Bioinformatics student of OUAT, Bhubaneswar, Odisha for a period of four months to complete a project related to her M.Sc. thesis work. (P.K.Meher)
- Consultation provided to Harkirshna Yadav, Scientist, Division of Genetics, IARI, New Delhi in the analysis of QTL mapping and alpha Lattice of Raghunandan K., Scientist, IARI, New Delhi. (Himadari Shekhar Roy)
- Advisory to Dr. Manoj Kumar Goyal, College of Agriculture CCSHAU Campus Kaul (Kaithal), regarding time series data analysis using ARIMAX model. (R.K. Paul)
- Consultancy to Dr. Tanmoy Karak, Principal Scientist, Tea Research Association regarding stepwise regression analysis and time series trend estimation in climate variables. (R.K. Paul)
- Consultancy to Puja Kumari M.Sc. Student, BAU, Sabour, Bhagalpur in statistical analysis of factorial CRD with contrast analysis of data. (Prakash Kumar)
- Advisory services to Dr. Madhusudhan Bhattarai, Independent Consultant, New Delhi on Break Even Point (BEP) analysis for tractor on 18th July, 2017. (Ravindra Singh Shekhawat)
- Advice for analysing data of study entitled "Effects of Six Weeks of Aerobic Dance Training on Health Related Fitness among High School Boy" of Mr. Siddappa Nandar, Assistant Professor, Dept of Physical Education University of Agricultural Sciences, Dharwad on 19.07.2017 in R software. (Santosh Rathod)
- Genetic component analysis was performed based on the data from the experiment of Ms. Nehi, a student from the Division of Vegetable Science, IARI, New Delhi. Phenotypic correlation and variance, genotypic correlation and variance, environmental correlation and variance along with heritability were obtained. (Arpan Bhowmik)
- Dr. Dibakar Mahanta, VPKAS, Almora was advised on the use of principle component analysis in reducing the dimensionality of the data pertaining to soybean and wheat crop and also provided him the SAS code for doing the same. (Eldho Varghese)
- A Ph.D student of IARI, D. Yadav, from the Division of Agronomy has been advised regarding the analysis of data. The design used for the experiment was split plot design. The experiment consisted of 5 main plot and 4 subplot factors with 3 replications. The data was analyzed using MS excel software. (Mohd. Harun)

- Advised Dr. Sujay Rakshit, Indian Institute of Maize Research Ludhiana on Use of alpha designs (i)  $v=250, r=3, k=25$ ;  $v=250, r=3, k=10$ ; (ii)  $v=285, r=2, k=15$ ; (iii)  $v=165, r=2, k=11$  and (iv)  $v=750, r=2, k=25$ .(Dr. Rajender Parsad)
- Advised Dr. Subrata Dutta, Associate Professor, Department of Plant Pathology (AICRP on Vegetable Crops), BCKV, Kalyani on effect of different dates of planting on *Rhizoctonia solani* using Artificial Neural Network methodology. (Dr. Mir Asif Iquebal)
- Advised Dr. S.C Dubey, Head, Division of Plant Quarantine, ICAR-National Bureau of Plant Genomic, New Delhi on analysis of RBD-Factorial experiment for individual year as well as pooled analysis.(Dr. Mir Asif Iquebal)
- Advised Samir Barman M.Sc. (Agricultural Statistics) Student of ICAR-IASRI in developing R codes for simulation study for his thesis problem. (Dr. Pradip Basak)
- Provided consultancy to Stability and biplot analysis of chickpea data provided by Dr. Naresh Kumar, Assistant Professor, PAU, RRSs, Gurdaspur Punjab. (Prakash Kumar)
- Advised to Ph.D. Scholar, Mohammed Mustafa Ibrahim at Division of Entomology, ICAR-IARI, New Delhi, regarding analysis of data on hygienic behavior of honeybee against *Varroa* Mites. The data was collected monthly for a period of six months on different attributes like number of damaged mites, number of damaged legs, number of damaged body, number of damaged females, number of damaged male, total no. of mites etc. As per researcher's interest correlation and regression analysis was done using SPSS and SAS. (Mohd. Harun)
- Advice to Mr. Kharatmol Rudrappa Balaji, Ph. D Scholar (FRM), ICAR-CIFE, Mumbai for determining sample sizes of various stake holders for sending questionnaire on FAO Code of Conduct for Responsible Fishing.(Dr. Ramasubramanian V.)
- Advisory service provided to one Ph.D. scholar (Saleh Md. Hedayatullah)of Dr. Sadia, Department of linguistics, AMU, Aligarh on nonparametric test for ordinal data. (Dr. Wasi Alam)
- Advisory carried out RBD data analysis in SAS of Mr. Mahesh Badiger, Ph.D. scholar (Vegetable Science), ICAR-IARI, New Delhi, for his Ph.D. thesis entitled "Studies on genetic diversity and crossability between *A. esculentus* and its wild species for resistance to BYVMV" on 22.08.2017. (Santosh Rathod)
- Consultancy service provided project proposal with International Livestock Research Institute (ILRI). (Dr. U.B. Angadi)
- Guidance in analysis of wheat data provided by Mr. Prafull Jaiswal, SRF, NRCPB, New Delhi. (Prakash Kumar)
- Guidance to Dr. Sabita Kumar Senapati, Professor, Division of Entomology, UBKV, Pundibari in analysis of data for pest management and to Mr. Om Prakash, Scientist, ICAR-CAZRI, Jodhpur, in the analysis and interpretation. (Himadri Shekhar Roy)
- Advised Mr. Sunil Kumar, a Ph.D. Research Scholar from division of Agricultural Extension was on the use of logistic regression to determine the influence of different socio-economic factors on stakeholders in term of use of Rice Knowledge Management Portal (RKMP).(Arpan Bhowmik)
- Advised a M.Sc. Student in Genetics and Plant Breeding from UAS, Bengaluru on construction of a simple lattice design for 121 genotypes. (B N Mandal)
- Advised V. Bhargav, from Deptt. Of Floriculture and Landscape Architecture, ICAR-IARI:IIHR, Bengaluru-89, in cluster analysis of data using SAS and SPSS to find out the inter-cluster distances, intra-cluster distances and cluster mean for different characters. (Mohd Harun).

## RECOMMENDATIONS OF COMMITTEE(S)

## Research Advisory Committee

Recommendation of the 18<sup>th</sup> Meeting of Research Advisory Committee of the ICAR-IASRI held on 22 April, 2017.

1. *Institute has made outstanding contributions in research, innovative applications and human resource development. All out efforts need to be made to reach out to stakeholders by showcasing its achievements. The Institute needs to find out ways to remove boundaries among various Departments/Universities and IASRI for stronger collaborations. The Institute should develop revival strategy for strengthening of Discipline of Statistical Sciences in AUs. ICAR-IASRI is playing an important role across all SMD's of the Council. In view of the important role played by this Institute, ICAR-IASRI may be accorded the status of a National Institute so that it can play its role more effectively.*
2. *For strengthening the Statistical Sciences in ICAR an appropriate scientific strength is essential. Therefore, while deciding the seats for Agricultural Statistics, Computer Applications and Bioinformatics, the positions available in 2011 cadre strength of ICAR for Computer Applications should also be taken into account as vacant positions by ICAR rather than considering only the vacant positions of Agricultural Statistics. Further, for strengthening the discipline of Bioinformatics, some positions from relevant disciplines of biological sciences should be converted into Bioinformatics. While deciding the vacancy positions in different disciplines, Statistics should be given due importance as research in statistics is essential for development of Information Sciences. A comprehensive note may be prepared for this purpose for consideration of the Council.*
3. *For attracting talented students for admission to PG Programmes in Statistical Sciences i.e. Agricultural Statistics, Biostatistics, Statistics, Computer Applications and Bioinformatics throughout NARES B.Sc. with Statistics/ Mathematics/ Bioinformatics/ Computer Science or equivalent or Graduate having one of the subjects of Statistical Science/ Mathematics should be included in educational qualifications, Provision may be made to allow remedial courses as extra credit hours in each trimester/ semester to PG students in Statistical Sciences possessing B.Sc. in Statistics/ Mathematics so that they can complete their degree requirements without spending one extra year and simultaneously gain knowledge of agricultural sciences and Admission for M.Sc./M.V.Sc. in Biostatistics should be done through Statistical Sciences rather than Animal Sciences as it is being done at present. A comprehensive note may be prepared for consideration of the Council.*
4. *The Institute has been involved in doing quality research in basic statistics particularly basic research and innovative applied research in the areas of Design of Experiments and Theory of Survey Sampling. As a matter of fact, the foundation of the IASRI was laid on the premises of research in Design of Experiments and subsequently Survey Sampling. Experimental Designs form the backbone of the research in agricultural systems research. Similarly Survey sampling has a very important role in agricultural research and also in the national statistical system. Several efficient experimental designs and advanced analytical techniques, Sample Survey Designs and Strategies have been used in NARES through Web Resources on Designed Experiments, Indian NARS Statistical Computing Portal, Advisory Services, Sample Survey Resources Server, and state Departments of Agriculture, Animal Husbandry, Fisheries, Horticulture, etc. These efforts need to be pursued more rigorously with renewed zeal, enthusiasm and passion so as to meet the challenges of agricultural research in the emerging areas of research in agricultural sciences. The research on development of efficient/cost effective experimental / survey designs and analytical techniques, keeping in mind the volume of data, the number of parameters and number of*

observations, etc., need to be carried out for making agricultural research globally competitive and acceptable. Of utmost importance is the fact that the basic research in statistics should encompass within its gamete the boundary constraints of applicability in agricultural sciences and the solutions have to be optimal in the restricted region defined by these applicability constraints. Agriculture is a very complex system with many synergistic and antagonistic interactions and very large intrinsic variability and the research in statistics must address these.

5. *The ICAR-IASRI has expertise for developing statistical models for forecasting, expressing agricultural systems and also developing stochastic time series models, bivariate and hybrid time series models, machine learning techniques, etc. Linear and non-linear models, State space models, ARIMA, ARCH and GARCH models, Space Time Autoregressive Moving Average (STARMA) models for forecasting spatio-temporal time series data, etc. have been used successfully in crop forecasting and agricultural systems. More concerted efforts should be made for developing admissible forecasting models that are applicable for wide range of data sets. The forecasting of incidence of pests and disease, quick estimation of losses through vagaries of weather like floods and droughts, volatility forecasting say prices of perishable commodities, etc. need to be developed.*
6. *Centre for Agricultural Bioinformatics should take up projects in priority areas such as Genome editing (CRISPER), Genomic Data Ware House and development of algorithms for biological data analysis. In order to support the supercomputing facilities i.e. ASHOKA, efforts may be made to develop a mechanism for automation of data submission and its curation in Bio-computing Portal. A brief note may be prepared depicting the importance of on-going research in Bioinformatics in the Council including role of ASHOKA.*
7. *Institute should make efforts for undertaking studies in the emerging field of national importance and priorities of Government of India such as "Crop-Insurance", "Monitoring and assessing Soil/Water Health" "Data-Integration" etc. Efforts may also be made to develop Indices for Hunger, Farmer Welfare, Food Security, Soil Reclamation, Female Empowerment etc. Basic research in Statistics and innovative applications should be taken up with more zeal and enthusiasm. Enabling environment for this may be prepared.*
8. *There should be more emphasis on multi-disciplinary team work. Therefore, the Institute should make attempts to develop multi-disciplinary research projects. IASRI and NIAP should institutionalize and strengthen their collaboration. Efforts should continue for involvement of the Institute in all AICRPs/Network Projects. A list of priority areas of research for next three years should be prepared for each Division of IASRI. In view of resource constraints, more efforts should be made for getting funds from outside for maintaining and upgrading the facilities rather than depending on the parent funding alone.*
9. *A background document for employability of students of IASRI, in ARS/AUs/elsewhere, may be prepared. Efforts should be made for obtaining sanction from the Council for initiation of Virtual Classrooms at IASRI for helping the AUs.*
10. *In view of the important role played by IASRI for providing Computational/ Informational services to the Council such as ERP, Unified Communications, Various Portals such as KRISHI, Indian NARS Statistical Computing Portal, Web Resources, Computational Resources etc., provision be made for adequate funding and required manpower to support the same.*
11. *The presence of abnormal observations or violation of any kind of statistical assumption may lead to erroneous conclusions from any kind of data analysis. Therefore, for detecting outliers in genetic*

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*data as well as estimating genetic parameters robustly in presence of outliers, suitable statistical methodologies should be developed. Efforts should also be made for developing statistical methodologies for predicting an individual's genetic potential of a single phenotype or more than one phenotype using genome-wide single nucleotide polymorphism (SNP) markers.*



## PERSONNEL

### *Promotion*

The following Scientists were awarded promotion to the next higher research grade from the dates as indicated against their respective names.

Name	Grade to which promoted	Date
Dr. Saumen Paul, Scientist	Rs. 15600-39100	20.04.2015
Dr. Monendra Grover, Scientist	Rs. 37400-67000	18.01.2016

### *Joining*

Dr. Shashi Dahiya, Scientist Joined back the institute on 03.07.2017 after availing the study leave from 03.07.2014 to 02.07.2017 for persuing the Ph.D. vide office order No. 19(1165)/1998-Admn.-I Dated 12.07.2017.

### *Study Leave*

Dr. Samrendra Das, Scientist has been granted study leave for persuing Ph.D. from 11.08.2017 to 10.08.2020 vide office order No. 19(1249)/2013-Admn.-I dated 01.08.2017.

### *Retirement*

Shri Dev Murti Prasad, UDC was granted voluntary retirement from 01.09.2017 forenoon, vide his application dated 27.05.2017 for the same.

Shri Ramayan Ram, Skilled Supporting Staff retired on 29.09.2017 after completing 60 years of his age.

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