

# IASRI NEWS

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INDIAN AGRICULTURAL STATISTICS RESEARCH INSTITUTE ( ICAR ), LIBRARY AVENUE, PUSA, NEW DELHI-110 012



## From Director's Desk . . . . .

This Newsletter highlights some of the salient research and training achievements made and other significant activities performed during the period under report.

Designs for mixture experiments with process variables have been obtained and catalogued.

Methods of construction of partially balanced incomplete block designs based on cubical and tetrahedral association schemes have been obtained.

For multimodal rainfall data, methodology of fitting mixture of distributions to 'body' and 'tail' using statistical learning theory is demonstrated. Three estimators of extreme value index are computed to fit the theoretical tail distribution to the rainfall data.

One implementation and training workshop on "PERMISnet- II" and one workshop cum brainstorming session on "Remote Sensing and GIS for Accelerated Growth of Agricultural Research and Development" were organised.

Brainstorming Session on "Establishment of Centre of Agricultural Bioinformatics" under the Chairmanship of Dr. Mangala Rai, Secretary, DARE & DG, ICAR was also organised.

As a part of Golden Jubilee celebrations of the Institute a publication entitled *IASRI. . . an era of excellence* has been brought out. This publication consists of messages from the leaders in the ICAR and all the well wishers, the reminiscences of alumni and the brilliance achieved during these 50 years in the research and teaching.

The Institute participated in number of meetings/conferences/symposia/workshops etc.

It is hoped that the contents of this document would be informative and useful for scientists in NARS. Any suggestions for improving the contents of the newsletter further, would be highly appreciated.

*VK Bhatia*

(VK BHATIA)

### IN THIS ISSUE

- Research Achievements
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### निदेशक की कलम से

समाचार पत्र के इस अंक में प्रतिवेदनाधीन अवधि के दौरान प्रमुख अनुसंधानिक एवं प्रशिक्षण सम्बन्धी उपलब्धियों और संस्थान की अन्य महत्वपूर्ण गतिविधियों पर प्रकाश डाला गया है।

प्रोसेस चरों सहित मिश्रण परीक्षणों के लिए अभिकल्पनाएँ प्राप्त की गयी तथा इन्हें कैटलॉगबद्ध किया गया।

क्यूबिकल एवं टेट्राहेड्रल एसोसिएशन योजनाओं पर आधारित आंशिक रूप से संतुलित अपूर्ण ब्लॉक अभिकल्पनाओं की विधियाँ उपलब्ध की गयीं।

मल्टीमॉडल वर्षा सम्बन्धी आँकड़ों के लिए सांख्यिकीय लर्निंग थ्योरी के उपयोग द्वारा 'बॉडी' एवं 'टेल' में मिश्रण के वितरण के संयोजन की पद्धति का प्रदर्शन किया गया। वर्षा सम्बन्धी आँकड़ों में सैद्धांतिक 'टेल' वितरण के संयोजन हेतु चरम मान सूचकांक के तीन आकलनों की संगणना की गयी।

परमिसनेट-II (PERMISnet-II) पर एक कार्यान्वयन एवं प्रशिक्षण कार्यशाला तथा कृषि अनुसंधान एवं विकास के त्वरित विकास के लिए सुदूर संवेदन एवं जी.आई.एस. पर एक कार्यशाला एवं ब्रेनस्टॉर्मिंग सत्र का आयोजन किया गया।

कृषि अनुसंधान एवं शिक्षा विभाग के सचिव एवं भा.कृ.अनु.प. के महानिदेशक, डॉ. मंगला राय की अध्यक्षता में कृषि जैवसूचना केन्द्र की स्थापना पर एक ब्रेनस्टॉर्मिंग सत्र का आयोजन किया गया।

संस्थान के स्वर्ण जयन्ती समारोह के आयोजन के अन्तर्गत भा.कृ.सा.अ.सं...उत्कृष्टता का एक युग नामक प्रकाशन प्रकाशित किया गया। इस प्रकाशन में भा.कृ.अ.प. के लीडरों तथा सभी शुभचिन्तकों के संदेश, कृषि अनुसंधान नायकों के संस्मरण तथा इन 50 वर्षों के दौरान अनुसंधान एवं अध्यापन के क्षेत्र में प्राप्त उपलब्धियाँ शामिल हैं।

संस्थान द्वारा अनेक बैठकों/सम्मेलनों/संगोष्ठियों/कार्यशालाओं इत्यादि में सहभागिता की गयी। आशा है कि इस अंक की विषयवस्तु राष्ट्रीय कृषि अनुसंधान प्रणाली के वैज्ञानिकों के लिए सूचनाप्रद एवं उपयोगी होगी। समाचार पत्र की विषयवस्तु में सुधार लाने हेतु आपके सुझावों का स्वागत है।

*Vijay Kumar*

(विजय कुमार भाटिया)

### RESEARCH ACHIEVEMENTS

- Mixture experiments with process variables have commonly been used in agricultural experiments. For example, consider an experiment that has been conducted with the application of total of 120 kg Nitrogen (N) applied in splits at different crop growth stages. Since the fixed quantity of nitrogen has been applied at different crop growth stages, therefore, the response depends upon the proportion of nitrogen applied at different crop growth stages. This experiment was conducted with two varieties of paddy viz. Saket-4 (early) and Rasi (medium). The split doses of nitrogen applied in splits constitute the experiments with mixtures. The varieties are not the part of mixture proportions but they affect the response variable. So the variety is the process variable and the whole experiment becomes mixture experiment with process variable. These experiments in NARS are generally conducted and analyzed using a Randomized Complete Block design. This provides the inference on the best treatment tried during the experiment and does not provide any information on the relationship of the proportions with the response variable. Further, the experimenter may be interested in obtaining optimum split which may be other than those tried in the experiment. These questions can be answered by drawing an analogy of these experiments with experiments with mixtures. The basic problem in analyzing the data from these experiments as per experiments with mixtures methodology is that the number of points are chosen arbitrarily and may not allow fitting of canonical polynomials.

To deal with such situations, two methods of construction of designs for mixture experiments with process variables have been developed. In Method I, the use of orthogonally blocked response surface designs and projection matrices is suggested. In Method II, blocking criteria of response surface designs suggested by Wu and Ding (1998; *J. Statist. Plann. Inf.*, 71, 331-348) is employed. The designs for mixture experiments with process variables obtainable from these methods of construction have been catalogued for both Linear and Quadratic models for 2-5 mixture components and one process variable with 2-levels.

- Two three-class association schemes called tetrahedral association scheme and cubical association scheme have been defined along with methods of constructing partially balanced incomplete block designs based on these schemes. Designs based on cubical association scheme are found to be resolvable. These designs are more efficient than the circular lattice [PBIB(3) designs] with the same number of experimental units for the estimation of elementary treatment contrasts.

- For multimodal rainfall data, methodology of fitting mixture of distributions to 'body' and 'tail' using statistical learning theory is demonstrated. Three estimators of extreme value index are computed to fit the theoretical tail distribution to the rainfall data. "Structural risk minimization procedure" is applied to fit the 'body' of the rainfall distribution. As an illustration, the probability distribution of monthly rainfall data for Orissa Meteorological Subdivision is obtained by combined body-tail estimation method and it is shown that Hill's method has performed the best.

#### NEW PROJECTS

- The project entitled 'Econometric study of long-run effects of public investment in irrigation on food-grains productivity' has been initiated from 21 August 2009.

#### VISIT ABROAD

Dr. Hukum Chandra attended:

- SAE 2009 conference on Small Area Estimation held at Elche, Spain during 29 June - 01 July 2009 and presented an invited paper entitled Small area estimation of proportions in business surveys.
- 57<sup>th</sup> Session of the International Statistical Institute (ISI 2009) conference during 16-22 August 2009 at Durban, South Africa and presented an invited paper entitled Small area estimation under transformation to linearity jointly written with R. Chambers.

#### HONOURS/AWARDS

- Dr. Hukum Chandra received the Cochran-Hansen Award 2009 by the International Association of Survey Statisticians (IASS).
- Dr. AK Vasisht received the Best Research Paper Award for the paper entitled "An analysis of volatility of agricultural prices- A case study of maize" in the two days national level Workshop cum Seminar on "Indian Commodity Market Derivatives & Risk Management-The Road Ahead" during 11-12 September 2009 at Pondicherry University, Puducherry.
- Dr. Sushila Kaul elected as a member of executive committee of Swadeshi Science Movement, Vigyan Bharti, Delhi for the years 2009-2011.

#### DISTINGUISHED VISITORS

Prof. Rohan Rajapakse and Other officials from Sri Lanka Council for Agricultural Research Policy, visited the Institute on 13 July 2009.



#### WORKSHOPS ORGANISED

- One day implementation and training workshop was organised on 'PERMISnet-II' on 22 July 2009 in NASC complex, New Delhi.



- One day workshop cum brainstorming session on "Remote Sensing and GIS for Accelerated Growth of Agricultural Research and Development" was organised on 31 July 2009 at IIRS, Dehradun.
- Brainstorming Sessions on Establishment of Centre of Agricultural Bioinformatics were organised:
  - With Dr. HP Singh, DDG (Hort.), Dr. MM Pandey, DDG (Engg.) and Dr. KD Kokate DDG (Extn.) of ICAR and other experts in the field of biotechnology and bioinformatics on 26 August 2009 at IASRI, New Delhi.
  - Under the Chairmanship of Dr. Mangala Rai, Secretary, DARE & DG, ICAR, with other experts in the field of biotechnology and bioinformatics on 22 September 2009 at NASC, New Delhi.



#### PANORAMA OF ACTIVITIES

- International Training Hostel was Inaugurated by Hon'ble Dr. Mangala Rai, Secretary, DARE & Director General, ICAR on Thursday, 09 July 2009.



- One meeting of the Institute Joint Staff Council was held on 10 July 2009 under the Chairmanship of Director IASRI.

- Meetings were organised for discussions about data collection and presentation of project, 'Evaluation of Rationalization of Minor Irrigation Statistics (RMIS) Scheme' on 25 July, 10 & 27 August 2009.

#### Annual Day Celebrations

- The Annual Day of the Institute was celebrated on 02 July 2009. Dr. Madan Mohan Pandey, DDG (Eng.), ICAR was the Chief Guest of the function. Dr. Anil Kumar Singh, DDG(NRM), ICAR delivered the Nehru Memorial Lecture entitled "Bridging the Statistical Divide".
- Nehru Memorial Gold Medal for the year 2008 was awarded to Sh. Sanjay Kumar Prasad, M.Sc. (Ag.Stat.) student.
- As part of Golden Jubilee Celebrations of the Institute a publication entitled *IASRI...an era of excellence* consisting of messages from leaders in Agricultural Science, Statistical Science and other well wishers along with 17 articles on various related topics was released by the Chief Guest. Annual Report of the institute and PAYBITAX Package Ver 1.0 were also released.

#### LECTURES DELIVERED

- The following Scientists were invited by Defence Institute of Physiology and Allied Sciences (DIPAS), Defence Research and Development Organization (DRDO), Delhi to deliver lectures under a Continuing Education Programme on Biostatistical Methods for Life Sciences during 14 -18 September 2009:
  - Dr. V.K. Bhatia - Statistical genomics and estimation of genetics parameters.
  - Dr. Seema Jaggi - Design of experiments for life sciences and illustration of analysis through SPSS.
  - Dr. Cini Verghese - Cross over designs and designs for bioequivalence trials.
- Dr. Cini Varghese delivered a lecture on Test plot designs and statistical analysis of data under vegetable trials on 25 September 2009 for International Trainings of Food and Agricultural Organization at Horticulture Division, IARI, New Delhi.
- Dr. Ramasubramanian V. delivered a lecture on Price forecasting: Statistical methods with emphasis on time-series modeling at National Institute of Agricultural Marketing, Jaipur on 25 September 2009.

#### PARTICIPATION OF INSTITUTE

##### Meetings

- First meeting of Standing Committee for the 17<sup>th</sup> Conference of Central and State Statistical Organization (COCSSO) on 23

July 2009 at Ministry of Statistics and Programme Implementation, Sardar Patel Bhawan, New Delhi.

- Meeting to discuss the issues regarding Estimation of Slum Population in the Country on 23 July 2009 at Sardar Patel Bhawan, New Delhi.
- Steering Committee meeting for implementation of the scheme Award under the chairmanship of Sh SK Das, DG (CSO) on 23 July 2009 at Sardar Patel Bhawan, New Delhi.
- Meeting with Director (Animal Husbandry) and other officials of Directorate of Animal Husbandry, Shillong, Meghalaya on project entitled 'Sampling methodology for estimation of meat production in Meghalaya' during 27-29 July 2009 at Shillong.
- Technical discussions with concerned officials of the Scheme "Evaluation of Rationalization of Minor Irrigation Statistics (RMIS)" at Hubli (Karnataka) during 06-08 August 2009. Visited different fields to actually see various minor irrigation schemes.
- Meeting of the Empowered Committee for Implementation of the Scheme "Awards & Fellowships and Outstanding and Meritorious Research Studies in Statistics" on 10 September 2009 at Sardar Patel Bhawan, New Delhi.
- II Meeting of the Working Group for the construction of Index Numbers of Area, Production and Yield of Agricultural Crops under the Chairmanship of ESA, Ministry of Agriculture, Govt. of India on 17 September 2009 at Krishi Bhawan, New Delhi.
- Meeting on Profile of Indian Scientists in Six Major Scientific Agencies under the Chairmanship of Sh. Rakesh Chetal, Advisor, DST, on 17 September 2009 at India International Centre (Annex), New Delhi.
- IV Meeting of the Technical Committee on FASAL under the Chairmanship of Principal Advisor, DES, Ministry of Agriculture, Govt. of India on 23 September, 2009 at Krishi Bhawan, New Delhi.
- Meeting with Sh. AK Mishra (Dy. Director), National Building Organization, Ministry of Housing and Urban Poverty Alleviation to discuss the result on Estimation of Slum Population on 29 September 2009 at IASRI, New Delhi.

#### Conferences/Workshops/Seminars/Trainings etc.

Scientists/Administrative/Finance Personnel participated in:

- Scientist of the Institute chaired the 1<sup>st</sup> meeting of Specialized Group for Revision

of Methodology in order to increase the coverage of data collection on meat production on 08 July 2009 in the Department of Animal Husbandry, Dairying and Fisheries at DMS Complex, New Delhi.

- 2<sup>nd</sup> National Conference on Innovation in Indian Science Engineering and Technology at N.P.L. during 17-19 July 2009.
- Workshop on Improvement of Statistical System in Kerala State organized by Kerala State Planning Board in association with the Department of Economics and Statistics on 20 August 2009 and also presented a paper.
- Training on Procurement Related Matters and Financial Management under NAIP on 12-13 August 2009 at NASC, New Delhi.
- Workshop on Information Technology Application in Horticultural Crops at CPRI, Shimla during 24-25 August 2009.
- Workshop on Study on Assessment of Future Human Capital Requirements in Agriculture organized by the Institute of Applied Manpower Research in collaboration with NAARM on 26 August 2009 at India Habitat Centre, New Delhi.

#### COMPUTING FACILITIES

##### Wide Area Network

- Internet services have been provided to the users and the website of IASRI is being updated regularly. This site has been visited 296207 times since 01 April 2008 and 662283 times since 05 September 2003.

#### SEMINARS DELIVERED

- Seminars in different areas of Agricultural Statistics and Computer Application were delivered. These seminars include presentations of salient findings of the completed research projects by the scientists, thesis/course seminars of students of M.Sc. and Ph.D. (Agricultural Statistics) and M.Sc. (Computer Application).

#### The details of Seminars Delivered

Category	Number
Student Course	07
Student Thesis	05
Scientist	03
<b>Total</b>	<b>15</b>

#### PUBLICATIONS

##### Research Papers

- Chandra, H and Chambers, R (2009). Multipurpose weighting for small area estimation. *J. Official Statist.*, **25**, 1-18.

- Jain, R, Minz, S and Ramasubramanian V (2009). Machine learning for forewarning crop diseases. *J. Ind. Soc. Agril. Statist.*, **63(1)**, 97-107.
- Kumar, Amit, Gandhi, RS and Paul, AK (2009). Genetic evaluation of lifetime traits in sahiwal cattle. *Ind. J. Dairy Sci.*, **62(1)**, 31-34.
- Parsad, Rajender, Nandi, PK, Bhar, LM and Gupta, VK (2008). Outliers in multi-response experiments. *Statist. Appl.*, **6(1&2)**, 275-292.
- Paul, AK, Kundu, MG, Singh, S and Singh, Pal (2009). Heritability of growth curve parameters of pigs. *Ind. J. Anim. Sci.*, **79(7)**, 716-719.
- Paul, AK, Kundu, MG, Singh, S and Singh, Pal (2009). Some aspect of efficiency of early selection in pigs. *Ind. J. Anim. Sci.*, **79(7)**, 729-731
- Paul, S, Sethi, IC, Arora, Alka (2009). Decision support system for nutrient management in crops. *J. Ind. Soc. Agril. Statist.*, **63(1)**, 91-96.
- Sarkar, Susheel Kumar, Lal, K and Jha, GK (2009). Non-linear growth models for pigs. *Ind. Vete. J.*, **86**, 796-799.
- Singh, DK, Rajput, TBS, Sikarwar, HS, Sahoo, RN and Ahmad, T (2006). Performance of subsurface drip irrigation system with line source of water application in Okra field. *J. Agril. Engg.*, **43(3)**, 23-26.
- Singh, Okendro N, Alam, Wasi, Paul, AK and Kumar, Surinder (2009). Length-weight relationship and growth pattern of *Tor putitora* (Hamilton) under monoculture and polyculture systems: A case study. *J. Ind. Soc. Agril. Statist.*, **63(1)**, 85-90.
- Singh, Okendro N, Joshi, CB and Paul, AK (2009). Non-linear statistical models on estimation of maximum size of *Tor putitora* (Hamilton) in different aquatic environments. *Ind. J. Fish.*, **56(2)**, 103-106.
- Sood, Pankaj, Nanda, Amarjeet Singh, Singh, Narinder, Javed, Mohammed and Parsad, Rajender (2009). Effect of lameness on follicular dynamics in crossbred cows. *Veterinarski Arhiv.*, **79(2)**, 131-141.

##### Popular Articles

- Jeeva, JC, Khasim, DI, Srinath, K, Unnithan, GR, Murthy, KLN, Rao, MT, Bathla, HVL and Ahmad, T (2007). Post harvest losses at various marketing channels in inland fisheries sector. *Fishery Technology*, **44(2)**, 213-220.
- Jeeva, JC, Khasim, DI, Srinath, K, Unnithan, GR, Rao, MT, Murthy, KLN, Bathla, HVL and Ahmad, T (2006). Harvest losses at various resources of inland fisheries. *Fishery Technology*, **43(2)**, 218-223.

### Book Chapters

- Parsad, Rajender, Handa, BR and Deepika (2009). Additional applications of multivariate techniques. Block 8 (Unit 24: Principal Component Analysis; Unit 25: Factor Analysis; Unit 26: Canonical Correlation and Unit 27: Conjoint Analysis) MMAC-023: Probability and Statistics (8 credits) for M.Sc. in Mathematics with Applications to Computer Science, IGNOU, New Delhi.

### Technical Bulletin

*IASRI...an era of excellence 1959-2009.*

### Research Papers Presented in the Conference

- Workshop on Improvement of statistical system in Kerala State organized by Kerala State Planning Board in association with the Department of Economics and Statistics on 20 August 2009:
  - Sud, UC. Small area estimation- Some applications in India.
- Workshop on Improvement of Agricultural Statistics at NASC Complex organized by Directorate of Economics and Statistics during 11-12 August 2009:
  - Ahmad, T. Causes of variation between official and trade estimates of cotton production: A statistical investigation.
  - Sahoo, Prachi Misra. Remote sensing and GIS based methodology for crop acreage estimation in north eastern hilly regions.
- 57<sup>th</sup> Session of the International Statistical Institute (ISI 2009) conference, Durban, South Africa, 16-22 August 2009 in association with the Department of Economics and Statistics on 20 August 2009:
  - Chambers, R, Chandra, H, Salvati, N and Tzavidis, N. Outlier robust small area estimation.
- National level workshop cum seminar on Indian commodity market derivatives and risk management-The Road Ahead held at Puducherry during 11-12 Sept., 2009:
  - Bhardwaj SP and Vasisht, AK. Price discovery in commodity markets-A case study of gram.
- National Symposium on Advances in Geo-Spatial Technologies with Special Emphasis on Sustainable Rainfed Agriculture and Annual Convention of Indian Society of Remote Sensing (ISRS) during 17-19 September, 2009 held at Nagpur:
  - Sahoo, Prachi Misra and Kapoor, Nitika. Extraction of information under cloud cover from satellite image using kriging.
  - Sahoo, Prachi Misra and Kundu, Seema. Web based mapping using ARCIMS.



A view of Brainstorming Session on Establishment of Centre of Bioinformatics in Agriculture

### Saleable Technologies

- Statistical Package for Factorial Experiments (SPFE 1.0)
- Statistical Package for Agricultural Research (SPAR 2.0)
- Statistical Package for Augmented Designs (SPAD)
- Statistical Package for Block Designs (SPBD 1.0)
- Statistical Package for Animal Breeding (SPAB)
- Software for Survey Data Analysis (SSDA 1.0)



A view of Annual Day Celebration of the Institute. The Chief Guest Releasing the IASRI Publication

## CONSULTANCY/ADVISORY SERVICES

- Dr. Sunil Jha, Senior Scientist, Division of Post Harvest Technology, IARI, New Delhi was advised on the analysis of data pertaining to an experiment conducted to study the firmness of 8 hybrid mango cultivars at different storage days (first day to 15 days at unequal intervals). The experiment was conducted using 3 replications. Due to unequal days interval, the data were non-orthogonal with three classifications. The data were analyzed using three way classified data. In the analysis hybrids, storage days and their interaction were found to be significant.
- Dr. Shiv Datt, Senior Scientist (Genetics) from Regional Research Station (RRS), Pali, Central Arid Zone Research Institute (CAZRI), Jodhpur was advised on generation of randomized layout of an Augmented Randomized Complete Block design for 35 test and 3 check entries in 6 blocks.
- Dr. Sujay Rakshit, Principal Scientist, NRC Sorghum, Hyderabad was advised on use of alpha design for AVHT and IVHT trials to be conducted under the aegis of All India Co-ordinated Sorghum Improvement Programme. The different randomized layouts of alpha design with  $v = 33$ ,  $b = 9$ ,  $r = 3$ ,  $k = 11$  were provided for 16 locations of IVHT. He was also advised on the generation of randomized layout of alpha designs with parameters (i)  $v = 28$ ,  $b = 4$ ,  $r = 3$ ,  $k = 7$  (AVHT Shallow soil) and (ii)  $v = 16$ ,  $b = 2$ ,  $r = 3$ ,  $k = 8$  (AVHT Deep soil) using Design Resources Server.
- Chanchal Pramanik, M.Sc. (Agricultural Statistics) student from Department of Statistics & Mathematics, Acharya N.G. Ranga Agricultural University, Rajendranagar, Hyderabad was provided the randomized layout of a square lattice design in 196 treatments in 3 replications. He was also advised on the steps of analysis of data using the link Resolvable Block Design on the page "Analysis of Data" available on the Design Resources Server.
- Dr. C. Chattopadhyay, Head, Division of Crop Protection, IIPR, Kanpur was advised on Cluster analysis for 13 *Alternaria brassica* isolates for mustard crop.

## PERSONNEL

### Transfer

Name	To	Effective Date
Sh. Anil Kumar T-4	ICAR, Research Complex for Eastern Region, Patna, Bihar	25-08-2009

### Wish you Happy and Healthy Retired Life

Name	Designation	Effective Date
Sh. PK Azad	T-6	31-07-2009
Sh. Hemant Kumar	Skilled SS	31-07-2009
Sh. Balbir Singh	Scientist(SG)	31-08-2009
Sh. PS Mann	LDC	31-08-2009
Dr. IC Sethi	Principal Scientist	30-09-2009

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