From Director's Desk . . . . .

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

Neighbour Balanced Block (NBB) designs for two factors in a plot that are strongly neighbour balanced for one factor have been obtained.

A web based information system on functional elements of rice genome has been developed. Online facilities have been created to access the information on Single Nucleotide Polymorphisms (SNPs) at functional elements.

The spatial market integration studies for important cereals, oil seeds, edible oils and pulses on the wholesale price of data from 1996 to 2008 revealed that the integration among the markets had improved over the recent years. The prices of agricultural commodities tend to converge among a few selected state-level wholesale markets in India.

Developed an online management system for PG School, IARI, New Delhi. The system is available to students, faculty members, scientists and administrative staff of PG School, IARI. It has five sub modules for management of Courses, Students, Faculty, Aministration and e-Learning.

As an outreach activity of the Institute organized a Travel Workshop on Experimental Designs in collaboration with ANGRAU, Hyderabad for 92 participants. A Refresher Course on Applications of Information Technology in Statistical Computing and Data Dissemination Techniques and 21 days Winter School on Bioinformatics and Statistical Genomics were organised.

Two International Training Programmes on Applications of Remote Sensing and GIS in Agricultural Surveys for Afro Asian Rural Development Organization (AARDO) and on Advances in Design and Analysis of Experiments for ICARDA, Aleppo Syria were organised.

Seven Research Papers and one Popular Article have been published during the period.

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)

निदेशक की कलम से...

प्रस्तुत समाचार पत्र में प्रतिवेदनाधीन अवधि के दौरान संस्थान की प्रमुख अनुसंधानिक एवं प्रशिक्षण उपलब्धियों के साथ-साथ विभिन्न महत्त्वपूर्ण गतिविधियों पर प्रकाश डाला गया है।

दो कारकों वाली परीक्षणात्मक परिस्थितियों के प्रतिवेशी सन्तुलित ब्लॉक (एन.बी.बी.) अभिकल्पनाएँ प्राप्त की गयी हैं जो एक कारक के लिए प्रतिवेशी सन्तुलित है।

चावल जीनोम के फलन-अवयवों पर एक वेब आधारित सूचना-तंत्र विकसित किया गया है। फलन-अवयवों पर सिंगल न्यूक्लियोटाइड पॉलीमॉर्फ़िज़्म (SNPs) पर सूचना प्राप्त करने के लिए ऑन-लाइन सुविधाएँ उपलब्ध करायी गयी हैं।

महत्वपूर्ण खाद्यान्नों, तिलहनों, खाद्य-तेलों एवं दलहनों की वर्ष 1996 से 2008 तक की थोक कीमत पर किये गये स्पेशियल मार्केट इन्टीग्रेशन अध्ययनों से ज्ञात हुआ कि हाल ही के वर्षों में बाजारों के बीच एकीकरण में सुधार हुआ है। कृषि-वस्तुओं की कीमतों में भारत के कुछ चुने हुए राज्य स्तर के थोक बाजारों के बीच अग्रसरित होने की प्रवृत्ति है।

पी.जी. स्कूल, भा.कृ.अ.सं., नई दिल्ली के लिए एक ऑन-लाइन प्रबन्धन-तंत्र विकसित किया गया। यह तंत्र पी.जी. स्कूल, भा.कृ.अ.सं. के छात्रों, संकाय सदस्यों, वैज्ञानिकों एवं प्रशासनिक कर्मियों के लिए उपलब्ध है। इसमें पाठ्यक्रमों के प्रबन्धन, छात्रों, संकाय, प्रशासन एवं ई-लर्निंग के लिए पाँच माड्यूल हैं।

संस्थान की प्रसार गतिविधि के रूप में ए.एन.जी.आर.ए.यू., हैदराबाद के सहयोग से परीक्षणात्मक अभिकल्पनाओं पर एक ट्रैवल वर्कशाप आयोजित की गयी। इसमें 92 प्रतिभागियों ने सहभागिता की। सांख्यिकीय संगणना एवं आँकड़ों के प्रसार की तकनीकों में सूचना प्रौद्योगिकी के अनुप्रयोग पर एक पुनश्चर्या पाठ्यक्रम तथा जैव-सूचना एवं सांख्यिकीय जीनोमिक्स पर एक 21 दिवसीय शीतकालीन स्कूल आयोजित किया गया।

एफ्रो एशियन रूरल डिवेल्पमेन्ट ऑर्गनाइजेशन (ए.ए.आर.डी.ओ.) के लिए कृषि-सर्वेक्षणों में सुदूर संवेदन एवं जी.आई.एस. के अनुप्रयोग पर तथा आई.सी.ए.आर.डी.ए., एलिप्पो, सिरिया में अभिकल्पना एवं परीक्षणों के विश्लेषण पर अन्तरराष्ट्रीय कार्यक्रम आयोजित किये गये।

इस अवधि के दौरान सात शोध-पत्र तथा एक लोकप्रिय लेख प्रकाशित किया गया।

संस्थान द्वारा अनेक बैठकों/सम्मेलनों/संगोष्ठियों/कार्यशालाओं इत्यादि में सहभागिता की गई। आशा है कि इस अंक की विषय-वस्तु नार्स (NARS) में कार्यरत वैज्ञानिकों के लिए सूचनाप्रद एवं उपयोगी सिद्ध होगी। इस समाचार पत्र की विषय-वस्तु में भावी सुधार लाने के लिए आपके सुझावों का स्वागत है।

(विजय कुमार भाटिया)

RESEARCH ACHIEVEMENTS

- **Neighbour Balanced Block Designs**

The concept of Neighbour Balanced Block (NBB) designs has been defined for the experimental situation where the treatments are the combinations of levels of two factors and only one of the factor exhibits neighbour effect. Some methods of constructing complete NBB designs for two factors in a plot that are strongly neighbour balanced for one factor have been obtained. These designs are variance balanced for estimating the direct effects of contrasts pertaining to combinations of levels of both the factors. An incomplete NBB design for two factors has also been obtained which is partially variance balanced with three associate classes.

- **Supersaturated Designs**

Supersaturated designs are useful for the experimental situations where the number of experimental units are less than the number of parameters to be estimated. In such experimental situations, it is quite common that an experimenter begins the experiments with the efficient design for the number of experimental units available at that point of time, say n. After the initiation of the experiment, additional resources become available and the experimenter can afford to include r more experimental units such that $n+r$ is still less than the number of parameters to be estimated. A procedure of selecting the additional runs so as the new design obtained after augmenting the original design is also efficient in $n+r$ runs has been developed for two level supersaturated designs (SSDs).

- **SNP's in Rice Genome**

Rice is the first crop to be sequenced and has a great impact in the field of crop genomics. Rice genome has about 390 million bases and its genomic information is quite useful in elucidating the genome structure and target genes in other crops. A web based information system on functional elements of rice genome has been developed. Online facilities have been created to access the information on Single Nucleotide Polymorphisms (SNPs) at functional elements. Visual graphic display tools have also been developed to annotate SNPs at different functional elements of genome. Web information system on rice functional elements facilitates users to extract sequence information on promoter regions, untranslated regions, translation start sites, splice sites, exons, introns, translation stop sites, etc. A special emphasis is given on Splice Store, which is a collection of 5 prime and 3 prime splice sites. Information on classification of splice sites, position weight matrices, phylogenetic relationships etc. is also provided in the Splice Store. A SNP-centric functional elements database is developed by integrating information on SNPs and functional elements. Online access facilities are provided to study the distribution of SNPs at functional elements of rice genome. Computational analysis of SNPs at genes, exons, 1K upstream, splice sites, coding sequence (CDS) and untranslated

regions reveals that more SNPs are present on chromosome 2 followed by chromosome 1. Light Weight Genome Viewer based visual graphic display of functional elements, SNPs on genome and SNPs at various functional elements have also been developed. An online BLAST facility is developed and provided to users for sequence alignment purposes. Few important links for analysis of genome and proteome data are collected and given at one place.

- **Market Integration Studies**

  Spatial market integration was studied using advanced econometric tools namely Augumented Dickey Fuller technique for testing stationarity of time series, Johansen's Co-integration method for finding the cointegrating vectors and Vector Error Correction mechanism for finding out the speed of adjustment of price series to equilibrium for important cereals, oilseeds, edible oils and pulses using time series data on wholesale prices for the period 1996 to 2008. The analysis revealed that the integration among the markets had improved over the recent years. The prices of agricultural commodities tend to converge among a few selected state-level wholesale markets in India. Further, the speed of convergence to the long-run path resulting from a shock in price was slow in case of almost all the selected commodities except paddy and wheat. The minimum support price and procurement policy were effectively implemented in rice and wheat crops which ensured price stability and stronger market integration. Similarly these schemes may be effectively implemented in other crops along with development of infrastructure and market intelligence to ensure better market integration.

- **Intranet Solutions for PG School, IARI, New Delhi**

  PG School, IARI is a deemed University and has 25 disciplines in which Masters and Doctorate degrees are awarded. The present system for PG School activities involves manual processing of various activities. As the disciplines of PG School are physically scattered, a lot of time is wasted and also requires additional paper work. One has to contact the concerned offices and disciplines of PG School to get or submit a piece of information. The collection and dissemination of information is not readily available easily. To take the advantage of advances in the Internet technologies and the available network infrastructure a online management system for PG School, IARI has been developed under project "Intranet Solutions for PG School, IARI". The system helps in achieving the PG School objectives by giving online access to various resources. The system is available to students, faculty members, scientists and administrative staff of PG School, IARI. It has five sub modules for management of Courses, Students, Faculty, Aministration and e-Learning.

AWARDS AND RECOGNITIONS

- Expert System on Wheat Crop Mangement for bridging the gap between experts and farmers by providing knowledge based redressal information, received Manthan Award South Asia 2009. Details can be viewed at

  http://www.manthanaward.org/ section_synopsis.asp?id=190&pno=2

- Dr. Rajender Parsad was invited as Consultant Biometrician by ICARDA, Syria to conduct an International Training Programme on Advances in Design and Analysis of Experiments.

- Dr. Anil Kumar was nominated as Member of Board of Studies for the Discipline of Statistics of Kumaun University, Nainital.

HUMAN RESOURCE DEVELOPMENT

- Conducted a Travel Workshop on Experimental Designs in collaboration with ANGRAU, Hyderabad for the scientists and teachers of ANGRAU, Hyderabad at RARS, Tirupati during 05-06 October 2009. Dr. Rajender Parsad from IASRI co-ordinated the Workshop. Faculty members for this workshop were Dr. VK Gupta, Dr. Rajender Parsad and Dr. LM Bhar. Workshop was inaugurated by Dr. T. Yellamanda Reddy, Director (Planning and Monitoring), ANGRAU, Rajendranagar, Hyderabad. The workshop was attended by 92 participants. Views of the participants were also taken on statistical problems encountered in their experimentation. Major issues that came up were: (i) How to analyze the data from on-farm trials conducted over years? (ii) How to take samples for estimation of yield per hectare from large plots in experiments on cultivator's fields? (iii) How to handle large variation in both directions of experimental plots due to soil depth, elevation under rain-fed conditions? and (iv) How to handle the variability within plots? The participants also felt that in future programmes, separate homogeneous groups according to the disciplines should be formed and the examples from disciplines pertaining to that group should be included for a given group.

- One day Study Visit was organized on 13 October 2009 at Institute on Functions and Activities of Institute for the participants of 63rd regular course of International Statistical Education Centre (ISEC), Kolkata on Official Statistics and Related Methodology conducted by National Academy of Statistical

Administration (NASA) from 05 October to 13 November 2009. The participants were from seven countries. Dr. Seema Jaggi was facilitator for this visit.

- A Refresher Course on Applications of Information Technology in Statistical Computing and Data Dissemination Techniques was organised for thirteen in-service ISS officers and senior officers of State Governments/UT for CSO during 26-30 October 2009. Dr. R.C. Goyal was the Course Director for the Refresher Course.

- संस्थान की राजभाषा कार्यान्वयन समिति की 20 जुलाई, 2009 को हुई बैठक में लिये गये निर्णय के अनुसार संस्थान द्वारा "भारत में फसल आकलन सर्वेक्षण" विषय पर दिनांक 07 नवम्बर, 2009 को एक-दिवसीय कार्यशाला का आयोजन किया गया। इस कार्यशाला के आयोजन में डा. उमेश चन्द्र सूद ने संयोजक तथा डा. कृष्ण कान्त त्यागी ने सह-संयोजक के रूप में कार्य किया। यह कार्यशाला दो तकनीकी सत्रों में आयोजित की गई: तकनीकी सत्र-1: (i) भारत में फसल आकलन सर्वेक्षण-दृष्टिपात (ii) फसल आकलन सर्वेक्षण-आकड़ो की गुणवत्ता (iii) फसल उत्पादन आकलन-वर्तमान परिदृश्य एवं तकनीकी सत्र-2: (i) फसल कटाई प्रयोग की विधि (ii) सुदूर संवेदन पद्धति एवं भौगोलिक सूचना तंत्र द्वारा फसल क्षेत्रफल का आकलन (iii) फसल आकलन सर्वेक्षण – उत्तर प्रदेश राज्य के अनुभव (iv) लघु क्षेत्र स्तर पर फसल उपज आकलन पर विचार विमर्श किया गया। कार्यशाला की मुख्य अनुशंसाएँ: (1) फसल पैदावार के आकलन के लिए राज्य सरकारों द्वारा आयोजित फसल

कटाई परीक्षणों (सी.सी.ई.) की संख्या बढ़ रही है, जिससे आँकड़ों की गुणवत्ता पर विपरीत प्रभाव पड़ रहा है । अतः फसल कटाई परीक्षणों (सी.सी.ई.) की संख्या को कम करने के प्रयास करने चाहिए। इसके लिए जिला स्तर से कम स्तर पर अर्थात सामुदायिक विकास खंड/ग्राम पंचायत स्तर पर लघु क्षेत्र आकलन तकनीकों का प्रयोग किया जाना चाहिए (2) कृषि मंत्रालय द्वारा फसल उत्पादन के लिए अपनाई जाने वाली विधि के स्थान पर उचित सांख्यिकीय तकनीकों का प्रयोग करके एक उद्देश्यात्मक विधि का प्रयोग करने की आवश्यकता है (3) फसल कटाई सर्वेक्षण के संचालन के अन्तर्गत, अनाज के उत्पादन के साथ-साथ फसल अवशेषों के उत्पादन को भी मापा जाना चाहिए एवं (4) पहाड़ी/उत्तर पूर्वी पहाड़ी राज्यों में, जहाँ ज्यादातर क्षेत्र

दुर्गम हैं, वहाँ भौगोलिक सूचना तंत्र (जी.आई.एस.) उपकरणों के साथ सूदूर संवेदन तकनीकों का प्रयोग करके फसल क्षेत्र आकलन किये जाने चाहिएँ।

- An International Training Programme on Applications of Remote Sensing and GIS in Agricultural Surveys sponsored by Afro Asian Rural Development Organization (AARDO) was organized at the Institute, during 06-25 November 2009. Dr. Anil Rai was the Course Director of the training programme. There were 08 participants from China, Ethiopia, Pakistan, Sudan, Syria and Nigeria.

- Dr. Rajender Parsad conducted an International Training Programme on Advances in Design and Analysis of Experiments at ICARDA, Aleppo Syria during 08-19 November 2009. He was invited as Consultant with its Computer Biometrics Services Unit and served as Course Director of training programme. He delivered 30 lectures during the training programme. Sh. Khaled-El-Shamma from ICARDA, Syria acted as Course Co-Director. The training programme was attended by 15 participants from National Agricultural Research Systems of Iraq, Iran, Azerbaijan, Sudan, Jordan, Uzbekistan, Lybia and Syria.

- 21 days Winter School on Bioinformatics and Statistical Genomics was organised during 17 November to 07 December 2009. The main objective was to train individuals at the interface of genomic, computational and statistical sciences. The course was structured in a series of modules on preliminaries, introduction to LAMP technology, bioinformatics and statistical genomics, covering important topics on biological databases, sequence alignments, genome browsers, SNPs, comparative genomics, machine learning approaches, HMMs, proteomics, QTLs, Marker Assisted Selection, Analysis of Molecular Variance

(AMOVA), Whole Genome Association (WGA) and bioinformatics software and tools. A total of 25 participants from ICAR institutes / SAUs representing 13 states, cutting across different disciplines like Molecular Biology & Biotechnology, Biochemistry, Breeding & Genetics, Computer Application, Statistics and Microbiology, participated in the Winter School. Dr. B.C. Barah, Director, NCAP was the Chief Guest for the inaugural session and Dr. Arvind Kumar, Deputy Director General (Education), ICAR was the Chief Guest for the valedictory session. Dr. A.R. Rao was the Course Director for the Winter School.

- Organized Symposia on (i) Statistical and Computational Genomics (ii) Statistical and Informatics Perspective of Climate Change on 03 December 2009 during 63rd Annual Conference of Indian Society of Agricultural Statistical held at Department of Statistics, Mathematics and Computer Application, Rajendra Agricultural University, Samastipur, Pusa, Bihar.
- Workshop of the project on Evaluation of Rationalization of Minor Irrigation Statistics Scheme was organized by the Institute.
- Sensitization Workshop relating to Online Management System for PG School was organized at IARI on 07 December 2009.

PARTICIPATION OF INSTITUTE
Conference/Workshop/Symposia/Training etc.
Various Scientists and Technical Personnel of the Institute participated in:

- One day workshop of CeRA sponsored by National Agricultural Innovation Project, ICAR, New Delhi at Central Agricultural Research Institute, Portblair (AN) on 22 October 2009.
- Brain Storming session on Agricultural Waste Management, convened by Dr. NSL Srivastava, Joint Director, SPRERI, Gujarat under the ageis of National Academy of Agricultural Sciences at NASC Complex, New Delhi during 23-24 October 2009.
- Winter School on Decision Making in Agriculture using Data Mining at National Centre for Agricultural Economics and Policy Research (NCAP), New Delhi on 27 October 2009.
- National Workshop on Sampling Design and Survey Methodology to Study Socio-economic Conditions of Fishers and Fish Farmers in India at Central Institute of Brackish Water Aquaculture (ICAR) at Chennai on 13 November 2009.
- 17th Annual Conference of Agricultural Economics Research Association (AERA) at TNAU, Coimbatore during 19-21 November 2009.
- One day Workshop on Achieving Food Security in India: Improving Competition, Markets and the Efficiency of Supply Chains on 24 November 2009 at New Delhi.
- FAI Annual Seminar held at Hyderabad during 3-5 December 2009.
- 19th Group workers meeting of AICRP(STF) at BSKKV, Dapoli during 14-17 December 2009.
- Three days workshop-cum-training programme on Bioinformatics Applications in Crop Science at IARI during 21-23 December 2009.

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 376438 times since 01 April 2008 and 741978 times since 05 September 2003.

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

The details of Seminars Delivered		
Category	Type of seminar	Number
Student	Course	14
	Thesis	04
Scientist		03
Guest		02
Total		**23**

Guest seminars were delivered by Dr. PK Gupta, Emeritus Professor, Ch. Charan Singh University, Meerut and Prof. Prem Narain, Former Director, IASRI.

INVITED LECTURES DELIVERED
Various Scientists of the Institute delivered invited lectures at other organisations:

- Dr. Rajender Parsad delivered a lecture on Statistical Designing and Analytical Techniques for Varietal Trials to the participants of the training programme in the area of Vegetable Variety Development and Evaluation for the officials of Ministry of Agriculture, Iraq sponsored by Food & Agriculture Organisation of United Nations held at IARI, New Delhi during 15 September - 14 October 2009.
- Dr. VK Bhatia delivered a lecture on Sampling Design and Methodology to Assess the Socio-Economic Conditions of Fishers and Fish Farmers in India during 12-14 November 2009 at Central Institute of Brackishwater Aquaculture, Chennai.
- Dr. Seema jaggi delivered two lectures on Statistical Methods for Microbiology and SPSS for Analysis of Experimental Data during a Winter School organized by Division of Microbiology, IARI, New Delhi during 17 November - 07 December 2009.

PUBLICATIONS
Research Papers Published
- Choudhary, SK, Rao, AR, Wahi, SD and Prabhakaran, VT (2009). Performance of simultaneous selection index against missing observations in genotype x environment data. *ICFAI University J. Genet. Evol.*, **2(4)**, 36-42.
- Gupta, VK, Singh, Poonam, Kole, Basudev, Parsad, Rajender (2009). Construction of efficient unbalanced mixed-level supersaturated designs. *Statist. Probab. Lett.*, **79**, 2359-2366.
- Panwar, Sanjeev, Sharma, SC, Kumar, Anil and Kaul, Sushila (2009). State-wise analysis of onion production in India using non-linear approach. *Agril. Situation India,* **65(1),** 689-698.
- Sarkar, Susheel Kumar, Lal, Krishan, Parsad, Rajender and Gupta, VK (2009). Generation of linear trend free designs for factorial experiments. *J. Ind. Soc. Agril. Statist.*, **63(2)**, 165-174.

- Singh, Surendra, Bhar, LM, Paul, AK and Shivaramane, N (2009). Modeling for growth pattern in cross breeding cattle along with auto-correlation. *J. Ind. Soc. Agril. Statist.*, **63(2)**, 159-164.
- Varghese, Cini, Dwivedi, Lokesh and Jaggi, Seema (2009). Factorial change over designs for two non-interacting factors. *J. Statist. Theo. Appli*, **8(3)**, 311-323.
- Yadav, Dinesh Kumar, Singh, Gurmej, Jain, Anand, Singh, Surendra and Paul, AK (2009). Fitting of growth models and evaluation of Marwari sheep under field conditions. *Ind. J. Anim. Sci.*, **79(12)**, 1242-1244.

Popular Article

- कुमार, अनिल एवं बाना, आर.एस.। पशुपालन एवं भारतीय अर्थव्यवस्था : एक नजर में, *आई.वी.आर.आई.स्मारिका।*

PAPERS PRESENTED IN CONFERENCES

- One day seminar on Commodity Derivative Markets: Opportunities and Challenges organized by Takshashila Academia of Economic Research Limited and Institute of Studies in Industrial Development at New Delhi on 30 October 2009.
  - Vasisht, AK. An econometric analysis of efficiency of agricultural commodity futures market and price discovery.
- 23rd National Conference of Indian Society of Agricultural Marketing at CRIDA, Hyderabad during 12-14 November 2009.
  - Bhardwaj, SP and Vasisht, AK. Strategic measures to meet marketing challenges in the changing scenario of liberalisation.
  - Vasisht, AK and Bhardwaj, SP. Price dynamics of agricultural commodity futures and its impact on demand-supply situation of agricultural commodities.
  - Bhardwaj, SP. Innovative models to reap market incentives.
- 63rd Annual Conference of Indian Society of Agricultural Statistics held at RAU, Pusa, Bihar during 03-05 December 2009.

Technical Address

- Bhatia, VK. Growth of quantitative genetics and estimation of genetic parameters.

Invited Talks

- Bhatia, VK. Bio-informatics in agriculture. Symposium on Statistical and Computational Genomics.
- Parsad, Rajender, Gupta, VK and Sarkar, Ananta. Design and analysis of microarray experiments. Symposium on Statistical and Computational Genomics.
- Bhatia, VK. Modelling climate effects. Symposium on Statistical and Informatics Perspectives of Climate Change.
- Parsad, Rajender, Gupta, VK and Malhotra, RS. Experimental designs for mitigation and adaptation strategies of climate change. Symposium on Statistical and Informatics Perspectives of Climate Change.
- Rai, Anil, Chaturvedi, KK and Malhotra, PK. Spatio-temporal data mining for monitoring of climate change. Symposium

A View of International Training Programme Sponsored by AARDO

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 2.0)

A View of International Training Programme Organised at ICARDA, Aleppo Syria

on Statistical and Informatics Perspectives of Climate Change.

Contributed Papers
- Wahi, SD and Rao, AR. Some investigations on sampling variance of genetic correlation
- Paul, AK, Singh, Mohan Das and Wahi, SD. Some investigation on the statistical properties of goodness of fit criteria of non-linear growth curves through bootstrap technique.
- Arnab, R and Sud, UC. A note on variance estimation of ratio estimator under two phase sampling.
- Singh, Jagbir. Estimation from independent sub samples of a population.
- Arya, Prawin, Vasisht, AK, Shivaramane, N and Singh, DR. Market investigation in coarse cereals in India: A case of maize and jowar.
- Kaul, Sushila. Implications of global warming on agricultural production in India.
- Agrawal, Ranjana, Chandrahas and Kausav, Aditya. Use of discriminant function analysis for forecasting wheat yield.
- Ramasubramanian, V, Bhatia, VK, Kumar, Amrender, Pal, Satya and Premi, Sarvesh Kumar. Forecasting technological needs in genetics and plant breeding for sustainable agriculture.
- Workshop of AICRP on LTFE at IGKV, Raipur during 06-08 December 2009.
  - Sehgal, DK. Superimposition/ bifurcation of treatments in long term fertilizer experiments.
- CSISA Experimental Platform meeting held at ICAR-RCER Patna during 14-16 December 2009.
  - Parsad, Rajender. Designs of experiments with emphasis on CSISA Experimental Platform (Invited talk)
- International Conference on Artificial Intelligence (IICAI 09) held at Tumkur, Bangalore during 16-18 December 2009.
  - Sudeep. Disease and pest identification in crops – A semantic Web approach.
  - Arora, Alka, Upadhyaya, Shuchita, Jain, Rajni. Approach for mining multiple patterns from clusters.

- Humanising Work and Work Environment 2009 Conference held at Kolkata during 17-19 December 2009.
  - Gite, LP, Tiwari, PS, Abhijit Khadatkar (CIAE) and Tyagi, KK, Bathla, HVL and Kher, KK. Farm machinery accidents in Indian agriculture.
- Dissemination Workshop on Mixture Experiments: Theory and Applications, jointly organized by Department of Statistics, Calcutta University and Department of Statistics, Kalyani University at BCKV, Kalyani during 21-22 December 2009.
  - Parsad, Rajender. Applications of mixture designs
  - Lal, Krishan and Gupta, VK. Efficient mixture designs with process variables in agriculture.
  - Batra, PK, Alam, N and Parsad, Rajender. Designs for multi-factor mixture experiments.
- 7th International Triennial Calcutta Symposium on Probability & Statistics at the University of Calcutta during 28-31 December 2009.
  - Chandra, H and Chambers, R (2009). Small area estimation for skewed data in presence of zeros.

ADVISORY SERVICES
A Ph.D. (Animal Genetics and Breeding) student from NDRI, Karnal was advised on fitting of Multiphasic Logistic Function on milk yield of Karanfries cows over time period. The steps for fitting the function using SAS were also explained.

PERSONNEL
Congratulations on your Promotion

Name	Promoted to	Effective Date
Sh. Udaiveer Singh	T-6	01.01.2009
Smt. Shakuntla Devi	T-4	12.08.2009

Wish you Happy Retired Life

Name	Effective Date
Sh. Purushottam Sharma, S.S.S.	31.10.2009
Sh. Om Prakash, T-6	31.11.2009
Sh. AK Chaturvedi, O.S.D.	31.12.2009