IASRI

ANNUAL REPORT

2011-12

INDIAN AGRICULTURAL STATISTICS RESEARCH INSTITUTE
(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)
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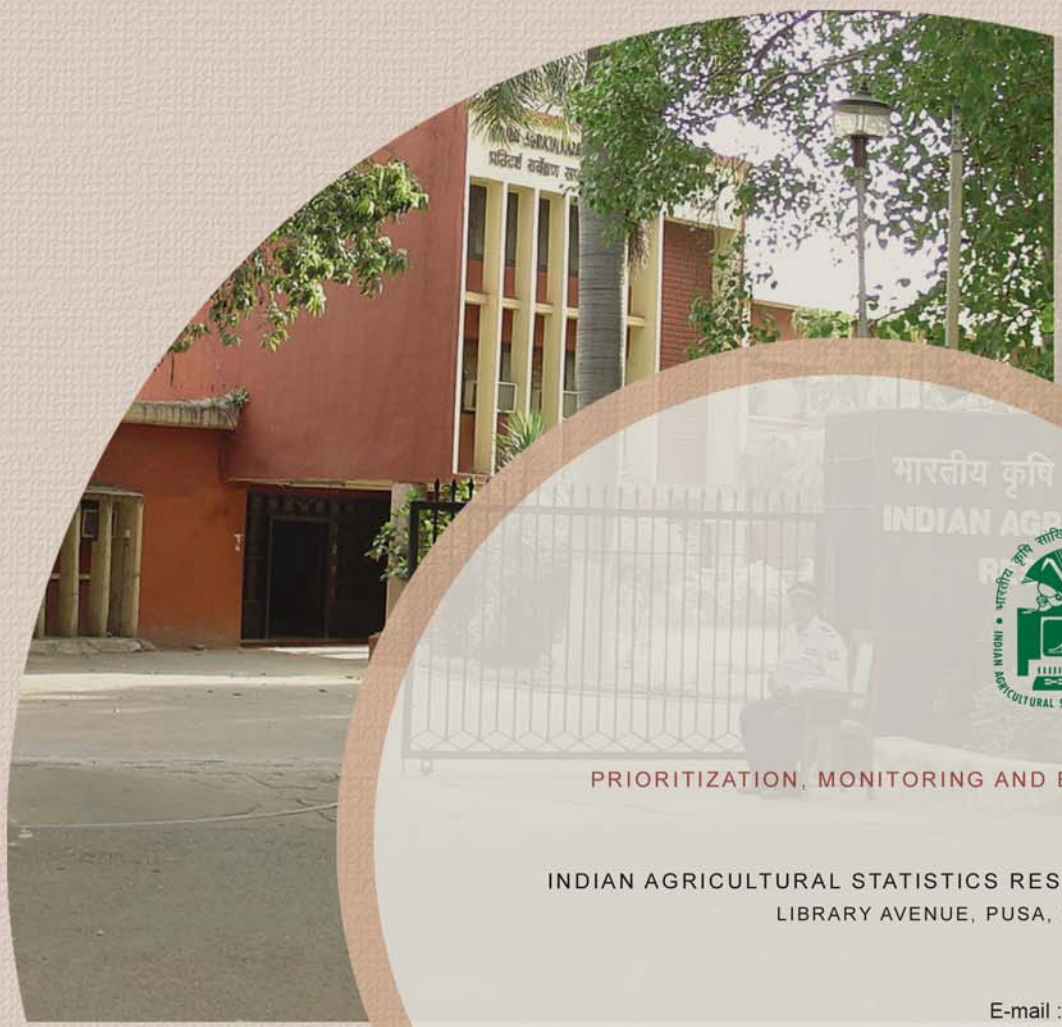

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Dr. V.K. Bhatia	August 2008 onwards

Preface

It gives me immense pleasure in bringing out the Annual Report 2011-12 of the Indian Agricultural Statistics Research Institute (IASRI). The present report highlights some of the glimpses of the research achievements made, new methodologies developed, significant advisory and consultancy services provided, dissemination of knowledge acquired and human resource development. The scientists, technical personnel, administrative, finance and other staff of the Institute have put in their best efforts in fulfilling the mandate of the Institute.

To fulfill objectives and mandate of the Institute, the research was carried out under 72 research projects in the Institute (01 National Professor Scheme, 35 Institute funded, 16 funded by other outside agencies and 20 in collaboration with other Institutions). 18 projects have been completed and 34 new projects have been initiated.

The Institute has successfully implemented its flagship programme on Strengthening Statistical Computing for NARS, which have paved the way for statistical thinking and publishing research papers in high impact factor journals. For providing service oriented computing, Indian NARS Statistical Computing portal has been strengthened by adding the link of augmented block designs. Web based Softwares Statistical Package for Agricultural Research (SPAR 3.0), Software for Survey Data Analysis (SSDA 2.0) and Web based generation and analysis of Partial Diallel Crosses (WebPDC) have been developed. For Half-Yearly Progress Monitoring (HYPM) of the Scientists in ICAR, web based software for online submission of half yearly progress report of the scientists has been designed and developed. Extended group divisible designs, fractional factorial plans and appropriate statistical techniques have been recommended to researchers of NARS through advisory services.

Twenty one training programmes were organised (Two under Center of Advanced Faculty Training; two Winter Schools; one for officials of Andhra Pradesh; one for ISS Probationers, one for CSO officials; three International Training programmes, one for Sri Lankan participants and two sponsored by AARDO; Nine training programmes under various research projects and two other training programmes through outsourcing). In all 437 participants were trained in these training programmes. Five Sensitization-cum-Training Workshops were organised for Nodal officers of HYPM, three for Nodal Officers under NISAGENET, one Workshop under PIMS-ICAR, one under NAIP Consortium SSCNARS and one under Evaluation of Agricultural Census Scheme. Two Partners Meet under NAIP Consortium and one Interactive Meet were also organised. Institute also celebrated the Birth Centenary of Professor PV Sukhatme on 27 July 2011.

Scientists of the Institute published 90 research papers in National and International refereed Journals along with 20 popular articles, 11 book chapters, 38 projects/technical reports/reference manuals/leaflet brochures and 03 macros.

I am happy to note that some of our colleagues received academic distinctions during the year. Dr. VK Bhatia conferred upon the prestigious title of Sankhyiki Bhushan, Dr. Rajender Parsad received National Award in Statistics for Young Statistician, Dr. Prajneshu received Prof. PV Sukhatme Gold Medal Award, Dr. Yogita Gharde received Dr. GR Seth Memorial Young Scientist Award, Dr. Eldho Varghese received IARI Merit Medal, and Dr. Anil Kumar received Young Professional Award 2011.

The scientists of the Institute were deputed for presentation of their papers in various national/international conferences. This year three scientists were deputed to present their papers to Germany, Brazil and Ireland. Six scientists visited Germany, Philippines, Sri Lanka, Australia, USA and South Africa on different assignments.

This report has been compiled through collective efforts rendered by Heads of Divisions, scientists and other staff of the Institute. I wish to express my sincere appreciation to all of them for their devotion, whole-hearted support and cooperation in carrying out various functions and activities of the Institute.

I wish to express my sincere thanks to all my colleagues in Prioritization, Monitoring and Evaluation (PME) Cell for all their efforts in bringing out the Report in time and coordinating various activities.

It is expected that the scientists in NARS will be immensely benefited from the information contained in this publication. I look forward to any suggestions and comments for its improvements.

VK Bhatia

(VK Bhatia)
Director

Milestones

1930	• Statistical Section created under ICAR
1940	• Activities of the Section increased with appointment of Dr. PV Sukhatme
1945	• Re-organisation of statistical section into Statistical Branch as a centre for research and training in the field of Agricultural Statistics
1949	• Re-named as Statistical Wing of ICAR
1952	• Activities of Statistical Wing further expanded and diversified with the recommendations of FAO experts, Dr. Frank Yates and Dr. DJ Finney
1955	• Statistical Wing moved to its present campus
1956	• Collaboration with AICRP initiated
1959	• Re-designated as Institute of Agricultural Research Statistics (IARS)
1964	• Installation of IBM 1620 Model-II Electronic Computer
	• Signing of MOU with IARI, New Delhi to start new courses for M.Sc. and Ph.D. degree in Agricultural Statistics
1970	• Status of a full fledged Institute in the ICAR system, headed by Director
1977	• Three storeyed Computer Centre Building inaugurated
	• Installation of third generation computer system, Burroughs B-4700
1978	• Re-named as Indian Agricultural Statistics Research Institute (IASRI)
1983	• Identified as Centre of Advanced Studies in Agricultural Statistics and Computer Applications under the aegis of the United Nations Development Programme (UNDP)
1985–86	• New Course leading to M.Sc. degree in Computer Application in Agriculture initiated
1989	• Commercialization of SPAR 1.0
1991	• Burroughs B-4700 system replaced by a Super Mini COSMOS LAN Server
1992	• Administration-cum-Training Block of the Institute inaugurated
1993–94	• M.Sc. degree in Computer Application in Agriculture changed to M.Sc. in Computer Application
1995	• Centre of Advanced Studies in Agricultural Statistics & Computer Application established by Education Division, ICAR
1996	• Establishment of Remote Sensing & GIS lab with latest software facilities
	• Outside funded projects initiated
1997	• Senior Certificate Course in 'Agricultural Statistics and Computing' revived
	• Establishment of modern computer laboratories
	• First software in India for generation of design along with its randomised layout SPBD release 1.0
1998	• Four Divisions of the Institute re-named as Sample Survey, Design of Experiments, Biometrics and Computer Applications
	• Revolving Fund Scheme on Short Term Training Programme in Information Technology initiated
	• Training programmes in statistics for non-statisticians in National Agricultural Research System initiated

1999	• Strengthening of LAN & Intranet with Fibre optics & UTP cabling
	• Substantial growth in outside funded projects and training programmes
2000	• Two Divisions re-named as Division of Forecasting Techniques and Division of Econometrics
2001	• Data Warehousing activities (INARIS project under NATP) initiated
2002	• Development of PIMSNET (Project Information Management System on Internet) for NATP
2003	• Establishment of National Information System on Long-term Fertilizer Experiments funded by AP Cess Fund
	• Development of PERMISnet (A software for Online Information on Personnel Management in ICAR System)
	• First indigenously developed software on windows platform released Statistical Package for Factorial Experiments (SPFE) 1.0
2004	• National Information System on Agricultural Education (NISAGENET) Project launched
	• Training Programme for private sector initiated and conducted training programme for E.I. DuPont India Private Limited
	• E-Library Services initiated
2005	• Statistical Package for Augmented Designs (SPAD) and Statistical Package for Agricultural Research (SPAR) 2.0 released
	• Design Resources Server with an aim to provide E-advisory in NARS initiated
2006	• Organisation of International Conference on Statistics and Informatics in Agricultural Research
2007	• Establishment of Agricultural Bioinformatics Laboratory (ABL)
2008	• Software for Survey Data Analysis (SSDA) 1.0 released
2009	• Golden Jubilee Celebration Year of the Institute
	• Strengthening Statistical Computing for NARS initiated
	• Expert System on Wheat Crop Management launched
	• International Training Hostel inaugurated
2010	• Establishment of National Agricultural Bioinformatics Grid (NABG) in ICAR initiated
	• Division of Biometrics renamed as Division of Biometrics and Statistical Modelling
	• Division of Forecasting Techniques and Division of Econometrics merged to form Division of Forecasting and Econometrics Techniques
	• A new centre namely Centre for Agricultural Bio informatics [CABin] created
2011	• Maize AgriDaksh and Expert System on Seed Spices launched
	• Service Oriented Computing Services initiated
	• Strengthening Statistical Computing for NARS Portal initiated
	• M.Sc. degree in Bioinformatics initiated
2012	• Software for Survey Data Analysis (SSDA) 2.0 released

Vision

Statistics and Informatics for enriching the quality of Agricultural Research

Mission

Undertake research, education and training in Agricultural Statistics, Computer Application and Bioinformatics for Agricultural Research

Mandate

- To undertake basic, applied, adaptive, strategic and anticipatory research in Agricultural Statistics
- To conduct Post-Graduate teaching and in-service, customized and sponsored training courses in Agricultural Statistics, Computer Applications and Bioinformatics at National and International level
- To lead in development of Agricultural Knowledge Management and Information System for National Agricultural Research System
- To provide advisory and consultancy services for strengthening the National Agricultural Research System
- To provide methodological support in strengthening National Agricultural Statistics System

Executive Summary

Indian Agricultural Statistics Research Institute (IASRI) since its inception is mainly responsible for conducting research in Agricultural Statistics to bridge the gaps in the existing knowledge. The Institute has used the power of Statistics, as a science, blended judiciously with Informatics and has contributed significantly in improving the quality of Agricultural Research. The Institute has also been providing education/training in Agricultural Statistics and Informatics to develop trained manpower in the country. The research and education is used in improving the quality and meeting the challenges of agricultural research in newer emerging areas.

To achieve its goal and mandate, a number of research projects were undertaken during the year. Research was carried out under 72 research projects in the Institute, of which 01 National Professor Scheme, 35 Institute funded, 16 funded by other outside agencies and 20 in collaboration with other Institutes in various thrust areas. This year 18 projects were completed and 34 new projects were initiated.

The Institute has successfully implemented its flagship programme on Strengthening Statistical Computing for NARS, which have paved the way for statistical thinking and publishing research papers in the high impact factor journals.

- For capacity building of the researchers in the usage of high end statistical computing facility, 776 researchers of NARS (496 from ICAR Institutes and 396 from SAUs) have been trained through 37 training programmes of one week duration each. With this the number of researchers trained has gone upto 1672 through a total of 80 training programmes.
- New updates and upgrades have been received and upto March 31, 2012, the software is installed on 1623 computers across NARS out of which 653 installations have been done during the year.
- Strengthened Indian NARS Statistical Computing portal (http://stat.iasri.res.in/sscnarsportal) for providing service oriented computing to Indian NARS Users through IP Authentication. Analysis of data generated from any block design (complete or incomplete), augmented block designs, split plot design and combined analysis of block designs is available on this portal.
- For customized analysis, macros for analysis of data generated from Split-split plot designs; Split Factorial (Main A, Sub B x C) designs and econometric analysis have been developed and made available on the project website.

Some other salient research achievements are

- Portal for submission of genomic data and four different genomic databases have been developed and opened for beta testing. This portal would be used for storage of nucleotide, genes, genome, EST, GSS, SNP, RNA etc. apart from number of other biological databases. Functional annotation of ESTs, detection of SSRs, pSNPs, protein

domains, signal peptides have been performed on Water Buffalo using 1825 EST sequences obtained from public domain.

- A block design with neighbour effect(s) is said to be neighbour balanced if every treatment has every other treatment appearing constant number of times as neighbour(s). Robust neighbour balanced complete block designs against one or more missing observations have also been identified. Obtained balanced treatment-control structurally complete/incomplete row-column designs for the experimental situations requiring to compare a set of new (test) treatments with an already existing (control) treatment. Two series of linear trend free block designs balanced for spatial indirect effect from neighbouring experimental unit have been developed. For two way elimination of heterogeneity settings, neighbour balanced row-column designs have been defined wherein every treatment has every other treatment appearing as neighbour constant number of times in rows and columns.
- Minimum aberration fractional factorial plan is one that ensures estimation of maximum number of lower order interactions for a given resolution plan. Minimum aberration fractional factorial plans have been obtained for two level irregular fractional factorials, 5 and 7 level factorial experiments for number of factors ranging from 4 to 15 and mixed level factorial experiments (some factors at 4 levels and rest of the factors at 2 levels each).
- Efficient designs for 3, 4 and 5 components mixture experiments with one process variable have been obtained. The methodology for obtaining optimum combination of ingredients in mixture experiments with process variables has been developed by using dual optimization technique.
- The analytical procedures for block designs, row-column designs and block designs for 2^k factorial experiments have been developed for the situations in which errors follow the *t*-family of symmetric distributions.
- A catalogue of balanced incomplete block designs and variance balanced block designs that are robust against the loss of any number of observation(s) in a block on the basis of average variance of all possible pairwise treatment comparisons but not on the basis of individual pairwise treatment contrasts has been prepared.
- A general method for constructing variance balanced alternating treatments designs (ATD), suitable for making comparisons of two or more experimental conditions with each other or baseline in veterinary trials has been developed. Designs for making comparisons of investigational products with more than one active control have been obtained.
- Fertilizer response ratios have been computed using data from On Farm trials conducted by Project Directorate of Farming Systems Research, Modipuram. The fertilizer response ratios (FRR) of recommended doses of N, NP, NK and NPK over control for cereals are 9.51 kg/kg, 10.45 kg/kg, 10.00 kg/kg and 11.06 kg/kg respectively. Whereas FRRs for pulses these are 7.77 kg/kg, 6.21 kg/kg, 8.54 kg/kg and 6.37 kg/kg.
- Weather based forewarning models have been developed in two stages, modeling natural growth pattern and relating the deviations (from natural pattern) to appropriate lagged weather variables (maximum relative humidity, minimum relative humidity, maximum temperature, minimum temperature, wind velocity and rainfall with different lags and disease incidence of previous week) for weekly disease incidence. The results indicate that forecasts are quite close to the observed ones except in the first week i.e. week of disease appearance, due to the reason that in this year, disease appeared late as compared to years used for modeling. Time of first appearance can be obtained using the model reported last year and so reliable forecasts for per cent disease incidence can be obtained using two weeks data upto preceding week.
- A small area estimator for small area means has been developed for the situation when population level auxiliary information is not available. The developed small area estimator uses estimated population level auxiliary information using survey weights. Unbiasedness property of the proposed small area estimator has also been studied. Mean square error estimator of small area estimator has also been developed.
- In many agricultural and environmental data, the rate of change of target variable and auxiliary information changes from location to location causing spatial non-stationarity. To incorporate the

spatial non-stationarity in the data, a geographically weighted pseudo empirical best linear unbiased predictor (GWEBLUP) for small area means under area level model has been developed using geographical weighted regression approach. The micro level estimates generated by using the developed small area estimation method are found to have smaller bias and root mean square error as compared to empirical based linear unbiased predictor.

- Estimates of district level poverty incidence have been made using small area estimation technique from NSSO Data. The poverty estimates are found to be highest for MP state followed by UP while the minimum values are obtained for Punjab.
- Optimum sample sizes have been determined for estimation for crop yield estimation at the Gram Panchayat level.
- Structural analyses of proteins belong to detoxifying family for salt stress and proteins from rest of the families have been analysed. All the structures are superimposed and conserved residues are identified. Domain analysis has also been carried out.
- In time series data, certain exceptional external events called 'interventions' could affect the time series phenomenon under study. For forecasting cotton yields, Autoregressive Integrated Moving Average (ARIMA) intervention model is found to be superior to the conventional ARIMA models.
- To deal with asymmetry in time series data, nonlinear time-series models have been used by taking the autoregressive coefficient as a time-varying coefficient and illustrated for building the model considering quarterly oil sardine fish catch in Kerala for the period 1985-2008. The 2009-2010 data has been used for validation.
- Nonlinear time delay neural network (TDNN) models have been found to be outperformed ARIMA models for six and twelve months ahead forecasting in terms of root mean square error and one step ahead forecasting using data on monthly wholesale price of oilseed crops traded in different markets in India.
- For describing cyclical data Self-Exciting Threshold Autoregressive Moving Average (SETARMA) model has been fitted and illustrated using annual mackerel catch data of Karnataka, India during the period 1961-2008. It is observed that, for hold-out data, observed values are quite close to forecast values and estimated variances are near to theoretical values up to three-steps ahead prediction.
- Bio-physical index based on long term weather parameters and soil conditions etc. has been developed for all 500 districts of the country for assessment of agricultural potential in collaboration with CRIDA. To assess the yield risk at district level Weather Index based models have been developed. Further, classification and regression technique (CART) has been applied on different weather parameters in Tamil Nadu to get various thresholds for yields in rice crop.
- The expenditure elasticities of demand have been estimated for major spices (turmeric, garlic, ginger, dry chilli and other spices) for rural and urban areas of different regions and are found to be moderately inelastic with values 0.65 to 1.0 in all the regions. These elasticities are lower in urban areas as compared to rural areas.
- Study on asymmetry in retail wholesale price transmission for selected essential commodities is conducted for vertical and horizontal cointegration between wholesale and retail price of gram in the selected markets of Bhopal, Chittoor, Delhi and Ganganagar. It indicated that there exists cointegrating vectors and cointegrating equations thereby confirming a long run relationship in the Gram markets. The value of error correction coefficient and the value of long run multiplier are observed.
- Prototype of comprehensive information and online decision support system for effective knowledge delivery for farm entrepreneur related to risk assessment and insurance product have been developed to provide to farmers, insurance companies and policy-makers for risk mitigation against uncertain risks like climate risk, production risks, etc.
- For Half-Yearly Progress Monitoring (HYPM) of the scientists in ICAR, a web based software for online submission of half yearly progress report of the scientists has been designed and developed. This software is implemented from 01 April 2012.

- PIMS-ICAR has been integrated with Half Yearly Progress Monitoring of scientists (HYPM) system developed and implemented for all the ICAR institutes. At present the ICAR institutes have initiated project data entry process for more than 5110 ongoing and 5150 completed projects into PIMS-ICAR from their respective institutes.
- Web based software for survey data analysis (SSDA) 2.0 has been developed and made available on http://nabg.iasri.res.in/ssda2web/.
- The operational architecture of National Information System on Agricultural Education Network in India (NISAGENET) has been modified to three tier web architecture and now it is possible to directly enter/ update data from university/college(s). 19 Agricultural Universities (AUs) established in the recent past have been added to the system.
- A web based software Statistical Package for Agricultural Research (SPAR) 3.0 has been developed using Microsoft.NET (ASP.NET with C#) technology.

Scientists of the Institute published 90 research papers in National and International refereed Journals along with 20 popular articles, 11 book chapters and 38 projects/technical reports/reference manuals/leaflets. Three macros available at institute's website are also developed.

This year 21 training programmes were organized in which 437 participants were imparted training

- Three International training programmes (two on Application of Remote Sensing and GIS in Agricultural Surveys for the participants from Afro-Asian Rural Development Organization (AARDO) member countries and one on Forecasting Techniques in Agriculture for the participants from Sri Lanka).
- One 21 days and one 10 days training programme under Centre of Advanced Faculty Training on Statistical Modeling in Agriculture.
- Two Winter Schools on Data Mining Techniques and Tools for Knowledge Discovery in Agricultural Database and Recent Advances in Designing and Analysis of Agricultural Experiments.
- Three Resource Generation training programmes on Statistical Techniques for Data Collection and Analysis for Department of Agriculture, Government of Andhra Pradesh and two CSO Sponsored training programmes on Data Analysis and Interpretation: Use of Statistical Softwares for ISS Probationers and on Agricultural Statistics for CSO officials.
- Nine training programmes were conducted under National Agricultural Innovation Projects:
  - Seven under Consortium on Strengthening Statistical Computing for NARS, (i) A Researcher Training on Data Analysis using SAS, (ii) Some Specific Examples on Data Analysis of Natural Resources Management Research, (iii) Genetics/Genomics Data Analysis using SAS, (iv) Data Analysis in Social Sciences Research using SAS, (v) Data Analysis and Interpretation in Farm Implementation and Machinery Research using SAS, (vi) Data Mining using SAS and (vii) Data Analysis using SAS.
  - One training programme on Forecast Modelling in Crops sponsored by NAIP.
  - One on Recent Advances in Statistical and Computational Genomics Data Analysis under NAIP Consortium on Bio-prospecting of Genes and Allele Mining for Abiotic Stress Tolerance.
- Two training programmes through outsourcing on Computational Genome Analysis using ANYAYA and on High Performance Bio-Computing and Drug Design under National Agricultural Bioinformatics Grid were also organized.

Dr. VK Bhatia was conferred upon the prestigious title of Sankhyiki Bhushan by Indian Society of Agricultural Statistics. He was nominated as Statistical Coordinator for DARE and as Member of Steering Group for Agricultural Statistics by Economic and Social Commission for Asia and the Pacific (ESCAP) of United Nations.

Dr. Rajender Parsad was awarded National Award in Statistics for Young Statistician in honour of Prof. CR Rao 2010-11 from Ministry of Statistics and Programme Implementation, Government of India.

Dr. Prajneshu received Prof. PV Sukhatme Gold Medal Award 2011 from ISAS and elected as Fellow of NAAS.

Dr. Yogita Gharde received Dr. GR Seth Memorial Young Scientist Award from ISAS.

Dr. Ranjana Agrawal received Scroll of Appreciation at XX Group Worker's Meeting of AICRP on STF.

Dr. Eldho Varghese received IARI Merit Medal for outstanding research work as a part of Ph.D. (Agricultural Statistics) from PG School, Indian Agricultural Research Institute.

Dr. Sudeep and Dr. Alka Arora received Achievement Award in special recognition of research to the field and also in special appreciation of valuable services to the Conference in the 5th Indian International Conference on Artificial Intelligence.

Dr. Anil Kumar received Young Professional Award 2011 of the Society for Community Mobilization for Sustainable Development.

Dr. VK Bhatia was deputed to attend ISO/TC/69 Technical Committee/Sub Committee and Working Groups at Berlin, Germany and to attend the First meeting of the Steering Group for Agricultural Statistics at Manila, Philippines.

Dr. UC Sud was deputed to attend 4th Meeting of WYE Group of Statistics on Rural Development and Agriculture Household Income at Brazil.

Dr. Anil Rai was deputed to FAO, Sri Lanka to provide Consultancy Services on Feasibility Study on the use of GIS/Remote Sensing for Census of Agriculture by Food and Agricultural Organisation.

Dr. Hukum Chandra completed Post Doctoral Research of one year at the Centre for Statistical and Survey Methodology in the University of Wollongong, Australia and participated in International Statistical Institute (ISI) World Statistics Congress held at Dublin, Ireland sponsored by International Statistical Institute's World Bank Fund Award.

Dr. Sushila Kaul was deputed to attend 4th International Conference on Inclusive Museum at University of Witwatersrand, Johannesburg, South Africa.

Dr. Ramasubramanian V. was deputed to attend International training programme in the area of Science Policy and Technology Forecasting at University of Houston, USA under NAIP-HRD-L&CD, Social Sciences Division.

Two Partners Meet of NAIP Consortium on Strengthening Statistical Computing for NARS and one for National Agricultural Bioinformatics Grid (NABG) were organised.

Second Workshop-cum-Installation training programme for Nodal Officers of NAIP Consortium on Strengthening Statistical Computing for NARS was organized.

Workshop related to the project Evaluation of Agricultural Census Scheme was organised.

Institute celebrated Birth Centenary of Professor PV Sukhatme on 27 July 2011.

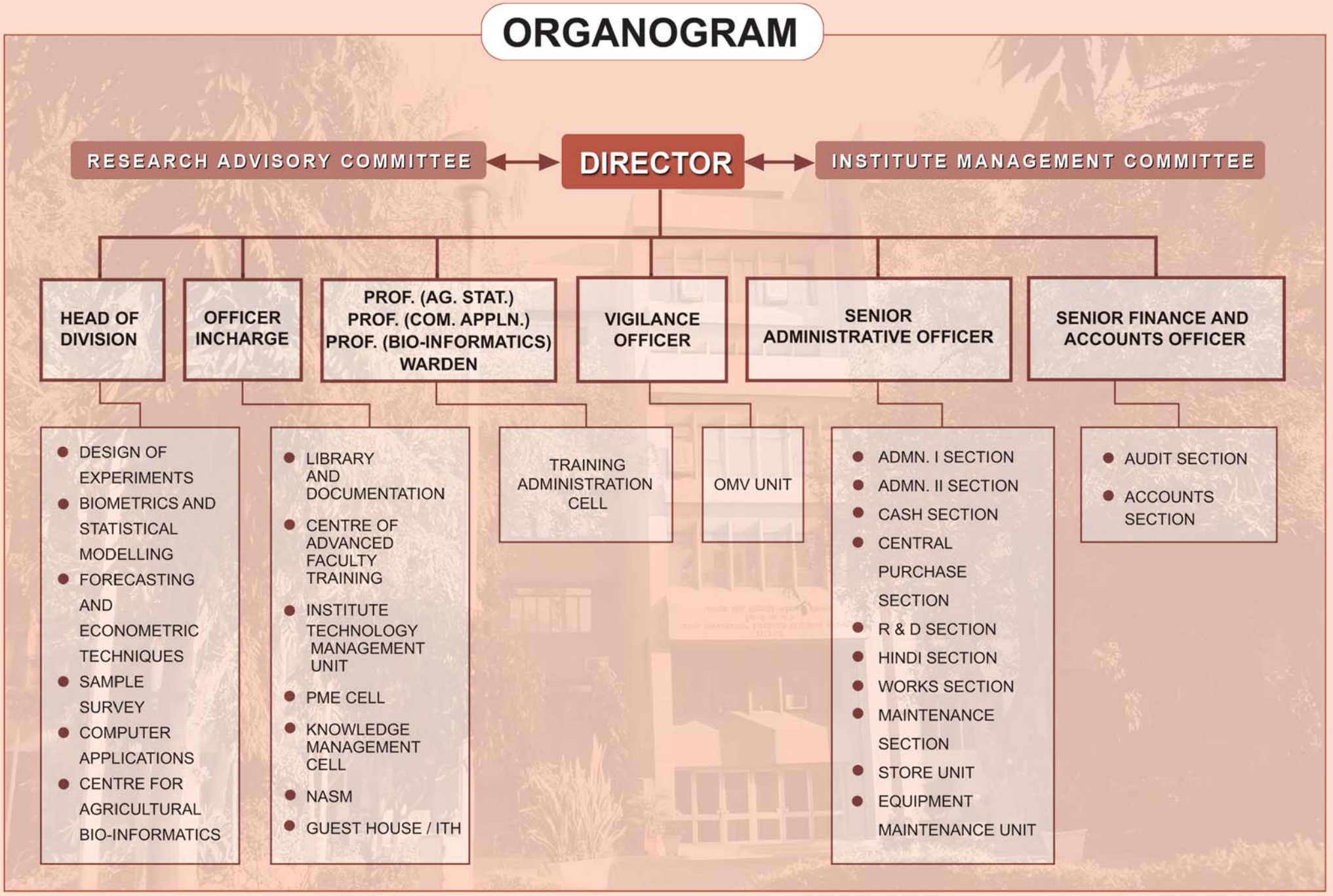
Three sensitization-cum-training workshops on NISAGENET for the Nodal Officers of SAUs were organised at UP, Mumbai and Tirupati and five on HYPM for the Nodal Officers at IASRI, New Delhi; CIFE, Mumbai; DWM, Bhubaneshwar and NAARM, Hyderabad were organized.

The activities relating to education and training which include planning, organization and coordination of the entire Post-graduate teaching programmes of the Institute were undertaken in collaboration with PG School, IARI. During the year, a total of 17 students {03 Ph.D. (Agricultural Statistics), 07 M.Sc. (Agricultural Statistics) and 07 M.Sc. (Computer Application)} completed their degrees. 21 new students {06 Ph.D. (Agricultural Statistics), 08 M.Sc. (Agricultural Statistics), 04 M.Sc. (Computer Application) and 03 M.Sc. (Bioinformatics)} were admitted.

A Senior Certificate Course in Agricultural Statistics and Computing was organised. 05 officials participated in this Certificate Course.

❑

ORGANOGRAM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SENIOR FINANCE AND ACCOUNTS OFFICER
DESIGN OF EXPERIMENTS
BIOMETRICS AND STATISTICAL MODELLING
FORECASTING AND ECONOMETRIC TECHNIQUES
SAMPLE SURVEY
COMPUTER APPLICATIONS
CENTRE FOR AGRICULTURAL BIO-INFORMATICS
LIBRARY AND DOCUMENTATION
CENTRE OF ADVANCED FACULTY TRAINING
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CASH SECTION
CENTRAL PURCHASE SECTION
R & D SECTION
HINDI SECTION
WORKS SECTION
MAINTENANCE SECTION
STORE UNIT
EQUIPMENT MAINTENANCE UNIT
AUDIT SECTION
ACCOUNTS SECTION

Introduction

Indian Agricultural Statistics Research Institute (IASRI) is a premier Institute of Indian Council of Agricultural Research (ICAR) with glorious tradition of carrying out research, teaching and training in the area of Agricultural Statistics and Informatics. The Institute has used the power of Statistics, as a science, blended judiciously with Informatics and has contributed significantly in improving the quality of Agricultural Research. Ever since its inception way back in 1930, as small Statistical Section of the then Imperial Council of Agricultural Research, the Institute has grown in stature and made its presence felt both nationally and internationally. IASRI has been mainly responsible for conducting research in Agricultural Statistics to bridge the gaps in the existing knowledge. It has also been providing education/training in Agricultural Statistics and Computer Applications to develop trained manpower in the country. The research and education is used in improving the quality and meeting the challenges of agricultural research in newer emerging areas.

The functions and activities of the Institute have been re-defined from time to time in the past. The present main thrust of the Institute is to undertake research, education and training in the discipline of Agricultural Statistics, Computer Applications and Bioinformatics and to develop trained manpower to address emerging challenges in agricultural research.

The contributions towards research, teaching and training have been monumental. Since scenario of agriculture research is changing at a very fast rate, the Institute has set its future agenda to meet the statistical and informatics needs. The efforts are to become a lead organization in the world in the field of agricultural statistics, statistical computing, information communication technology including bioinformatics, and be responsive, vibrant and sensitive to the needs of researchers, research managers and planners.

The vision of the Institute is to use the power of Statistics as a science blended judiciously with information communication technology to enhance the quality of agricultural research. To convert this vision into a reality, the Institute has set for itself a mission to undertake research, teaching and training in Agricultural Statistics and Informatics so that these efforts culminate into improved quality of agricultural research and also meet the challenges of agricultural research in newer emerging areas. The present main thrust of the Institute is to conduct basic, applied, adaptive, strategic and anticipatory research in Agricultural Statistics, to develop trained manpower and to disseminate knowledge and information produced so as to meet the methodological challenges of agricultural research in the country.

The Institute has made its presence felt in the National Agricultural Research System (NARS). The Institute is also becoming progressively a repository of information on agricultural research data and has taken a lead in the country in developing a data warehouse on agricultural research data. The Institute has established linkages with all NARS organizations for strengthening

statistical computing. A National Agricultural Bioinformatics Grid is being planned with high performance computing facilities. The Institute also occupies a place of pride in the National Agricultural Statistics System (NASS) and has made several important contributions in strengthening NASS, which has a direct impact on the national policies. Some of the research activities and their impact are given in the sequel:

Research Achievements and Impact

The Institute has made some outstanding and useful contributions to the research in Agricultural Statistics in the fields like Design of Experiments, Statistical Genetics, Forecasting Techniques, Statistical Modelling, Sample Surveys, Econometrics, Computer Applications in Agriculture, Software Development, etc. The Institute has conducted basic and original research on many topics of interest and has published number of papers in national and international journals of repute. The Institute has been providing and continues to provide support to the NARS by way of analyzing voluminous data using advanced and appropriate analytical techniques. The Institute has also been very actively pursuing advisory services that has enabled the Institutes to enrich the quality of agricultural research in the NARS. Through its advisory, the Institute has made its presence visibly felt in NARS and now experimenters look to IASRI for designing experiments and analysis of experimental data.

The efficient designs like balanced incomplete block designs, group divisible and extended group divisible designs, reinforced extended group divisible designs, square and rectangular lattice designs, α-designs, reinforced α-designs, augmented designs, designs for fitting response surfaces, fractional factorial plans, etc. and advanced analytical techniques including contrast analysis, linear models with nested structures, experiments with mixtures methodology, mixed effects models, biplot, etc. have been adopted by the experimenters in NARS. The application of α-designs and resolvable block designs has improved the precision of treatment comparisons in Crop Improvement Programmes of rapeseed and mustard, sorghum, etc. The analytical techniques for estimating/ projecting the Energy Requirement in the Agricultural Sector has been exploited for the analysis of countrywide data. The analytical techniques for the analysis of data from the experiments conducted to study the post harvest storage behaviour of the perishable commodities like fruits and vegetables are being widely used in NARS. The Institute works in close collaboration with NARS organizations and many projects are being run at the Institute in collaboration with All India Co-ordinated Research Projects and ICAR Institutes. The analytical techniques based on mixed-effects models and biplot developed for the analysis of data generated from Farmers Participatory Trials for resource conservation agriculture are used by Rice-Wheat consortium for Indo-Gangetic plains for drawing statistically valid conclusions. The Institute has developed linkages with the CGIAR organizations such as CIMMYT, IRRI and ICARDA. The status of experimentation is now changing and with the support provided in terms of suggesting efficient designs and analyzing the data using modern complicated statistical tools, the research publications of the agricultural scientists are finding a place in high impact factor international journals.

The methodology for General Crop Estimation Surveys (GCES), cost of cultivation studies, Integrated Sample Surveys for livestock product estimation, fruits and vegetables survey, which are being adopted throughout the country are research efforts of IASRI. Methodology based on small area estimation technique for National Agricultural Insurance Scheme suggested by IASRI has been pilot tested in the country. A status paper on chronological development and present status of information support system for management of agriculture has been prepared as a part of State of Indian Farmer: A Millennium Study of Ministry of Agriculture. The sample survey methodology for imported fertilizer quality assessment, fish resources estimation, flower production estimation, area and production of horticultural crops estimation, estimation of post harvest losses of crops/commodities etc. have been developed and passed on to the user agencies. Integrated methodology for estimation of multiple crop area of different crops in North Eastern Hilly Regions using Remote Sensing data has been developed.

The Institute has also made very significant contributions in developing the analytical techniques for the estimation of genetic parameters, models for pre-harvest forecasting of crop yields, models for forewarning of incidence of pests and diseases and econometrics and statistical modeling of biological phenomena using non-linear models, non-parametric

regression, structural time series, neural network and machine learning approaches. The techniques developed have potential applications in long term projections of foodgrain production, aphid population, marine fish production, etc. The methodology developed for forecasting based on weather variables and agricultural inputs has been used by Space Application Centre, Ahmedabad, to obtain the forecast of wheat yield at national level. Models developed for forewarning of aphids in mustard crop are used by National Research Centre for Rapeseed and Mustard to provide forewarning to farmers which enabled them to optimize plant protection measures and save resources on unnecessary sprays consecutively for three years. The modification in the procedure of estimation of genetic parameters has been suggested for incorporating the effect of unbalancedness, presence of outliers, aberrant observations and non-normality of data sets. Procedures for studying genotype × environment interactions and QTL × Environments have been developed and used for the analysis of data generated from crop improvement programmes. The research work on construction of selection indices and progeny testing and sire evaluation have been used for animal improvement programmes. The Institute has now initiated research in the newer emerging area of statistical genomics.

Achievements in Information Communication Technology

The Institute has the capability of development of Information Systems, Decision Support Systems and Expert Systems. Realizing the need of integration of databases to prepare a comprehensive knowledge warehouse that can provide desired information in time to the planners, decision-makers and developmental agencies, Integrated National Agricultural Resources Information System (INARIS) with the active support of 13 sister institutes as partners has been developed. The data warehouse comprises of 59 databases on agricultural technologies of different sectors of agriculture and related agricultural statistics at districts/ state/national levels, population census including village level population data as well as tehsil level household assets and livestock census. Subject-wise data marts have been designed and multi-dimensional data cubes have been developed and published in the form of online decision support system. The Institute has also developed information systems for agricultural field experiments, animal experiments and long term fertilizer experiments conducted in NARS. Besides, a comprehensive Personnel Management Information System Network (PERMISnet) has been implemented for the ICAR for manpower planning, administrative decision making, and monitoring. For National Agricultural Technology Project, a Project Information and Management System Network (PIMSnet) has been developed and implemented for concurrent monitoring and evaluation of 845 projects. This is being developed as a Project Information and Management System for all ICAR projects. A National Information System on Agricultural Education Network in India (NISAGENET) has been designed, developed and implemented so as to maintain and update the data regularly on parameters related to agricultural education in India. Online Management System for Post Graduate Education has been developed and implemented for PG School, IARI, New Delhi. Expert Systems on Wheat Crop, Maize Crop and Seed Spices have also been developed and implemented. An online system for Half yearly progress monitoring system (HYPM) of the scientists has also been developed.

A milestone in the research programmes of the Institute was created when it started developing indigenous statistical software packages mainly for analysis of agricultural research and animal breeding data. Statistical packages for generation of experimental designs for various experimental situations, both unstructured and factorial structure of treatments, catalogues of designs, randomized layout of design and analysis of data were also developed. Statistical packages developed and widely being used in NARS are:

- Statistical Package for Agricultural Research (SPAR) 2.0
- Statistical Package for Block Designs (SPBD) 1.0
- Statistical Package for Factorial Experiments (SPFE) 1.0
- Statistical Package for Augmented Designs (SPAD) 1.0
- Software for Survey Data Analysis (SSDA) 1.0 & 2.0
- Statistical Package for Animal Breeding (SPAB) 2.1

A total of 386 Statistical packages have been sold out since their release, which includes 199 SPAR 2.0, 50 SPAD 1.0, 64 SPFE 1.0, 31 SPAB 2.0, 37 SPBD 1.0 and 05 SSDA 1.0, out of which 25 Statistical packages including 20 SPAR 2.0, 02 SPAD 1.0, 01 SPFE 1.0, and 02 SPAB 2.0 have been sold during the period under report. SSDA 2.0 has now been made available online.

The creation of Design Resources Server, an e-learning and e-advisory resource for the experimenters, has been another revolution in the growth of the Institute. The server provides a platform to popularize and disseminate research and also to further strengthen research in newer emerging areas in design of experiments among peers over the globe in general and among the agricultural scientists in particular so as to meet the emerging challenges of agricultural research. This server is hosted at www.iasri.res.in/design. For providing service oriented computing, the Institute has developed Indian NARS Statistical Computing Portal which is available to NARS users through IP authentication and is being widely used by the researchers.

Achievements in Human Resource Development

One of the thrust areas of the Institute is to develop trained manpower in the country in the disciplines of Agricultural Statistics and Computer Applications for meeting the challenges of Agricultural Research in the newer emerging areas. A humble beginning in the area of development of trained manpower was made in 1945 with the initiation of two regular certificate courses, one course of six months duration, called Junior Certificate Course (JCC) and the other course of one year duration called Senior Certificate Course (SCC). Besides, there was another course of one year duration known as Professional Statisticians' Certificate Course (PSCC) that was introduced to train professional statisticians. Subsequently, a Diploma course involving a research project of one year duration, in addition to PSCC consisting of one year course work in advanced statistics, was also introduced. These certificate courses helped in strengthening the linkages of the Institute with the State Departments of Agriculture and Animal Husbandry. The certificate courses started in 1945 were discontinued by the Indian Council of Agricultural Research (ICAR) in 1985-86. However, during 1997, the Senior Certificate Course in Agricultural Statistics and Computing was revived. This course is now of six months duration and lays more emphasis on statistical computing using statistical softwares. The course is divided into two modules viz. (i) Statistical Methods and Official Agricultural Statistics, and (ii) Use of Computers in Agricultural Research, of three months duration each. Since 1997, 83 participants have completed both the modules, 33 have completed module-I only and 21 have completed module-II only.

The year 1964 witnessed tremendous changes in the activities of the Institute when an Memorandum of Understanding (MOU) was signed with Indian Agricultural Research Institute (IARI), New Delhi to start new degree courses leading to M.Sc. and Ph.D. in Agricultural Statistics. In 1981, a two years Diploma Course in Advanced Computer Programming was introduced. On the recommendations of UNDP, this course was soon discontinued and in 1985 another new course leading to M.Sc. degree in Computer Applications in Agriculture was initiated in collaboration with IARI, New Delhi. This course was re-designated as M.Sc. degree in Computer Application during 1993-94. The Institute has so far produced 179 Ph.D. and 305 M.Sc. students in Agricultural Statistics and 100 M.Sc. students in Computer Application. A new degree course M.Sc. in Agricultural Bioinformatics has been initiated from academic year 2011-12 in collaboration with IARI, New Delhi; NRCPB, New Delhi and NBPGR, New Delhi.

The functioning of the Institute as a Centre of Advanced Studies in Agricultural Statistics and Computer Application during October 1983 to March 1992 under the aegis of United Nations Development Programme was another landmark in the history of the Institute. The purpose of this programme was to develop the Institute as a Centre of Excellence with adequate infrastructure and facilities to undertake advanced training programmes and to carry out research in various emerging areas of Agricultural Statistics and Computer Application. Under this programme, a number of illustrious statisticians and computer scientists from abroad visited the Institute with a view to interact with the scientists, giving seminars/ lectures and suggesting gaps in the research programmes of the Institute. Under the programme some scientists of the Institute received training for capacity building from abroad. Another singular development in the growth of the Institute was the Centre of Advanced Studies Programme in Agricultural Statistics and Computer

Application established during the VIII Five Year Plan in 1995. Under this programme the Institute organizes training programmes on various topics of current interest for the benefit of scientists of NARS. These training programmes cover specialized topics of current interest in statistics and agricultural sciences. During the period under report the Centre of Advanced Studies (CAS) is renamed as Centre of Advanced Faculty Training (CAFT). So far 47 training programmes have been organised under the aegis of CAS/CAFT. In all a total of 845 participants have been benefited.

There is yet another form of training courses, which are tailor–made courses and are demand driven. The coverage in these courses is need based and the courses are organized for specific organizations from where the demand is received. The Institute has conducted such programmes for Department of Agriculture, Government of Andhra Pradesh, Indian Statistical Service probationers and senior officers of Central Statistical Organization and many other organizations. The Institute has also conducted several international training programmes on request from FAO, particularly for African, Asian and Latin American countries. The Institute has broadened the horizon of capacity building by opening its doors to the agro-based private sector. A number of research workers from the Institute have served as consultants and advisors in Asian, African and Latin American countries. Also, a number of statisticians and students of the Institute are at present occupying high positions in universities and other academic and research institutions of USA, Canada and other countries.

Infrastructural Developments

As the activities of the Institute started expanding in all directions, the infrastructure facilities also started expanding. Two more buildings 'Computer Centre' and 'Training-cum-Administrative Block' were constructed in the campus of the Institute in the years 1976 and 1991, respectively. There are three well furnished hostels, viz. Panse Hostel-cum-Guest House, Sukhatme Hostel and International Training Hostel to cater the residential requirements of the trainees and students. An important landmark in the development of the Institute was the installation of an IBM 1620 Model-II Electronic Computer in 1964. A third generation computer Burroughs B-4700 system was installed in March 1977. The Burroughs B-4700 system was replaced in 1991 by a Super Mini COSMOS-486 LAN Server with more than hundred nodes consisting of PC/AT's, PC/XT's and dumb terminals all in a LAN environment. Later, COSMOS-486 LAN Server was replaced by a PENTIUM-90 LAN Server having state-of-art technology with UNIX operating system. Computer laboratories equipped with PCs, terminals and printers, etc. have been set up in each of the six Scientific Divisions as well as in the Administrative Wings of the Institute.

For undertaking research in the newer emerging areas, a laboratory on Remote Sensing (RS) and Geographic Information System (GIS) was set up in the Institute. The laboratory is equipped with latest state-of-art technologies like computer hardware and peripherals, Global Positioning System (GPS), softwares like ERMapper, PCARC/INFO, Microstation 95, Geomedia Professional, ARC/INFO Workstation, ARC-GIS and ERDAS Imagine by using the funds received through two AP Cess Funded projects. This computing facility has further been strengthened with the procurement of ARC-GIS software under NATP programme.

An Agricultural Bioinformatics Lab (ABL) fully equipped with software and hardware has been set up to study crop and animal biology with the latest statistical and computation tools. A training lab for Strengthening Statistical Computing for NARS has also been established.

Keeping pace with the emerging technologies in the area of Information Technology (IT), from the year 1998 onwards the computing infrastructure have been constantly upgraded/replaced with newer platforms and versions. The computing environment in the Institute has latest computing and audio visual equipments i.e. High Performance Computing having 144 core Intel HPC cluster, rack mount & redundant SMPS servers, workstations, desktops, laptops, netbooks, documents printing & scanning, DVD duplicator, visualiser and wireless multimedia projectors etc. The Institute is also well equipped with redundant power source and 12 mbps bandwidth fiber optics backbone wired and wireless networking campus.

The networking services at IASRI have steadily been strengthened. Currently the internet services are being provided to the scientists, technical & administrative staff and students through Firewall, Content filtering, E-mail filtering, Antivirus, Application control and Data Leak Prevention. The Institute domain service like

Primary and Secondary DNS, Domain (iasri.res.in) Website (http://www.iasri.res.in), Live E-mail services, more than 462 network nodes and number of various Online Information Systems are being developed and maintained by the Institute's officials.

As per requirements, scientists and officials of the Institute have been provided with workstations/ desktops/notebooks, printers and peripherals and also software packages that are needed for application development, statistical data analysis, network securities and office automation.There are various labs at the Institute for dedicated services like ARIS lab for Training, Statistical computing lab, Stat lab for Statistical analysis, Student lab and Centre for Advanced Study lab. Some of the important softwares that are available are SAS 9.2 & 9.3, JMP 8.0 & 9.0, JMP Genomics 4.0 & 5.1, SAS BI Server 4.2 & 4.3, SPSS, SYSTAT, GENSTAT, Data warehouse software – Cognos, SPSS clementine, MS Office 2007, MS Visual Studio.net, MS-SQL Server, Oracle, Macro-Media, E-views, STATISTICA Neural Networks, Gauss Software, Minitab 14, Maple 9.5, Matlab, Web Statistica, Lingo Super, ArcGIS etc.

Organisational Set-up

The Institute is having six Divisions, one Unit and three Cells to undertake research, training, consultancy, documentation and dissemination of scientific output.

Divisions

- Design of Experiments
- Biometrics and Statistical Modelling
- Forecasting and Econometrics Techniques
- Sample Surveys
- Computer Applications
- Centre for Agricultural Bioinformatics [CABin]

Unit

- Institute Technology Management Unit (ITMU)

Cells

- Prioritization, Monitoring & Evaluation Cell (PME)
- Training Administration Cell (TAC)
- Consultancy Processing Cell (CPC)

Financial Statement

Through regular monitoring, the Institute was able to ensure optimal utilization of funds available in the budget. The actual utilization of the budget both under plan and non-plan is furnished in the sequel.

Budget Allocation vis-à-vis Utilization (2011–12)

Head of Account	Allocation		Expenditure	
	Plan	Non-Plan	Plan	Non-Plan
Pay & Allowances	0.00	1935.00	0.00	1931.08
TA	5.00	4.00	4.98	3.98
OTA	0.00	1.00	0.00	0.33
HRD/Fellowship	1.00	35.50	1.00	31.99
Contingencies	69.50	246.76	68.60	218.90
Equipments	16.00	10.00	15.93	8.83
Furniture	0.00	0.00	0.00	0.00
Works	26.50	150.45	26.32	148.64
Library	32.00	0.00	31.99	0.00
Pension/Loan & Advances	0.00	379.00	0.00	363.36
Total	**150.00**	**2761.71**	**148.82**	**2707.11**

Staff Position (as on 31 March 2012)

Manpower	No. of posts sanctioned	No. of posts filled
Director	1	1
Scientific	130	65
Technical	218	96
Administrative	84	83
Auxiliary	14	8
Skilled Supporting	80	62
Total	**527**	**315**

Research Achievements

The research targets set by the Institute were implemented by six Divisions of the Institute, viz. Design of Experiments, Biometrics and Statistical Modelling, Forecasting and Econometrics Techniques, Sample Surveys, Computer Applications and Centre for Agricultural Bioinformatics. The basic, applied, adaptive and strategic research in Agricultural Statistics and Informatics is carried out under six broad programmes that cut across the boundaries of the Divisions and encourage interdisciplinary research. The six programmes are as under:

1. Development and analysis of experimental designs for agricultural system research
2. Forecasting and remote sensing techniques and statistical applications of GIS in agricultural systems
3. Development of techniques for planning and execution of surveys and analysis of data including economic problems of current interest
4. Modeling and simulation techniques in biological systems
5. Development of informatics in agricultural research
6. Teaching and training in Agricultural Statistics and Computer Application

Programme 1: DEVELOPMENT AND ANALYSIS OF EXPERIMENTAL DESIGNS FOR AGRICULTURAL SYSTEM RESEARCH

Efficient Multi-level *k*-circulant Supersaturated Design

A supersaturated design (SSD) is a fractional factorial design having insufficient run size for estimating all the main effects represented by the design matrix. SSDs have received considerable attention in literature because of potential application in factor screening experiments, computer experiments, software testing, medical, industrial, and engineering and biometrical experiments. An algorithm to construct and generate efficient balanced multi-level *k*-circulant supersaturated designs with *m* factors and *n* runs has been developed. Using the proposed algorithm many balanced multi-level supersaturated designs are constructed and catalogued. A list of many optimal and near optimal, multi-level supersaturated designs is also provided for $m \leq 60$, $n \leq 25$ and number of levels $q \leq 10$. The algorithm can be used to generate two-level *k*-circulant supersaturated designs also and some large optimal two-level supersaturated designs are presented. An upper bound to the number of factors in a balanced multi-level supersaturated design such that no two columns are fully aliased is also provided.

Experimental Designs in Presence of Neighbour Effects

In agricultural field experiments, in order to control heterogeneity and conserve resources, treatments are assessed using small adjacent plots. Under such situations, the treatment applied to one experimental plot may affect the response on neighbouring plots besides the response of the experimental plot to which it is applied. This may be due to spread of treatments such as fertilizer, irrigation or pesticide to adjacent plots causing neighbour effects. Thus, neighbour effects may

contribute to variability in experimental results and lead to substantial losses in efficiency. For precise comparison of treatment effects in presence of neighbour effects, neighbour balanced designs are useful. These designs ensure that no treatment is unduly disadvantaged by its neighbour(s).

- **Robust Neighbour Balanced Block Designs:** A block design with neighbour effect(s) is said to be neighbour balanced if every treatment has every other treatment appearing constant number of times as neighbour(s). However, there is a possibility that some of the observations could become unavailable for analysis. The robustness of neighbour balanced complete block designs has been examined when specific observations are missing. The information matrix for direct treatment effects of the resultant design (one-sided neighbour effects) after missing of an observation from a block is derived and the efficiency of resulting design is investigated. The efficiencies are found to be quite high indicating the designs to be fairly robust against missing observations.
- **Neighbour Balanced Row-column Designs:** Row-column designs are an important class of designs which are very useful in situations when the heterogeneity present in the experimental material is in two directions. Neighbour balanced row-column designs have been defined wherein every treatment has every other treatment appearing constant number of times as neighbour in rows and columns. Two types of models have been considered based on how the neighbour effects of treatments are taken into account viz., row-column model with non-directional neighbour effects having same effects from all the four sides and row-column model with directional neighbour effects having different effects from different sides. The methodology for estimating the direct and neighbour effects of treatments has been derived under both the models. Series of row-column designs balanced for neighbour(s) have been obtained and are found to be variance balanced for estimating direct and neighbour effects.
- **Response Surface Methodology Incorporating Neighbour Effects:** Response Surface Methodology (RSM) is used to explore the relationship between one or more response variables and a set of experimental variables or factors with an objective to optimize the response. It is generally assumed that the observations are independent and there is no effect of neighbouring units. But in field experiments, the neighbour effects from the treatments applied to adjacent neighbouring plots may arise. The response surface model incorporating neighbour effects from immediate left and right neighbouring units has been studied assuming that the units are arranged linearly with no gaps. Procedure has been developed to estimate the parameters of both the first order and second order response surface models with differential neighbour effects. The variance of estimated response has also been obtained and conditions for the model to be rotatable have been obtained. A method of obtaining designs satisfying the derived conditions has been developed. An illustration showing the impact of neighbour effects has been given using a simulated data set. Further, the problem of large runs has also been taken care of by giving a method of construction of response surface design incorporating neighbour effects using fractional factorials. The variation between the blocks in the experiment is accounted for by including block effects in the statistical model. For first order model, the condition for orthogonal estimation of the parameters of the model with block effects has been obtained. Numerical examples have been given for illustrating the experimental situation where experimental units are grouped into complete/incomplete blocks. The neighbour effect in terms of neighbour coefficient has also been estimated. Procedure has been developed to estimate the parameters of the first order response surface model when the units experience neighbour effects from adjacent units and also the observations are correlated. The variance of the estimated response has also been obtained. A method of obtaining designs satisfying the derived conditions has been developed.
- **Experimental Designs in the Presence of Indirect Effects of Treatments**: Indirect effects are effects which occur in an experiment due to the units which are adjacent (spatially or temporally) to the unit being observed. Considering more than one relationship between observations on units over space, the methodology for estimating

the direct and spatial (neighbour) indirect effect has been developed under a block design setup with neighbour effect and incorporating trend component. Two series of linear trend free block (one complete and one incomplete) designs have been obtained that are totally balanced for estimating direct and spatial (neighbour) indirect effect of treatments. For easy accessibility of the designs by the experimenters, it is required that these designs are compiled and presented at one place. Considering the time period (residual) as the indirect effect, the module for web generation of William's square designs for even number of treatments has been developed.

Analysis of Experimental Designs with *t*-Family of Error Distributions

The interpretation of experimental data based on analysis of variance is valid only when the assumptions like error are independently and identically distributed as normal with mean zero and constant variance and effects are additive in nature. In several data sets collected in agricultural experiments, these assumptions may not be satisfied. In the analysis of experimental data when errors follow *t*-family of symmetric distribution, the normal equations obtained from the derivative of log-likelihood function with respect to parameters do not yield explicit solutions for the parameters due to non-linearity of the function. Generally, these equations are not easy to solve by iterative method because of slow convergence, multiple roots, and convergence to incorrect values or even divergence. The theory of modified maximum likelihood estimation (MMLE) has an explicit solution of these equations and is asymptotically identical with MLE. It has been shown in the literature that modified maximum likelihood estimates (MMLEs) are almost as efficient as maximum likelihood estimates (MLEs).

The analytical procedures have been developed for the analysis of data generated from designs of one-way elimination of heterogeneity when the error follows the *t*-family of symmetric distribution. These procedures are based on the solution of modified maximum likelihood estimations. When the derivative of log-likelihood function with respect to parameters do not yield explicit solutions for the parameters due to non-linearity of the function, the non-linear function has been expanded using the Taylor's expansion of the first order and by this procedure the function becomes linear and the equations become solvable. Further, the test statistics and their distributions have been worked out. Similar to the designs of one-way elimination of heterogeneity, the theory of MMLEs have been developed for the designs of two-way elimination of heterogeneity. Procedures for the analysis of designs of two-way elimination of heterogeneity have been developed. Also the test statistics for testing the null hypothesis of the effects of treatments, rows and columns for latin square have been developed. One of the most commonly used types of factorial designs is the 2^k factorial experiment. For the model of 2^2 factorial experiments when the error follows the *t*-family of symmetric distribution, contrasts and sum of squares of contrasts for main effects and two factor interactions have been worked out. Variance of the error components has also been worked out. For testing hypothesis of the main effects and two factor interaction effects, test statistics have been developed. Further, this method of MMLE of 2^2 factorial experiment has been extended for 2^3 factorial experiments and have been generalized for the factorial experiments with *k* factors each at 2 levels.

Robust Block Designs against Missing Data for Making all Possible Pairwise Treatment Comparisons

Robustness of incomplete block designs against the unavailability of data has been investigated in the literature in terms of average variance of all possible pairwise treatment comparisons in the design. But for examining the robustness of a design for the loss of observation(s) on the basis of individual pairwise treatment comparisons, loss of information of some of treatment comparisons may be more than that of the loss of information on the basis of average variance of the residual design. A design that is robust on the basis of overall efficiency may not be robust when the efficiency is worked out on the basis of individual pairwise treatment comparisons. Therefore, all the estimates of individual pairwise treatment contrasts for the loss of any number of observation(s) in a block for balanced incomplete block design and variance balanced block designs have been investigated. Designs that are robust on the basis of average variance but not on the basis of pairwise treatment contrasts have also been identified.

Efficient Designs for Drug Testing in Veterinary Trials

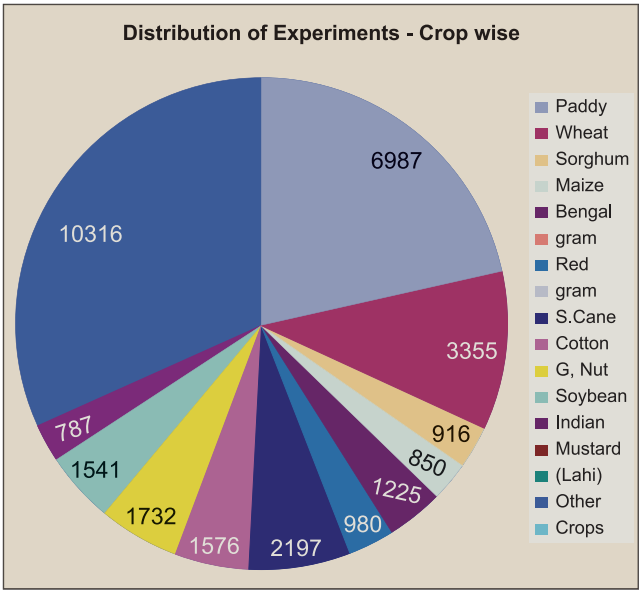
In veterinary trials, neither a specific intervention treatment (treatment that has not been tested earlier)

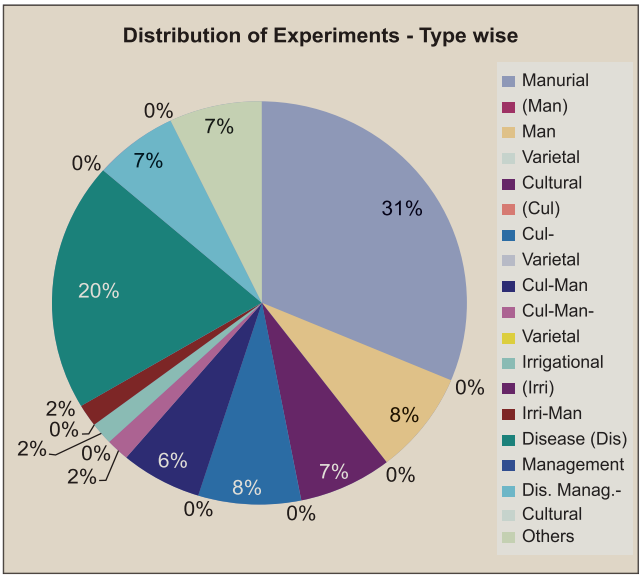
can be given continuously to animals, nor can these treatments be withdrawn after any period, for ethical reasons. An alternating treatments design (ATD) does not require treatment withdrawal and minimizes irreversibility problem of the treatments and enables to study sequence effects. It facilitates quick comparison of two or more experimental conditions with each other or baseline. Due to treatment surrounding rule, only a limited number of intervention treatments and baseline can be compared at a time. A general method for constructing variance balanced ATDs, suitable for making comparisons of two or more experimental conditions with each other or baseline has been developed.

Two series of row-column designs for comparing investigational products with an active control/placebo in veterinary trials have been obtained. The arrangement of investigational products in the design is such that they follow 3-associate class rectangular association scheme. Further, designs for making comparisons of investigational products with more than one active control have also been obtained. Two series of symmetric factorial row-column designs were obtained. Properties of these designs have been studied and it was observed that these are partially variance balanced.

Agricultural Field Experiments Information System (AFEIS)

AFEIS is a Web-enabled information system (http://js.iasri.res.in/afeis) wherein information relating to informed agricultural field experiments (excluding purely varietal trials) conducted in the country are stored and maintained on-line. Presently, the database contained information relating to 32,462 agricultural field experiments, out of which 1727 experiments have been entered on-line by regional officers and others during the current year. For experiments with manure, alone and in combination with other factors, it was observed that 59.71% experiments were on manure alone followed by 15.70% manure with varietal trials and 12.06% manure with cultural treatments. The number of replications used in an experiment affects the precision of inferences as well as the cost of experimentation. Distribution of replication adopted, has been seen to be three in 61.16% of the experiments. Out of 32,462 experiments, raw data is available for 15,561 experiments. The software has been modified to download randomized complete block design raw data from the information system into Excel spreadsheets. The distribution of 32,462 experiments cropwise and type wise is presented below:





Experiments Planned ON STATIONS under the Project Directorate for Farming Systems Research

Under the Project Directorate for Farming Systems Research, the experiments ON STATIONS are planned and conducted under four types of research programmes viz. Development of new cropping systems; Nutrient management in cropping systems; Development of system based management practices and Maximum yield research using randomized

complete block (RCB) design, factorial RCB design, split plot designs, strip plot designs and reinforced 3^2 x 2 balanced confounded factorial experiments.

Data of 336 experiments conducted during the year 2010-11 have been received and analysis work for 220 experiments has been completed. Results have been tabulated in the form of summary tables and are being sent to the respective scientist-in-charge of the cooperating centres. The final tables of the results of the experiments have been prepared to be sent to PDFSR, Modipuram for inclusion in the project report of AICRP on IFS. The distribution of percent coefficient of variation (CV) for these 220 experiments is

CV	< 5	5-10	10-15	15-20	≥ 20
Number of Experiments	47	59	46	37	31

The assumption of normality of residual was tested using Shapiro-Wilk test for 56 experiments of Permanent plot experiment on integrated nutrient supply system in a cereal based crop sequence conducted during 2010-11. The assumption of normality is satisfied in all the experiments. Homogeneity of error variances was tested using Bartlett's χ^2 test. The error variances were found to be heterogeneous in 3 experiments, for these cases data were transformed by Box-Cox transformation procedure and were analysed using Skilling Mack non-parametric procedure for testing equality of means.

Module for online analysis of data pertaining to the experiment Intensification/Diversification of cropping sequence based on high value crops has been developed. Scripts for developing information system for experiment (Permanent plot experiment on integrated nutrient supply system in a cereal based crop sequence) have been prepared.

ON FARM Research Experiments

Three types of experiments viz. Response of nutrients; Diversification/Intensification of cropping system and Sustainable production system were planned and conducted during 2010-11 at 31 ON FARM centres. One more experiment "On-farm evaluation of farming system modules for improving the profitability of small and marginal households" has also been initiated during 2011-12 in all the On Farm Research Centres. Online data entry and analysis for Experiment Response of Nutrients conducted during 2009-10 and 15 experiments (482 trials) at 12 OFR centres has been carried out. The data of 69 experiments conducted at 1,326 farmers at 24 On Farm centres of two types (Intensification/ Diversification and Sustainable Production System) were also processed for statistical analysis.

For the experiment On farm evaluation of farming system modules for improving the profitability of small and marginal farmers suggested that it is an investigation in which interventions may help in improving the incomes of households. Also, as the holding size, crop sequences, animal size, family size etc. may not be alike for all farmers so the proposed treatments in the technical programme may be called interventions rather than the treatments. By utilizing the input and output of these interventions in the given situations, pair wise comparison can be made only by using paired t-test.

Fertilizer Response Ratios for Various Crops and Crop Sequences

Data of about 11,000 on farm trials conducted in different NARP zones with the recommended fertilizer in various crop sequences of the experiments Response of Nutrients during the period 1999-2000 to 2008-09 under AICRP on FSR has been utilized for evaluating the fertilizer response ratios (a measure of the increase in production per unit fertilizer use) of four crop sequences and different crops. Four fertilizer response ratios such as N, NP, NK and NPK over control have been obtained for different crop sequences and crops. The fertilizer response ratios of 4 major crop sequences (rice-rice, rice-wheat, maize-wheat and soybean-wheat) have been obtained and then grouped according to the groups formed on the basis of initial major nutrients (N, P, K) present in soil. The fertilizer response ratio of 15 crops (5 cereals, 4 pulses, 5 oilseeds and 1 fibre) has been obtained at NARP zones, states level and national level using suitable weights. These response ratios have been again evaluated in different soils and states.

The fertilizer responses ratios vary widely from crop to crop, state to state and also on available initial soil nutrients. FRR also observed to vary in different groups formed on the basis of available soil nutrient and pair-wise comparison of groups shows the significant difference in FRR values in different soils for all the four crop sequences taken under study.

For rice-rice sequence, the initial soil test values of major nutrients were available in 710 trials. Groups of trials are formed for low N (< 280 kg/ha), high N, low P (< 10kg/ha), high P, low K (< 108 kg/ha) and high K by Muhr's classification. The fertilizer response ratio of N

over control of rice (kharif) and rice (rabi) have been evaluated in low N and high N groups as below.

Fertilizer response ratio of Rice-Rice sequence for groups on available initial major soil nutrients (Low and High) in experimental site

Groups	No. of trials	Rice (Kharif)	Rice (Rabi)
Response ratio to N over control (kg/kg)			
N at low level	391	5.80	6.13
N at high level	319	8.01	6.17
Significant		*	NS
Response ratio to P (kg/kg)			
P at low level	131	11.99	13.20
P at high level	579	12.17	12.15
Significant		NS	NS
Response ratio to K (kg/kg)			
K at low level	100	18.10	19.00
K at high level	610	13.80	12.94
Significant		*	*

*Indicates significant at 5% level

Using Kruskal-Wallis test, the difference of response ratios of rice (kharif) between groups low N and high N is observed significant at 5% level whereas it is not significant for rice (rabi). For both rice (kharif) and rice (rabi) the fertilizer response ratios of K differs significantly between groups low K and high K.

The fertilizer response ratios at all India level for cereal group of crops are observed higher than those of oilseeds and pulsses groups. At national level the fertilizer response ratio of all nutrient combinations are high for rice crop whereas these values are moderate for wheat crop. The response ratio of jowar and bajra to various nutrients are low. In pulse crops, blackgram are low. Oilseeds observed response ratio to N over control as moderate and low for other nutrients.

Continuous use of fertilizer in farmer's field may alter the control plot output and affect fertilizer response ratios. These fertilizer response ratios obtained in the present study may be used with caution as these have been evaluated from the trials conducted at farmer's field with recommended dose of fertilizer.

Planning, Designing and Analysis of Data Relating to Experiments Conducted under AICRP on Long-Term Fertilizer Experiments

The data in respect of various crop wise characters viz. grain and straw yield, plant nutrients concentration/ uptake and available soil nutrients after the completion of each crop cycle from cooperating centres for each season pertaining to the experiments were undertaken. The superimposed treatments data on various characters relating to bifurcated plots of original treatments from the centres viz. Ludhiana (4 bifurcated treatments, each with 3 superimposed treatments); Pantnagar (2 bifurcated treatments, each with 5 superimposed treatments); Ranchi (4 bifurcated treatments, each with 3 superimposed treatments); Coimbatore (2 bifurcated treatments, each with 4 superimposed treatments) and Bangalore (4 bifurcated treatments, each with 3 superimposed treatments) were statistically analysed using the nested model to explore the possibility to utilize the build up P and to overcome the decline in yield due to inadequate supply of K or other nutrients like Zn and S. Guidelines and layout plan for bifurcations of original treatments with new superimposed treatments in one of the replications to generate new information on managing/harnessing of soil nutrients from the on-going experiment were provided to the centre in-charge of the Barrackpore centre. The scrutinized results and summary tables were provided to them for preparing their individual annual reports.

Fertilizer response ratios of different crop group (All India)

Crop Groups	Area ('000 Hectare)	No. of Trials	Average Control yield (kg/ha)	Response over control (kg/kg)			
				N	NP	NK	NPK
Cereals	86863.1	9909	2056.2	9.51	10.45	10.00	11.06
Oilseeds	15677.6	1086	1082.5	9.38	6.16	7.74	6.36
Pulses	5580.1	197	679.2	7.77	6.21	8.54	6.37
Foodgrains	**108120.8**	**11192**	**1843.9**	**9.40**	**9.61**	**9.60**	**10.13**

Programme 2: FORECASTING AND REMOTE SENSING TECHNIQUES AND STATISTICAL APPLICATIONS OF GIS IN AGRICULTURAL SYSTEMS

Weather Based Forewarning of Mango Pests

Weather based forewarning models have been developed for weekly disease incidence assuming that disease incidence in a particular week is due to two reasons viz. natural disease growth pattern and weather. Therefore, the model has been developed in two stages, modeling natural growth pattern and relating the deviations (from natural pattern) to appropriate lagged weather variables.

For natural growth pattern, the appropriate model was

$$Y_i = \frac{23.119}{1+226.222\,e^{-0.799Wk}}$$

where Y_i is per cent disease incidence in i^{th} week (averaged over years), *Wk* is week number.
Deviations of weekly disease incidence from natural growth pattern were related with previous week population and weather with appropriate lags. The form of the model was

$$y_k = A_0 + \sum_{i=1}^{p}\sum_{j=0}^{1} a_{ij} z_{ij} + \sum_{i,i'=1}^{p}\sum_{j=0}^{1} a_{ii'j} z_{ii'j} + c y_{km} + e$$

where

$$z_{ij} = \sum_{m=n_1}^{n_2} r_{im}^{j}\, x_{im},\ z_{ii'j} = \sum_{m=n_1}^{n_2} r_{ii'm}^{j}\, x_{im}\, x_{i'm}$$

y_k : Per cent disease incidence in k^{th} week (deviation from natural pattern)

y_{km} : Disease incidence in m^{th} lag-week to k^{th} week (deviation from natural pattern)

x_{im} : Value of i^{th} weather variable (deviation from average) in m^{th} week lag

r_{im} : Correlation coefficient between y_k and x_{im}

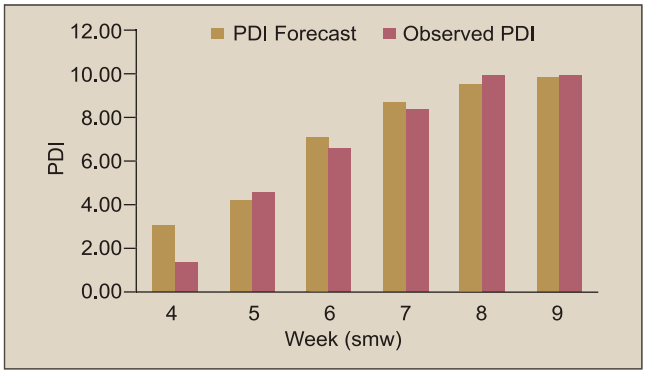
$r_{ii'm}$: Correlation coefficient between y_k and product of x_{im} and $x_{i'm}$

p : Number of weather variables

n_1/n: Initial/Final week lag for which weather data was included in the model and

e : random-error term

Models were developed taking weather variables (x_i, i=1, ..., 6 represent maximum relative humidty, minimum relative humidity, maximum temperature, minimum temperature, wind velocity and rainfall) with different lags (1 to 4) and disease incidence of previous week. The model taking data of previous two weeks (lag 1 and 2) was found appropriate. The model was $y_k = 0.045 + 1.08\ y_{k1} + 5.836\ z_{31} + 3.093\ z_{260}$ and $R^2 = 0.89$. Using this model, forecasts of per cent disease incidence in different weeks for 2008-09 were obtained and are presented as



The results indicate that forecasts are quite close to the observed ones (deviations less than 10 per cent) except in the first week i.e. week of disease appearance. It may be due to the reason that in this year, disease appeared late as compared to years used for modeling. Time of first appearance can be obtained using the model reported last year. Therefore, it can be concluded that using this model, reliable forecasts for per cent disease incidence can be obtained using two weeks data upto preceding week.

Visioning, Policy Analysis and Gender (V-PAGe) (Sub-Prog. III): Policy Analysis and Market Intelligence (NAIP Project)

Demand elasticities were estimated for major spices (turmeric, garlic, ginger, dry chilli and other spices) for rural and urban areas of different regions. The expenditure elasticities of demand for selected spices except ginger were found to be moderately inelastic and ranged from 0.65 to 1.0 in all the regions. These elasticities were lower in urban areas as compared to rural areas of north, west, south and east regions. On the other hand, the expenditure elasticities were higher in the urban areas than that of rural areas of north-east region. Further, the expenditure elasticities of demand

for ginger were higher in the urban areas than that of rural areas of all the regions. Direct demand for major spices was also projected for the year 2015 and 2020 under high and moderate growth scenarios. The projections showed that the household demand for spices under moderate and high growth scenarios would be 4.56 & 5.52 million tonnes during 2015 and 6.72 & 8.22 million tonnes during 2020, respectively. During 2020, the demand for garlic and ginger was projected to be 1.38 & 0.64 million tonnes under moderate and 1.78 & 0.81 million tonnes under high growth scenarios, respectively. The demand of spices would be the highest in the southern region followed by western region of India. The supply analysis was carried out for major wheat and rice producing states of India. The estimation procedure includes an estimation of yield and area response through econometric analysis and these models were estimated simultaneously using Zellner's SUR method. The analysis showed that gross irrigated area, seed and lagged yield were significantly influencing the area sown and current yield realized. Own and competing crops relative prices were found to have significant influence on yield in all selected states. Fertilizer consumption had significantly increased the area under wheat crop in Uttar Pradesh.

The efficiency criterion for future and cash markets was examined for discovering better price in soybean trade. The vertical market integrations among wholesale prices of groundnut products, namely seed, oil and cake were studied using the sequential procedure of Johansen's multivariate cointegration technique. The results of the sequential multivariate cointegration tests for Chennai markets showed that the seed and oil prices of groundnut were integrated while oilcake was out of the system. In case of Hyderabad, price series at all the processing levels were integrated with each other in the long run. The speed of adjustment to the equilibrium was also studied using Vector Error Correction Model. The results showed that even though the seed and oil are integrated in both Chennai and Hyderabad markets, the speed of adjustment is more in Chennai as compared to Hyderabad. The analysis of farmers' participation in future markets showed that most of the potato growers were unaware about future trading and opined that future market is a speculative market (*Satta Bazaar)* and not for hedging against price risk. The warehouse owners can be used as agency for financing, providing reliable market intelligence and quality and quantity certification. The margin should be fixed for farmers for instilling the confidence among the farmers' about participation in futures market. Based on information collected from potato farmers, warehouse owners and future traders, a model is being developed for potato farmers' participation in futures market.

Asymmetry in Retail Wholesale Price Transmission for Selected Essential Commodities

The prevailing large difference between wholesale and retail price of gram in the important markets in the country indicated towards delayed or lack of information flow and not following the market efficiency criterion. The study of vertical and horizontal cointegration between wholesale and retail price of gram in the selected markets of Bhopal, Chittoor, Delhi and Ganganagar using test and eigenvalue statistics indicated that there existed cointegrating vectors and cointegrating equations which confirmed a long run relationship in the Gram markets. The value of error correction coefficient ã was observed to be significantly higher (the speed of price adjustment) in Chittoor and Bhopal markets as compared to Ganganagar and Delhi markets. The value of long run multiplier suggest that the equilibrium between wholesale and retail price of gram in Chittoor market takes minimum time of 4 days, Bhopal 7 days, Ganganagar 49 days and Delhi market takes 63 days to attain the equilibrium level between wholesale and retail prices.

Programme 3: DEVELOPMENT OF TECHNIQUES FOR PLANNING AND EXECUTION OF SURVEYS AND ANALYSIS OF DATA INCLUDING ECONOMIC PROBLEMS OF CURRENT INTEREST

Sampling Methodology for Estimation of Meat Production in Meghalaya

The study was planned to modify the existing sampling methodology for estimation of meat production by working out the ratios of meat production between slaughter/butcher shops in meat markets and households and to estimate the species-wise number of animals slaughtered and meat production from different sources at district level with reasonable degree of precision.

A sample survey was carried out in East Khasi Hills district of Meghalaya State. Here, the meat markets are the major source for capturing the information on meat production. The complete enumeration of butcher shops was carried out in all the weekly and daily meat markets once in a year. 13 daily and 12 weekly meat markets

were randomly selected for recording the data on species-wise animal slaughtered and meat yield.

The study established that a substantial number of each kind of animals were slaughtered by the households in the villages of the East Khasi Hills district. Neglect in capturing the slaughtering in villages could be the reason of underestimate of animals slaughtered in the Meghalaya State. In north eastern hilly regions, there are difficulties to collect the data from villages due to the typical topography so it is suggested that the data on animal slaughtered and meat production may be collected at a regular interval of time from the villages and a correction factor of 8.6% to the estimates of meat production from meat markets should be added as the annual meat production from villages for estimating the total annual meat production in the years for which data is not collected from the villages.

National Initiative on Climate Resilient Agriculture (NICRA)-Agroforestry Component

For estimation of area under agroforestry using Remote Sensing and GIS techniques, two districts namely, Ludhiana from Punjab and Vaishali from Bihar States were identified. High resolution satellite imageries (LISS IV), digitized district maps with village boundaries and toposheets of the two districts under study namely, Ludhiana from Punjab and Vaishali from Bihar States were procured. Geometric correction of the satellite imageries was carried out with the help of scanned and geo-referenced Survey of India (SOI) toposheets. Digital image processing of the satellite data for both the districts was done using ERDAS Imagine software. Extensive ground truthing for image analysis was done in 20 villages of 7 blocks of Ludhiana district and in 22 villages of 8 blocks of Vaishali district.

For estimating area under agroforestry, the satellite imageries were first classified using unsupervised classification method in ERDAS Imagine software and then supervised classification method using maximum likelihood classifier. Another approach of classification i.e. masking of each layer and then mosaicing was also used. Land use land cover map was generated for both the districts. The total number of classes obtained in Ludhiana and Vaishali districts was nine and five respectively. Area under agroforestry for Ludhiana and Vaishali districts were obtained as 6039.80 hectares and 217.86 hectares respectively. Accuracy assessment, an essential part of remote sensing based mapping, was also done and overall classification accuracy for Ludhiana district was found to be 94.28%. Area estimated is a product of number of pixels classified under agroforestry and resolution of the pixels (5x5 sq.m.). Assuming one tree per pixel under agroforestry, the number of trees estimated in Ludhiana and Vaishali are 24,17,400 and 87,144 respectively.

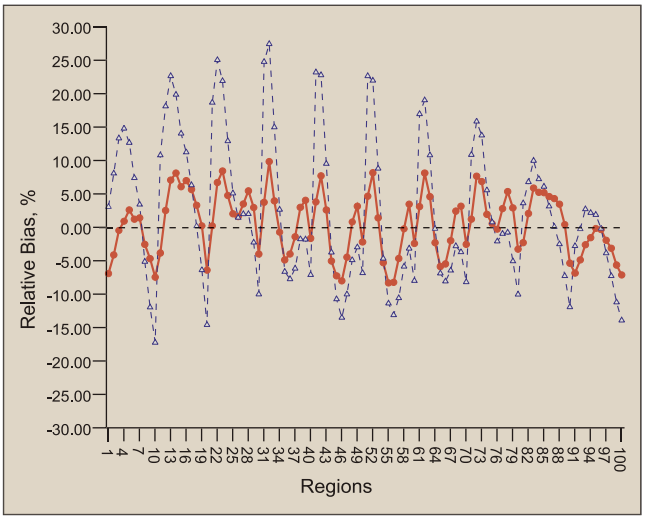
On Small Area Inference using Survey Weights

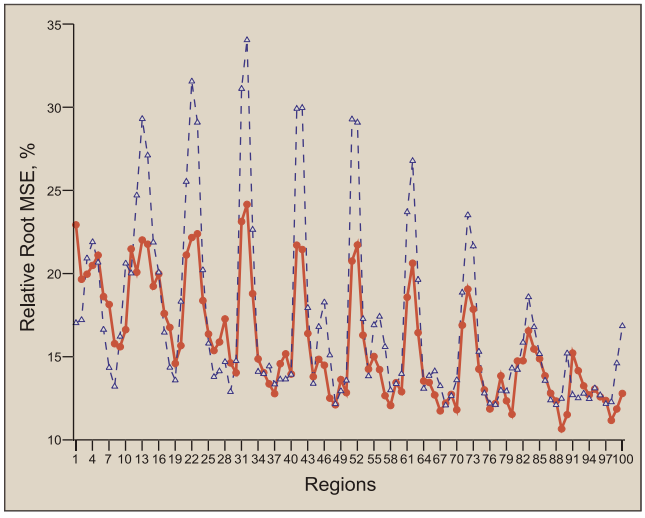
In several cases population level auxiliary information is not available and sometimes this information exist but is not accessible for use in survey estimation. In some cases, population and sample data can have inconsistency with respect to definition of auxiliary information since they are collected by different agencies/sources. In such situations, it is not possible to make full use of auxiliary information available in the survey data. When small area estimation is used, this problem becomes more serious as auxiliary information is very crucial and important. Keeping this in view, a small area estimator for small area means has been developed for the situation when population level auxiliary information is not available. The developed small area estimator uses estimated population level auxiliary information using survey weights. Unbiasedness property of the proposed small area estimator has also been studied. Besides, Mean Square Error estimator of small area estimator has also been developed. The developed method has a wide scope for adaptation in real life survey data analysis.

Spatial Nonstationarity in Small Area Estimation under Area Level Model

In recent years, the focus of economic and social planning has shifted from the macro to the micro level, and small area estimation is now of considerable interest to both planners and researchers in the country. Commonly used method of small area estimation, for example, empirical best linear unbiased predictor (EBLUP) under a linear mixed model assumes that the relationship between the variable of interest and auxiliary information is same over the study space. However, in many data sets this is not true and the process is referred to as the spatial non-stationary. This type of phenomenon is very common in agricultural and environmental data where relationship, that is, rate of change in target variable and auxiliary information changes from location to location. A geographically weighted pseudo empirical best linear unbiased predictor (GWEBLUP) for small area means under area level model has been developed. The proposed

estimator of small area mean is based on geographical weighted regression approach to incorporate the spatial non-stationarity present in the data. The method captures the local variation (or relationship) between the variable of interest and available auxiliary information via location specific models in small area estimation. The micro level estimates generated by using the developed small area estimation method are more reliable than the existing methods when spatial non-stationarity is present in the data. A comparison of relative biases and relative root mean square errors of the proposed GWEBLUP (solid line, red) and the EBLUP method (dash line, blue) are shown below. The GWEBLUP estimates have both smaller biases and root mean square errors as compared to the EBLUP estimates.





Determination of Optimum Sample Size for Crop Yield Estimation at the Gram Panchayat Level

In this study data was procured from the Ministry of Agriculture. Analysis of data was made through R package. Codes were written for generation of all possible simple random without replacement sample from a population and working per cent CV as per the design of sample survey for yield estimation at the GP level. Sample sizes were determined as per the specified criterion.

Optimum sample size required for yield estimation at GP level

State	Sample Size	Crop
Madhya Pradesh	3	Paddy (un-irrigated and irrigated),Soybean (Raisen district), Arhar, Gram
	4	Wheat (irrigated and un-irrigated), Soybean (Sehore district)
	5	Maize
Andhra Pradesh	6	Maize, Paddy
	8	Groundnut

District Level Poverty Incidence Estimation from NSSO Data using Small Area Estimation Technique

Measurement of poverty and its estimation has always been an important activity of the planning process in every developing country. Poverty measurement is generally based on household consumption expenditure surveys. Household consumption expenditure data in India are collected through National Sample Surveys Office (NSSO). At present, reliable estimates of poverty related parameters are available only at the state level. In view of the problem of non-availability of reliable estimates of various poverty related parameters at the district level for micro-level planning, a study was undertaken with the specific objectives of developing reliable district level estimates of various poverty parameters using small area estimation technique. The poverty parameters considered in the study were head count ratio, income gap ratio, poverty gap ratio and squared poverty gap ratio. Besides, estimates were also obtained for other related parameters like the number of persons, number of poor persons, monthly per capita consumer expenditure (MPCE) at the district level as well as various holding category wise, amount of loan outstanding at the district level and number of persons

in the various MPCE classes. The data of 59th and 61st round data of NSSO for the rural areas was used. The 59th round data pertained to UP and was used to estimate the parameter amount of loan outstanding at the district level. The 61st round data pertaining to UP, MP and Punjab was used to estimate number of persons, number of poor persons, poverty ratio, income gap ratio, poverty gap ratio, squared poverty gap ratio and number of persons falling in MPCE classes. Two types of estimates were developed. The first one was direct district level estimate which used only district specific sample size. The district level small area estimates were developed using an area level linear mixed model. The covariates used in the small area estimates were obtained from 2001 population census data. The results of the analysis clearly revealed that the small area estimation technique based estimates had better precision as compared to the direct district level estimates. Further, various small area diagnostic procedures were performed to validate the reliability of the model-based small area estimates versus direct survey estimates. The study clearly showed that the various poverty estimates were highest for MP state followed by UP while the minimum values were obtained for Punjab state.

Agricultural Research Data Book (ARDB)

The Agricultural Research Data Book 2011, which is the fourteenth in the series, is an attempt to put together main components/indicators of all the information pertaining to agriculture. The Data Book comprising 170 tables is organized, for the purpose of convenience of the users, into ten sections namely, Natural Resources; Agricultural Inputs; Animal Husbandry, Dairying and Fisheries; Horticulture; Production and Productivity; Agricultural Engineering and Produce Management; Export and Import; India's Position in World Agriculture; Investment in Agricultural Research and Education; and Human Resources under National Agricultural Research System (NARS). It also contains at the end, a list of important National and International Agricultural Research Institutions associated with agricultural research and education along with their addresses, telephone numbers and e-mail addresses. This edition contains the latest information / data as available in the country at the end of May 2011. In ARDB 2011, some value editions like predicting the future year production of foodgrain crops etc., based on previous years data using statistical models, pictorial/graphical representations of data have been done. For depicting state-wise data, thematic maps have been prepared using Geographical Information System (GIS).

Programme 4: MODELING AND SIMULATION TECHNIQUES IN BIOLOGICAL SYSTEMS

Stochastic Process Modelling and Forecasting through Discrete Non-linear Time Series Approach

Threshold Autoregressive (TAR) model is an important parametric family, which is capable of describing cyclical data. An important subclass of TAR model is Self-exciting TAR (SETAR) model, which is based on a "piecewise" linear approximation via partitioning a state-space into several subspaces. Self-exciting threshold autoregressive moving average model (SETARMA) two-regime model has been fitted which is capable of describing cyclical data. Real-coded genetic algorithm (RCGA) is employed to estimate the parameters of this model. As an illustration, Annual Mackerel catch data of Karnataka, India during the period 1961-2008 is considered. Before estimation of parameters an exploratory data analysis for justifying SETARMA model has been carried out. Using Naive approach and Monte Carlo simulation technique, out-of-sample forecast performance of SETARMA model vis-à-vis ARIMA and SETAR models, is examined on the basis of Mean Square Forecasting Error (MSFE). It is found that SETARMA model generally performs better. Finally, optimal out-of-sample forecasts up to three-steps ahead along with their forecast error variances are derived theoretically for fitted SETARMA model. It is observed that, for hold-out data, observed values are quite close to forecast values and estimated variances are near to theoretical values up to three steps ahead prediction.

Development of Methodology for Estimation of Compound Growth Rate and its Web-based Solution

Formulae for computation of compound growth rates on the basis of two four-parameter nonlinear growth models, viz. Richards and Mixed-influence model have been derived. Formulae have also been derived for computation of compound growth rates in respect of non-monotonic situations for all the three possibilities, viz. Over-damped, critically damped, and under-damped.

Assuming the random variable, where r_t represents $\log(1+r_{t+1})$ compound growth rate, to follow a nonstationary process, the model describing growth for time-series data is

$$Z_t=\log Y_{t+1}-\log Y_t=\log(1+r_t)=g(\tfrac{t}{n})+\varepsilon_t$$

Local linear smoothing approach has been employed to estimate $f_t = g(\frac{t}{n})$. Optimal bandwidth of the kernel used in local linear smoothing has been obtained by minimizing Mean Integrated Squared Error (MISE). Modified plug-in bandwidth estimation approach has been used to minimize MISE. Finally trend of growth rate has been estimated by the large sample approximation $\hat{E}(r_t) = \exp(\hat{f}_t)-1$. Local polynomial smoothing approach has been employed to estimate time-dependent compound growth rate. Optimal bandwidth of the kernel used in polynomial smoothing is obtained by minimizing MISE through bootstrap. The bias and variance are obtained by replacing the estimated local trend and bandwidth in asymptotic theoretical expression. Under dependent error set-up, the two kernel smoothers have been used. Modified plug-in bandwidth estimation approach has been used to minimize MISE which is a function of unknown $g(.)$ and the scale and decay parameters. The optimal bandwidth of the kernel is obtained by minimizing MISE by iterative procedure where the scale and decay parameters of autocovariance function is estimated by regressing log periodogram of estimated error sequence on logarithm of frequencies. Code has been constructed in R language for estimation of compound growth rate using three-parameter nonlinear growth models, viz. Monomolecular, Logistic, Gompertz model and four-parameter nonlinear growth models, viz. Richards and Mixed-influence model. A web-based user interface has been developed to upload users' data online and to provide initial parameter values for the selected growth model. Based on the uploaded data and values of the initial parameters, code has been constructed to compute the estimated compound growth rate through the web-interface. Code for computing various statistics like Estimation of parameters, Predicted and residuals values, Shapiro-wilk normality test for residuals have also been constructed and incorporated into the web application.

Bio-prospecting of Genes and Allele Mining for Abiotic Stress Tolerance

Characterization and utilization of bio-diversity that is available in India is essential to meet the challenges of biotic and abiotic stresses under changing climate. For meeting the challenges of characterization of biodiversity

- Rice Germplasm database has been populated with the phenotypic data provided by the consortium centres, viz., NRCPB, IARI-New Delhi and CRRI-Cuttack.
- A transcriptome databases on camel, goat and bacteria (Enterobacter aerogenes) species has been developed from the data provided by NBAGR, Karnal and CIFRI, Barrackpore.
- SNVs data of camel and goat species provided by NBAGR has been parsed and a database on the same has been developed.
- Key residues responsible for salt stress tolerance across species for six different gene families have been identified by using bioinformatics approaches.
- ESTs similar to salt tolerant genes were annotated from the sequence data provided by CIFRI and further submitted at NCBI.
- Anoxia tolerant protein models were predicted and submitted to Protein Model DataBase (PMDB). These protein structures were predicted to find the structural conservedness among the anoxia tolerant proteins.
- Gene sequences for drought, acidity and temperature (chilling, freezing, heat and cold) stresses have been collected across the species and studied for the functional and structural conservedness.

Programme 5: DEVELOPMENT OF INFORMATICS IN AGRICULTURAL RESEARCH

Strengthening Statistical Computing for NARS

Strengthening Statistical Computing for NARS (www.iasri.res.in/sscnars) targets at providing

- research guidance in statistical computing and creating sound and healthy statistical computing environment and
- providing advanced, versatile, innovative and state-of-the-art high end statistical packages for analysis of data so as to enable drawing meaningful and valid inferences and converting research output into knowledge

The efforts also involve design intelligent algorithms to implement statistical techniques particularly for analyzing massive data sets, simulation, bootstrap, etc. It also involves capacity building. Achievements, usage and impact is summarized in the sequel.

Capacity Building

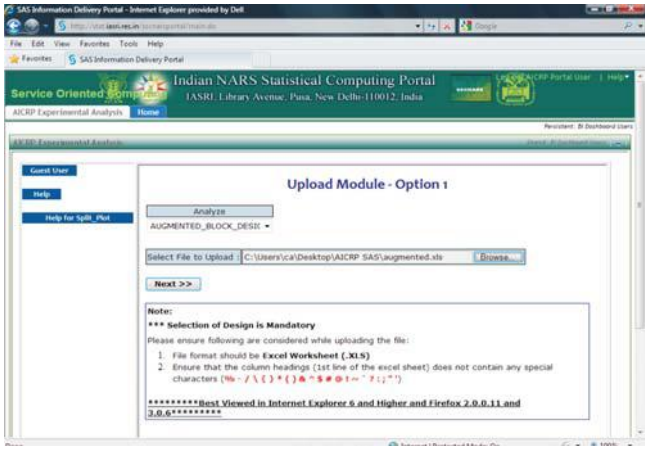
- 776 researchers of NARS have been trained through 37 training programmes of one week duration each. With this the number of researchers trained has gone upto 1672 through a total of 80 training programmes. Out of these 37 training programmes in 2011-12, 07 were organized by IASRI, New Delhi and rest 30 by consortium partners. 13 of these training programmes were organized at doorsteps of users such as at Pt. Deen Dayal Upadhayaya Veterinary University and Gau-Anusandhan Sansthan, Mathura; NDUA&T, Faizabad; PAU, Ludhiana; GBPUA&T, Pantnagar; CIRG, Makhdoom; CSUA&T, Kanpur; OUAT, Bhubaneshwar; BCKV, Kalyani; IGKV, Raipur; ICAR Research Complex for NEH Region, Manipur centre, Imphal; CPCRI, Kasargod; Karnataka Veterinary, Animal and Fisheries Science University, Bidar; RARS Tirupati. 09 of these training programmes were on specific topics such as Data Analysis of Natural Resource management Research, Genetics/Genomics Data Analysis using SAS; Data Analysis in Social Sciences Research; Data Analysis and Interpretation of Farm Implements and Machinery Research, Data Mining Using SAS; Data Analysis in Dairy Science; Analysis of Veterinary Science Data and Multivariate Data Reduction and Analysis.
- 100 scientists have been sensitized on Data Analysis Using SAS through FOCARS by NAARM, Hyderabad (a total of 258 scientists were sensitized).
- WebEx sessions on JMP Genomics 5.1 were arranged.
- To discuss the progress made, lessons learnt and future course of action for Strengthening Statistical Computing for NARS, two Partners' meet were organized. It was decided that Statistical Computing hubs should facilitate the installation of the software at regional stations of different NARS organizations located in the same/nearby cities that of Statistical Computing Hubs. Nodal Officers from other NARS organizations may also be requested to help in this endeavour.

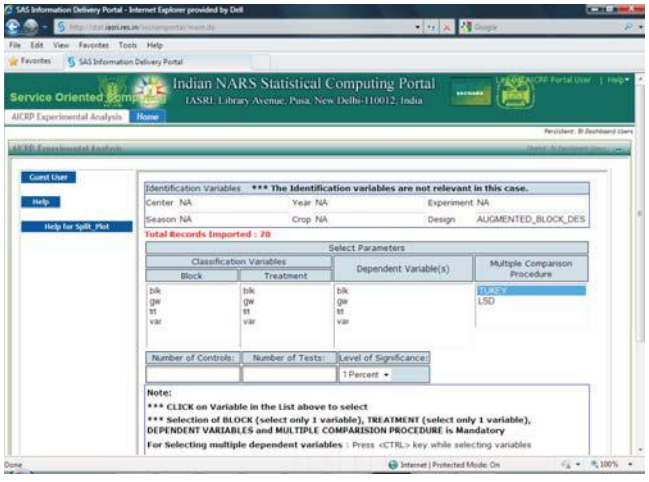
Updates, Upgrades and Installation

- Updates and upgrades were received. To sort out implementation issues and refinements in installation process, handing over of updates and upgrades and face to face interaction with nodal officers, second Workshop-cum-Installation training programmes at 08 statistical computing hubs except ICAR RC NEHR Barapani were organized. Updates and upgrades have been handed over to 128 NARS organizations. The software is installed on 1623 computers across NARS out of which 653 installations were done during the year.

Strengthened Indian NARS Statistical Computing Portal

- For providing service oriented computing, Indian NARS Statistical Computing portal has been established which is available to NARS users through IP authentication at http://stat.iasri.res.in/sscnarsportal. Any researcher from Indian NARS may obtain User name and password from Nodal Officers of their respective NARS organizations, list available at www.iasri.res.in/sscnars. Analysis of





data generated from any block design (complete or incomplete), augmented block designs, split plot design and combined analysis of block designs is available on this portal. Some screen shots showing the analysis of augmented block designs through portal are shown in above snapshots.

Following can also be accessed through IP authenticated networks:

- **Web Report Studio:** http://stat.iasri.res.in/sscnarswebreportstudio
- **BI Dashboard:** http://stat.iasri.res.in/sscnarsbidashboard
- **Public Page:** http://stat.iasri.res.in/sscnarsportal/public
- **E-Miner 7.1:** http://stat.iasri.res.in/SASEnterpriseMinerJWS/Status
- **E-Miner 6.1:** http://sas.iasri.res.in:6401/AnalyticsPlatform
- **Web OLAP Viewer:** http://sas.iasri.res.in:8080/sscnarswebolapviewer

Macros Developed for Customized Analysis

- For customized analysis, macros for analysis of data generated from Split-split plot design; Split Factorial (Main A, Sub B x C) designs and econometric analysis (diversity indices, instability index, compound growth rate, Garret scoring technique and Demand analysis using LA-AIDS model) have been developed and made available on the project website.

Sensitization of Researchers

- Website of the project is being maintained and updated regularly. Website registered under google analytics on November 15, 2010. Till March 31, 2012, there were 10153 page views across 228 cities of 60 countries. During April 01, 2011 – March 31, 2012, there are 8214 page views across 205 cities of 56 countries. Average time on page is 4.12 minutes.
- To sensitize the researchers about the availability of this high end statistical package, more than 20 presentations were made in training programmes/ Workshops/ Conferences/ Special Session at different NARS organizations.
- Nodal officers have been requested to provide a link of the project websites on LAN of their respective organizations.

Usage and Impact

The capacity building efforts have paved the way for publishing research papers in the high impact factor journals.

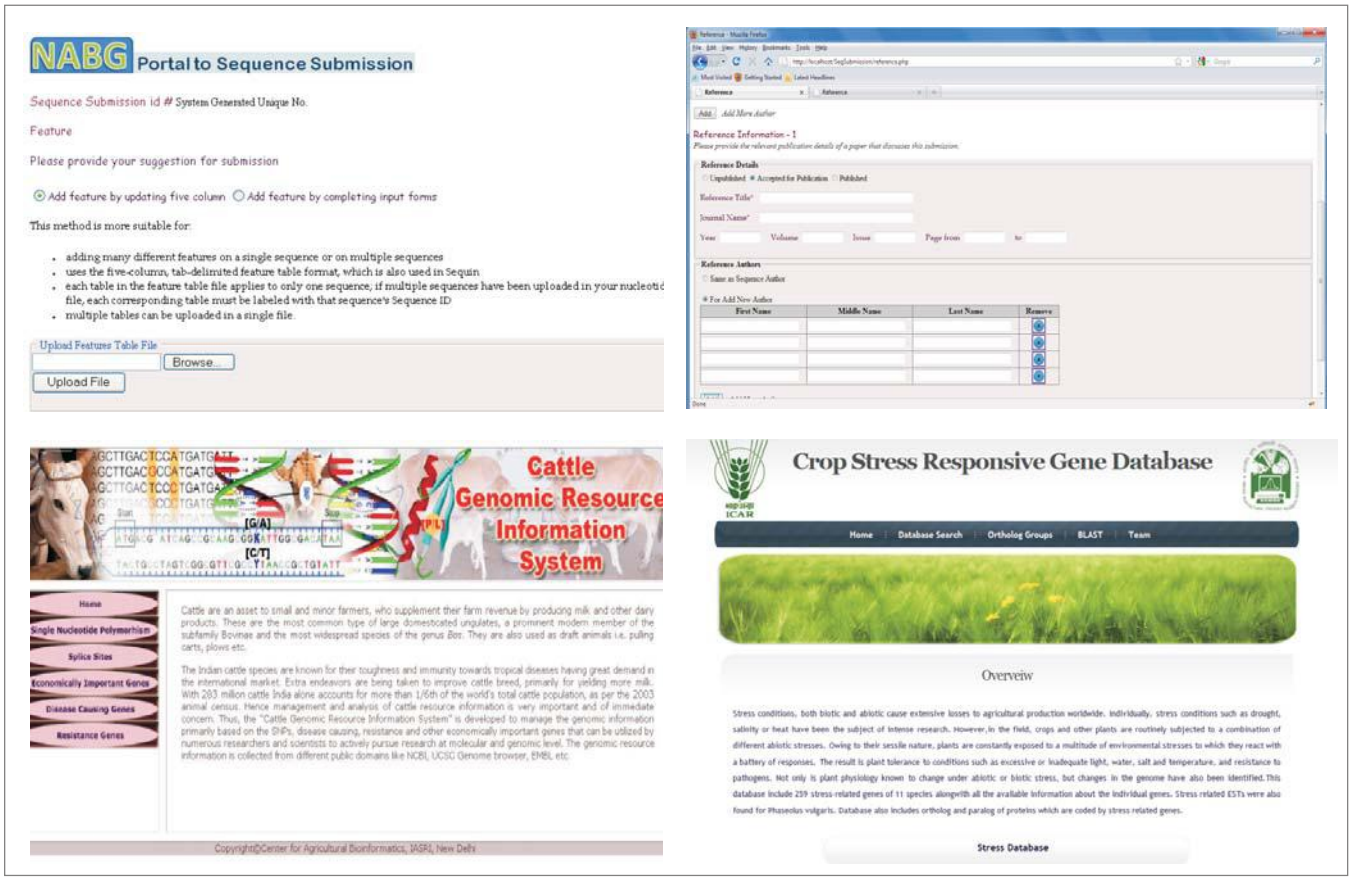
- Based on feedback received from 142 NARS organizations, 98 research reports, 100 research papers have been published/ accepted for publication (in journals like Animal Food Science and Technology, Field Crops Research, Journal of Food Engineering, Euphytica, Journal of Applied Polymer Science, etc.) by analysing the data using high end statistical computing facility; 60 students have used this in their dissertations; 984 students have used in their course work. The software is installed on more than 1623 computers across NARS. There are 692 new users out of 1892 total users of this high statistical computing facility.
- Nodal officer from CMFRI, Kochi has reported in saving of 20 man months in compilation of data related to Marine Fish Household Census 2010 consisting of 10 lakh households with 16 attributes,
- On the consortium website, there are hits across 228 cities of 60 countries.
- The e-manual developed has been cited in Journal of Doctoral Research in Economics of the Bucharest Academy of Economic Studies. The macro developed for augmented designs has been cited by Jennifer Kling, Oregon State University in Introduction to Augmented Designs.
- Number of hits on Indian NARS Statistical Computing Portal (outside IASRI) since April 2011: 4587 (on an average more than 12 hits per day).
- It has been included in FOCARS training programme by NAARM, Hyderabad.

Establishment of National Agricultural Bioinformatics Grid in ICAR

A genomic portal for submission of genomic data has been developed and this would be used for storage of Nucleotide, Genes, Genome, EST, GSS, SNP, RNA etc. Apart from this, number of other databases related to biological data have been extended and populated Cattle Genome Resource Information System.

Following four important research studies have been initiated in collaboration with partner institutions

- Identification and characterization of genomic sequences responsible for salinity-stress in cereal crops-rice, sorghum, maize and wheat.



Genomic Portal and different databases

- Study of synonymous codon usage and its relation with gene expressivity in genomes of halophilic bacteria.
- Analysis/Assessment of synonymous codon usage of Cytochrome P450 mono-oxygenase in agriculturally important insects.
- In-Silico identification of genes responsible for late blight disease in potato.

A detail review regarding genomic resources in the field of agriculturally important insect has been done.

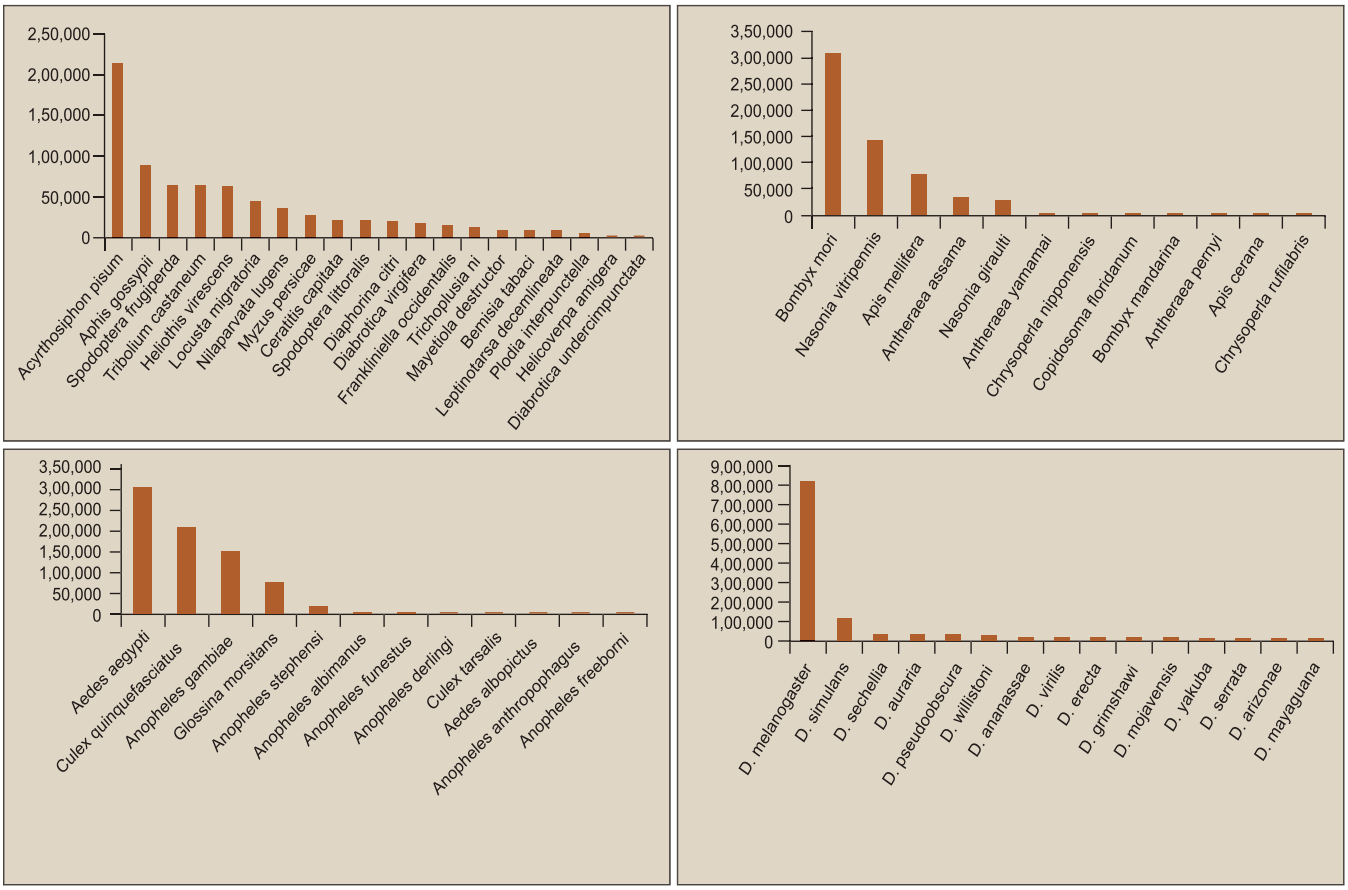
A study on analysis and functional annotation of EST's of Water Buffalo has been conducted. In this, EST including functional annotation, detection of SSRs, pSNPs, protein domains, signal peptides in Bubalus bubalis are performed for 1825 EST sequences obtained from public domain.

A phylogenetic analysis and secondary structure prediction of 15 drought tolerant Cap binding proteins from different plant species was carried out. On the rectangular cladogram *Mirabilis jalapa* was nearest to the origin and is placed separately with *Ricinus communis* forming separate cluster with root distance 0.019090 and pair distance 0.10204 with *Ricinus communis*.

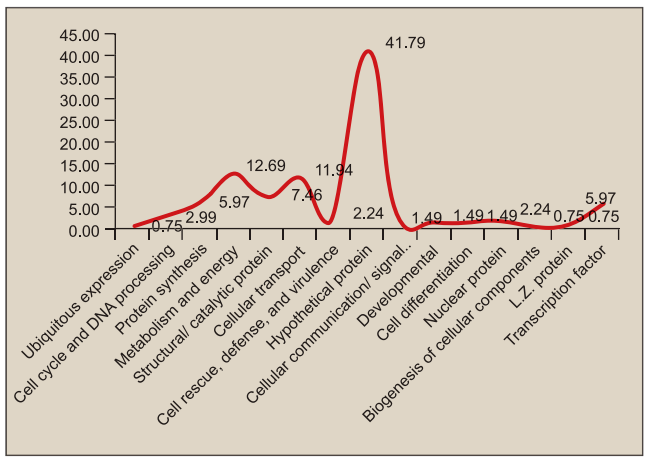
A review article of anti-microbial peptide and its role in agricultural biotechnology has been written.

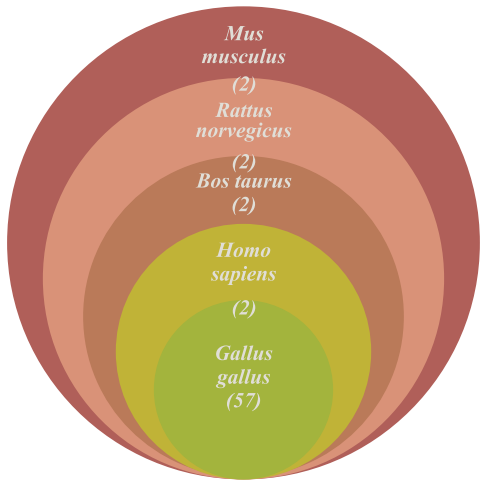
Numbers of other studies in different area of research in bioinformatics have been initiated such as:

- Genome-Wide Analysis for Identification of Salt-Responsive Genes in *Oryza Sativa.*
- Functional Analysis of Salt-Responsive ESTs in *Oryza Sativa*
- Synonymous Codon Usage of Cytochrome P450 Monooxgenase (Cyps) in Agriculturally Important insects
- Functional Analysis of Salt-Responsive ESTs in *Vitis Vinifera* (Grapes)

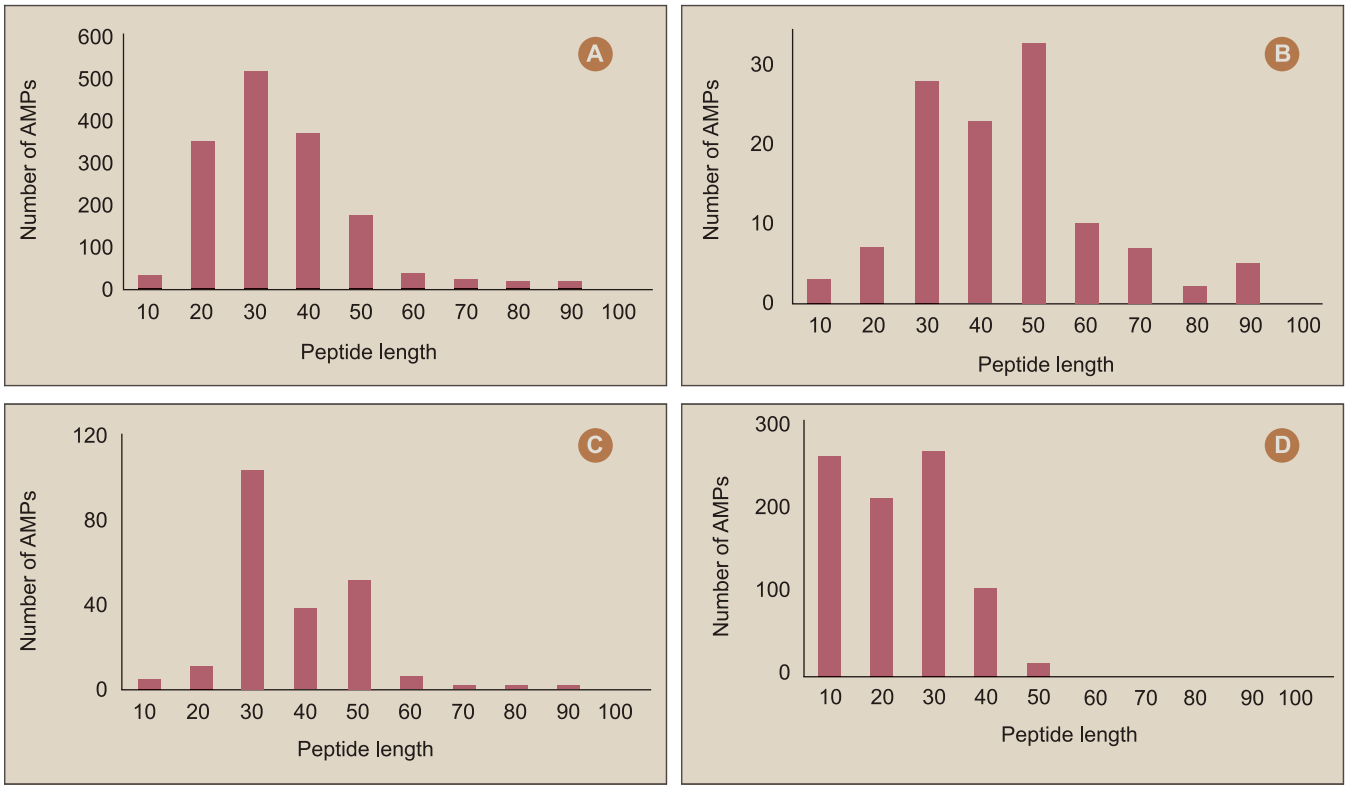


Expressed Sequence Tags related to important insects available in the public domain.





Frequency of genes in different functional categories *Bubalus bubalis* and Venn diagram for shared gene with different organism

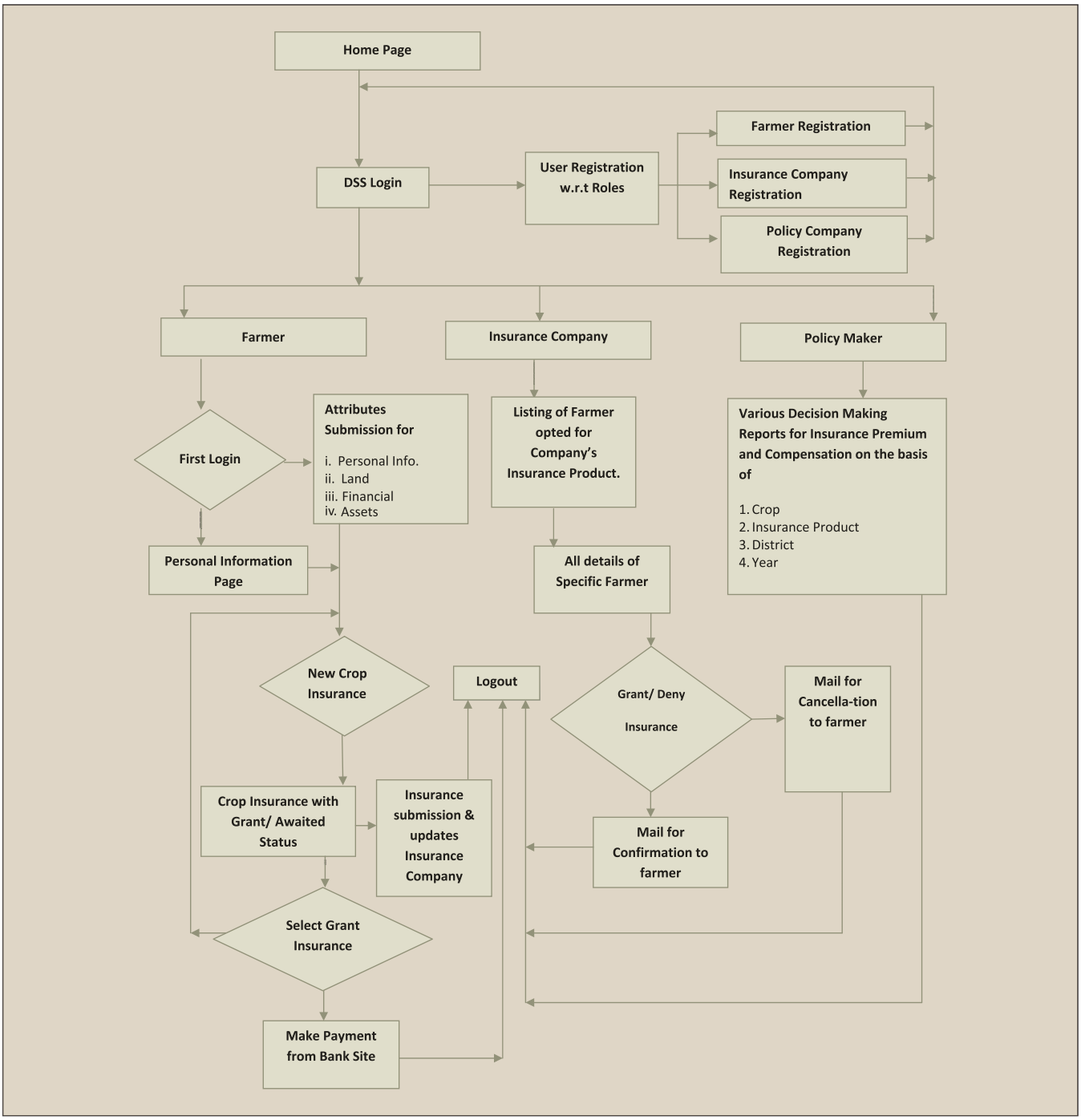


Distribution of AMPs in APD in terms of peptide length from (A) all sources (B) Bacteria (C) plants (D) amphibians.

Risk Assessment and Insurance Products for Agriculture

In order to characterization and mapping of all the districts based on various socio-economic parameters four indices were developed i.e. infrastructural index, health and sanitation index, nutritional index, economic status index for all 500 districts of the country. Finally, all these indices were integrated using data driven weights to formulate a livelihood index. Bio-physical index has been developed for all 500 districts of the country for assessment of agricultural potential. It is based on long term weather parameters and soil conditions etc. in collaboration with CRIDA. In order to assess the income risk at household level, Logistic regression model after incorporating survey weights has been developed. Also, to assess the yield risk at district level, Weather index based models have been developed. Further, Classification and Regression Technique (CART) has been applied on different weather parameters in Tamil Nadu to get various thresholds for yields in rice crop. This will be useful for development of new customized insurance products at local (district) level. The timely dissemination of information to the farmers is closely linked to the agricultural development and well being of the rural communities. Quick information transfer between the researchers and the farmers has specific importance. Hence, a prototype of comprehensive information and Online Decision Support System is developed for effective knowledge delivery for farm entrepreneur related to risk assessment and insurance product. The purpose of this system is to provide to farmers, insurance companies and policy makers for risk mitigation against uncertain risks like climate risks, production risks, etc. The system is divided into four major modules

- Farmers Module
- Insurance Company Module: Description for various insurance schemes to help and to provide further assistance to reduce crop risks.
- Policy Maker Module: Information about different policies being associated to the crop risk and the solutions for the farmers.
- Administrator Module: Administer all the tasks for DSS e.g. Login Process with roles.



Farmers Window: In this, the farmer has to provide information on the basis of his household characteristics like lighting source, cooking source, ration card information etc. Farmer also needs to provide information on the basis of his land attributes like land owned, land type, land irrigated etc. which are among the most important attributes for the crop insurance. Other attributes are farm assets and financial attributes. The farmer belongs to small marginal or upper marginal is based on his financial status. On the basis of these

particulars of the farmer, the crop insurance products which are available for framer for a particular crop on the basis of his profile will be displayed. The farmer will have option to choose the products from the alternatives which suits his risk coverage and finances. Payment of the premium amount is done after selection of payment mode and specific bank name. After this the farmer is redirected to the bank's site for further processing. Further, farmer can directly go for the second insurance by clicking on add new crop insurance or log out from the system. On the further login a user will see all the previous insurance details along with the scenario to go for new one. The data flow diagram of the system is provided in figure.

Administrator Window: All the databases, models related to risk assessments and users profiles are to be administered through the administration window. Administrator window shows various user profiles for activation/de-activation. Information about all the insurance companies is available in order to activate or de-activate user accounts. As soon as specific user is activated, he is allowed to login into the system. A mail is sent to the user's e-mail for the login details and activation or deactivation information. All data extraction module and model building exercise is in control of administration window.

Insurance Company Window

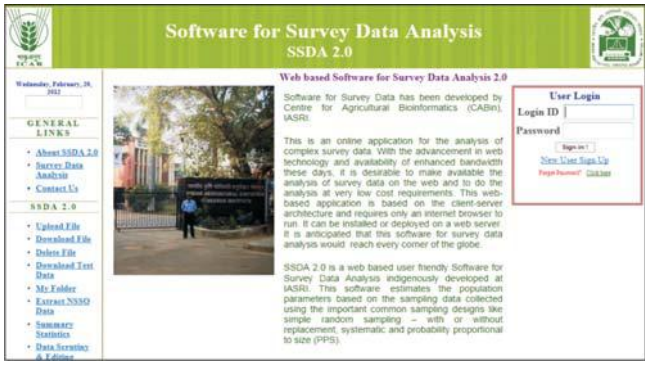
The entire list of farmers applied for different products of insurance products offered by insurance company will be displayed after successful login. The insurance agent can now see the full detail information of the farmer including risk profile at different level calculated from statistical models. The company can grant insurance or reject the application of the farmer which will be communicated through e-mail to the farmer.

Policy Maker Window: Policy maker is not an authorized person in order to enter the DSS and view various types of reports until and unless the administrator of the system allows him by setting his account as active. Policy makers are allowed to view different kinds of reports on the basis of data from the system. A crop wise report is generated to show the details for premium and compensation amount with respect to district, year and insurance product.

Software for Survey Data Analysis (SSDA) 2.0

A web based software SSDA 2.0 has been developed for survey data analysis for stratified multistage sampling

design. The home page of SSDA 2.0 server is shown in figure.



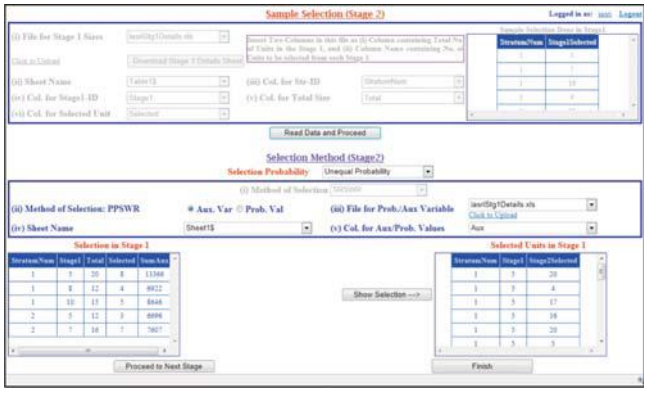
Home page of SSDA 2.0

It has links such as contact us, upload file, download file, delete file, and download test data. Some of the important features of the software are: New user registration and editing user profile, individual data storage folder for imputation and analysis under name My Folder, Feedback, Help Manual, Extraction of NSSO Data, Calculation of Summary Statistics, Scrutiny and Editing of Outlier Data, Sample Selection, Imputation of Missing Data using mean zero and mean of neighboring unit methods, Sampling Weight Calculations and Estimates of Parameter. SSDA 2.0 is capable of extracting the NSSO data. This extraction program module takes the required text file as well as the meta-data defining the positions of relevant input variables.

Column Name	Missing Value?	#Missing Values	Min Val	Max Val	Mean	Median	1st Quartile	3rd Quartile	Std Dev	Variance
Str	No	0	1	2	1.45	1	1	2	0.00	0.00
Block	No	0	1	6	3.26	3	2	5	0.04	0.00
Village	No	0	1	5	2.29	2	1	3	0.01	0.00
Household	No	0	1	4	1.88	2	1	2	0.01	0.00
Char1	No	0	12.5	87.1	43.08	40.8	31.2	51.9	0.27	0.07
Char2	No	0	206	881	565.18	560	415.5	693	2.25	5.05
SubPop	No	0	1	7	3.67	3	2	5	0.13	0.02

Calculation of Summary Statistics in SSDA 2.0

Sample selection module supports selection of samples for stratified three stage sampling and its lower subsets. This module includes sample selection methods namely simple random sampling with and without replacement (SRSWR and SRSWOR) and systematic sampling under equal probability selection and probability proportional to size (PPSWR) under unequal probability selection method. The sample selection page for stage II has been shown in figure.



Sample Selection-Stage 2 in SSDA 2.0

SSDA 2.0 performs the survey weights up to stratified three stage sampling and its subsets. The sampling designs incorporated in the software are SRSWR and SRSWOR and systematic sampling under equal probability and PPSWR under unequal probability.

Figure below shows the estimated results for mean, total and variances. It also includes estimates for ratio, sub-population and domain.

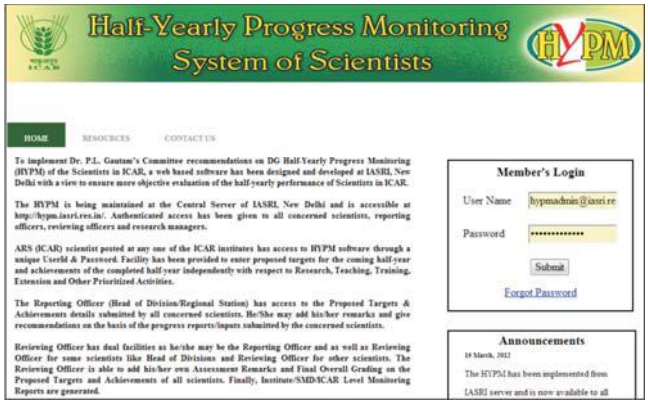
Results page of SSDA 2.0

SSDA 2.0 computes the estimates of parameters for any sampling design if the survey weights are supplied by the user.

Half-Yearly Progress Monitoring System of the Scientists in ICAR (HYPM)

For Half-Yearly Progress Monitoring (HYPM) of the Scientists in ICAR, a web based software has been designed and developed to ensure more objective evaluation of the half-yearly performance of scientists

in ICAR. The HYPM system has been implemented from 01 April 2012 for online submitting the proposed targets by the scientists for the first half year period (01.04.2012 to 30.09.2012). It is launched from IASRI server and made available at http://hypm.iasri.res.in.

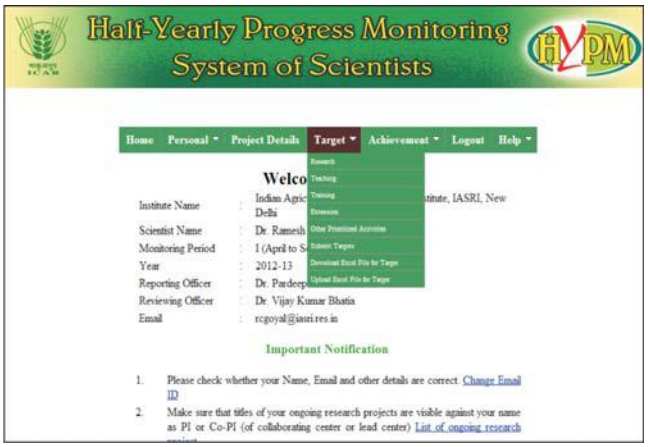


Home Page of HYPM

For effective implementation of HYPM from all the institutes of ICAR, the PME Cell I/Cs have been nominated as Nodal Officers of their respective institute. The Nodal officers are responsible for data management and customization of HYPM to maintain the website from their respective institute.

Home Page of Nodal Officer

ARS (ICAR) scientists posted at any one of the ICAR institutes have access to HYPM software through his/her unique User-Id and Password. Facility has been provided to enter proposed targets for the coming half-year and achievements of the completed half-year independently with respect to Research, Teaching, Training, Extension and Other Prioritized Activities. Finally, the scientist can submit the proposed targets to the concerned Reporting Officer through the option Submit Targets as visible in the home page of scientist.

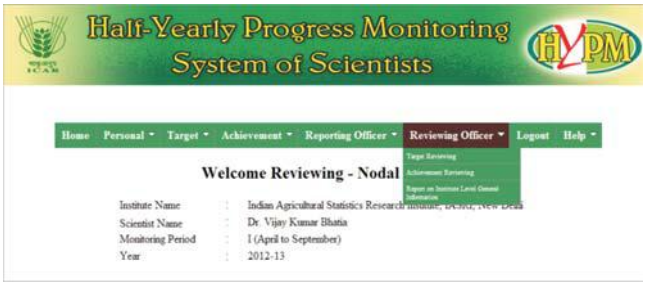


Home Page of Scientist

The Reporting Officer (Head of Division/Regional Station) has access to the Proposed Targets and Achievements details submitted by all concerned scientists. He/she may add his/her remarks and give recommendations on the basis of the progress reports/inputs submitted by the concerned scientists using the option as visible in home page of Reporting Officer. In addition he/she can also submit his/her own proposed targets.

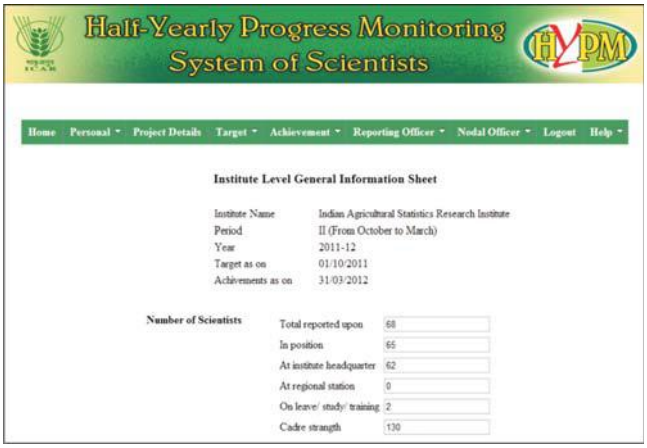
Home Page of Reporting Officer

Reviewing Officer has dual facilities as he/she may be the Reporting Officer for some scientists like Head of Divisions and Reviewing Officer for other scientists. The Reviewing Officers are able to add their own assessment remarks and final overall grading on the Proposed Targets and Achievements of all scientists.



Home Page of Reviewing Officer

As per requirement of HYPM, facility to the Director of the Institute to submit Institute Level General Information containing salient achievements of the institute for the completed half year period (as shown in the following image) has been provided.



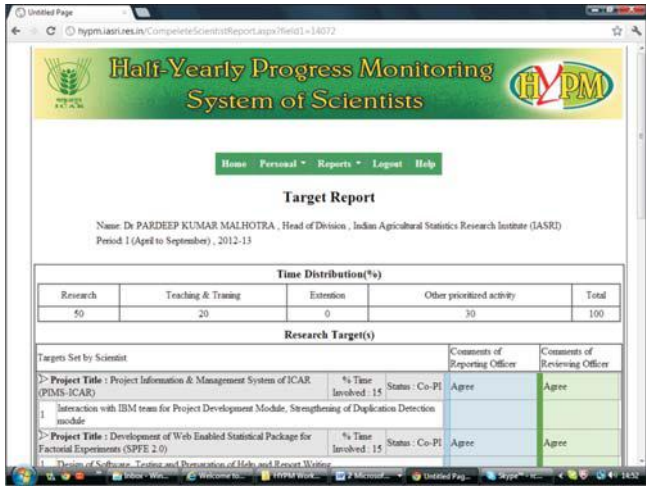
Institute Level General Information

For DG/SMD/ICAR level of monitoring progress of the scientists at different institutes, various reports are generated for the proposed targets status as submitted by the scientists and comments of the Reporting/ Reviewing Officers. These reports include target submission status reports with facility to view individual level proposed targets of the scientist and other options like manpower status, research projects, and salient research achievements of the institutes through the options under Report Module.

For effective implementation of HYPM from all the institutes of ICAR, Nodal Officers level User-Id and Password have been issued to customize HYPM for implementation from their respective institutes. HYPM system has been made available to all the scientists w.e.f. 15 March 2012. UserId and Password to all SMDs have also been issued for monitoring the progress through HYPM.

DG/SMD/ICAR Level for Monitoring

Target Submission Status Report



Comments of Reporting/Reviewing Officers

Development of Web Enabled Statistical Package for Agricultural Research (SPAR 3.0)

SPAR 3.0 is a web enabled software package that has been designed and developed for the statistical analysis of experimental research data in Plant Breeding and Genetics. It has been developed using Microsoft .NET technology (ASP.NET with C#). It consists of all the modules of data analysis which are available in SPAR 2.0.It has modules on Descriptive Statistics, Estimation of Breeding Values (General Mean and Scaling Tests), Correlation and Regression Analysis and Path Analysis, Variance and Covariance Components Estimation, Stability Analysis, Multivariate Analysis (Cluster Analysis, Discriminant Analysis and Principal Component Analysis), Mating Designs (Complete Diallel, Partial Diallel, Line x Tester - with and without parents, Three way cross, Double cross and North Carolina Designs I, II, III). It has Complete Online Help with Contents, Index, Search and Favorites facilities.

Home Page

National Information System on Agricultural Education Network in India (NISAGENET)

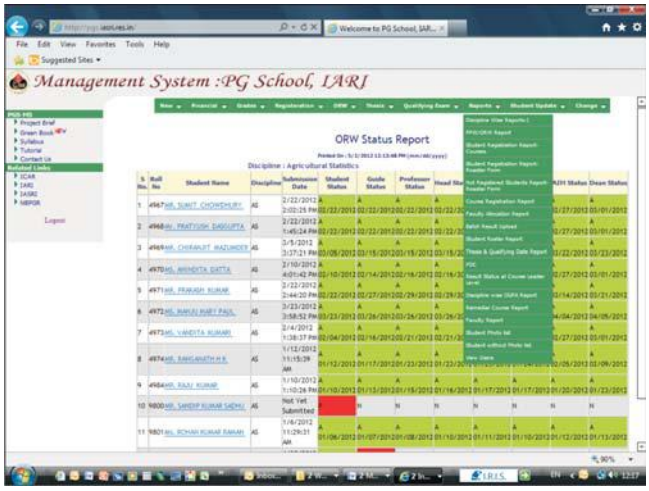
The NISAGENET web portal is being maintained at the Central Server of IASRI, New Delhi and is accessible at http://www.iasri.res.in/Nisagenet/. The database of this system contains the information on various aspects such as Academic data of the universities, Infrastructural facilities, Budget provision, Manpower employed, Faculty and R&D activities. Moreover, it has an exhaustive Query/Reports system to provide information at Country, State, University and college levels as well. Keeping in view the importance and utility of NISAGENET, ICAR has approved it to maintain as a regular ongoing activity of the Council. For maintaining up to date information, 19 Agricultural Universities established in the recent past have been added. The operational architecture has been modified to three tier web architecture and now it is possible to directly enter/ update data from university/college(s). The HRD data with regard to students Admitted/Passed and Faculty/ Administrative manpower for the years 2009-10 and 2010-11 uploaded by the universities is available in the form of reports. The NISAGENET acts as a single Window Information Delivery System and is an effective solution to check overlapping and parallel flow of information from the same university, but from different sources.

Management System for Post Graduate Education

This is a web enabled system for management of various activities of PG School of IARI. The system caters to the requirements of different users: Dean, Registrar, Professors, Heads, Guides, Faculty, Teachers, Students, Administrators and Officials for performing their assigned tasks. There are 5 modules: Courses Management, Faculty Management, Student Management, Administration Management and e-Learning.

Course Management module has various menu items which provide various facilities. The professor has access to add/delete/update courses, offer courses for each trimester, allocate courses to faculty, and allot students to guides. The course registration is accomplished by approval of students registered courses by course leader/instructors, guide, and professors. The Course Leader may declare class schedule, examination scheme and dates, and result. The Professor can suggest examiners for qualifying examination and thesis evaluation.

Faculty Module is meant to be used by teachers, guides, professors, heads, and dean. It provides them with the opportunity to perform various tasks as per their authorization such as approval of student courses, progress report, PPW and ORW and offering of trimester courses, allocation of courses to course leaders and instructors and submission of student examination grades etc. Dean can view current status of each activities of PG School and initiate actions/issue instructions for the pending tasks of guides/professors/ heads. Dean may also approve various forms/results/ reports after necessary approval by faculty/guides/ professors/heads.



ORW Status Report

Student Management module helps the students to register online, select their major and minor disciplines, members of advisory committee, and submit courses for registration, PPW, ORW etc. The information submitted by the students to the system is routed through various stages and approved/disapproved by the concerned faculty, guide, professor, head and dean. The students can then view roster form, PPW, ORW, class schedules, progress reports, their examination grades etc.

Administration Management module provides features for Administrator, Dean Office, and Registrar etc. The requests of new users, students, teachers, faculty, guides and professors are received by Administrator and approved after verifying the details. Administrator may also start and stop trimester registration, change student status as Pass Out/Current/Left Out. Through e-learning component, course instructors may attach, 5 files for Lecture Notes, Presentation Slides, Assignment, References and other resources for each topic.

The system has a strong reporting module to cater to the requirements of various functionaries. The system also has a provision of alert mechanism wherein the pending work is displayed on the homepage of the users. For important events emails are also sent automatically to the respective faculty. The system is available at http://pgs.iasri.res.in and is in use by PG School IARI since the year 2009-10. The system is ready for adoption by other deemed universities of ICAR for which requests have already been received.

Project Information & Management System of ICAR (PIMS-ICAR)

Project Information & Management System of ICAR (PIMS-ICAR) designed, developed and implemented at IASRI, New Delhi at http://pimsicar.iasri.res.in/ to help in taking decisions to check duplication in research projects both at divisional as well as inter divisional level of ICAR. PIMS-ICAR has also been integrated with Half Yearly Progress Monitoring of Scientists (HYPM) system developed and implemented for all the ICAR institutes. The integration has facilitated the visibility of Research Projects details of ongoing projects with respective PIs and Co-PIs in HYPM. As per the data entry status available in PIMS-ICAR, the ICAR institutes have initiated project data entry process for more than 5110 ongoing and 5150 completed projects into PIMS-ICAR from their respective institutes. Process for digitization and creation of repositories of RPFs-III is in progress. The RPF-III of 3740 projects has already been uploaded by institutes and is available in PIMS-ICAR.

Phenomics of Moisture Deficit and Low Temperature Stress Tolerance in Rice

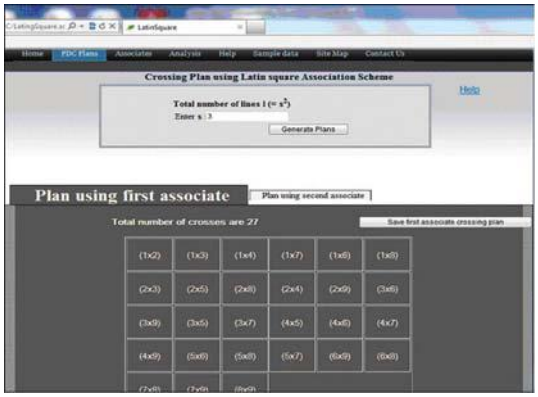
Phenomics database for rice has been designed. The database is scalable and can act as model database for other crops also. The application has been designed to capture meta data and experimental data about different experiments. Utility has been developed to upload data from the excel files. The application is based on *n*-tier Web architecture and is using JAVA, JSP and my SQL database. In addition to this LIRE image analysis API has been studied and tested with crop disease images.

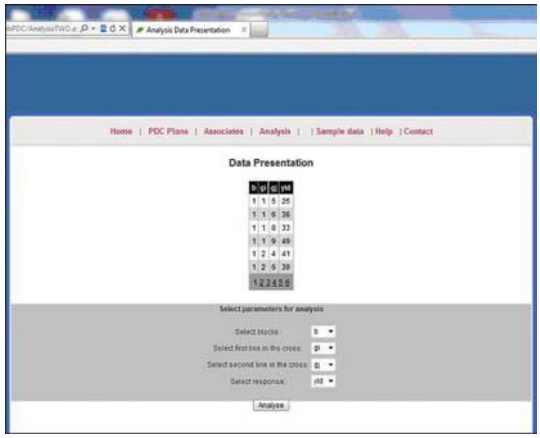
❑

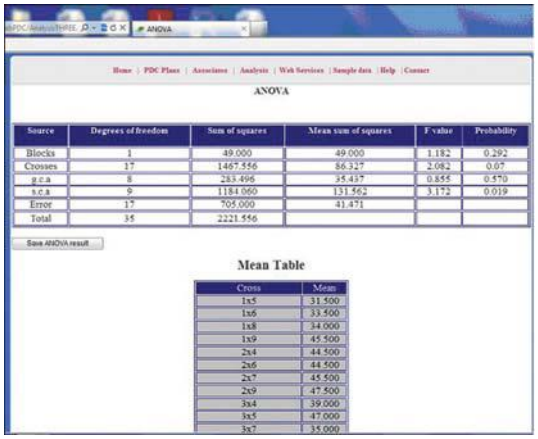
Technology Assessed and Transferred

Technology Assessed and Transferred

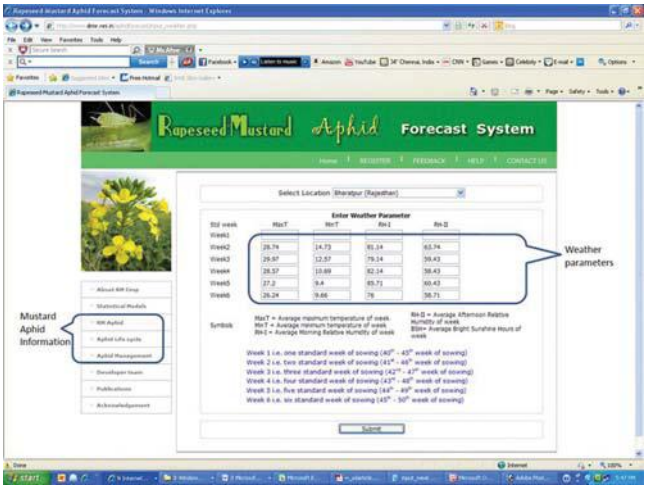
- A user friendly software ***webPDC*** has been developed for generation and analysis of partial diallel crosses (PDCs) obtained using association schemes of Partially Balanced Incomplete Block (PBIB) designs. This software is useful for breeders to a considerable extent for generation and analysis of PDC plans. Web services for generation and analysis of PDCs are also provided that can be utilized by other applications.







- Software for aphid forecasting in Mustard crop has been developed in collaboration with DRMR, Bharatpur IASRI and forewarnings are being issued to the farmers. This internet-based system is available at (http://www.drmr.res.in/aphidforecast/index.php). Forecast rapeseed-mustard aphid occurrence, has been implemented by embedding most effective earlier developed location-specific statistical models for aphid forecast. This web-based tool, developed for use by extension personnel, is useful to produce advisory for mustard growers to decide schedule of insecticide application. The user has to input weather parameters by selecting location closest to their crop plantings area and system will provide a forecast of aphid incidence along with recommendations for insecticide application. The forecast regarding occurrence of aphid (*Lipaphis erysimi*) on oilseeds *Brassica* crops in season can be available to farmers with sufficient lag period for taking necessary action. This tool enables to avoid unwarranted sprays of insecticide to prevent avoidable expenditure of the farmers and also safeguard the environment from undue pesticide load.



Education and Training

For human resource development programmes, the Institute conducts post graduate teaching and in-service courses in Agricultural Statistics and Computer Applications. Institute conducts M.Sc. and Ph.D. programmes in Agricultural Statistics since 1964 and M.Sc. in Computer Application since 1985-86. A new course M.Sc. (Bioinformatics) has been initiated from 2011-12. A brief description of human resource development during the year is given in the sequel.

DEGREE COURSES

The Institute continued to conduct the following degree courses in collaboration with the Post Graduate School, IARI, New Delhi which has the status of a Deemed University

(i) Ph.D. (Agricultural Statistics)
(ii) M.Sc. (Agricultural Statistics)
(iii) M.Sc. (Computer Application)
(iv) M.Sc. (Bioinformatics)

Both Ph.D. and M.Sc. students are required to study courses not only in Agricultural Statistics but also in Agricultural Sciences like Genetics, Agronomy, Agricultural Economics, etc. The courses in Mathematics, Agricultural Statistics and Computer Application are offered at this Institute while the courses in Agricultural Sciences are offered at IARI.

Number of students admitted/completed various courses during the period under report are:

Courses	Number of Students	
	Admitted	Completed
Ph.D. (Agricultural Statistics)	6	3
M.Sc. (Agricultural Statistics)	8	7
M.Sc. (Computer Application)	4	7
M.Sc. (Bioinformatics)	3	-

Brief of research work carried out by students who had completed various courses during 2011-12 is as follows:

Ph.D. (Agricultural Statistics)

i) Yogita Gharde

Small area estimation for spatially correlated data using bayesian approach

A spatial model for small area estimation was proposed using geographically weighted regression approach when parameters are spatial in nature and it was found that spatial model provided more efficient estimates as compared to non-spatial model. The proposed spatial model was put in Hierarchical Bayes (HB) framework and it was found that the estimates obtained were more efficient than Empirical Best Linear Unbiased Predictor estimates. Three types of spatial weight matrix (Neighbourhood Criteria method, Gaussian-Decay method and Spherical variogram approach) were used to incorporate spatial effects and among three, spherical method of incorporating spatial effect was the best for this model when the sample size was small.

Guide: Dr. Anil Rai

ii) Eldho Varghese

Some investigations on experimental designs incorporating neighbour effects

In agricultural field experiments, in order to control heterogeneity and conserve resources, the treatments are generally assessed using small adjacent units. Under such situation, the treatment applied to one experimental plot may affect the response on neighbouring plots and neighbour balanced block designs are useful for estimating the treatment effects in presence of neighbour effects if there is one source of heterogeneity in the experimental units. Neighbour balanced block designs were studied assuming neighbour effects proportional to the direct effects of treatments and their efficiencies were obtained. To deal with the two-way elimination of heterogeneity settings, row-column designs were obtained considering directional and non-directional neighbour effects from all the four sides. Methods of constructing designs were developed and these designs are found to be totally balanced/ variance balanced for estimating the direct and neighbour effects of treatments. For studying the relationship between response and the intervening levels of quantitative factors, first and second order response surface model were studied under the assumption of differential neighbour effects from both left and right units and the conditions for orthogonal estimation of parameters were derived. A method of obtaining designs satisfying the derived conditions was developed. Blocking aspects in response surface designs in the presence of neighbour effects were also studied.

Guide: Dr. Seema Jaggi

iii) Nitiprasad N. Jambhulkar

Some investigations on minimum aberration for fractional factorials

Minimum aberration fractional factorial plan is one that ensures estimation of maximum number of lower order interaction components under the assumption that higher order interactions are negligible for a given resolution plan. Methods of construction of irregular two level minimum aberration fractional factorial plans of the type $\frac{r}{2^p}(2^k)$ for different values of k and p where $r(< 2^p)$is a prime number, were developed. Minimum aberration fractional factorial plans for $\frac{1}{5^p}(5^k)$ and $\frac{1}{7^p}(7^k)$ level factorial experiments for $4 \leq k \leq 15$ and $1 \leq p \leq 12$ such that $k - p = 3$ were obtained. Minimum aberration fractional factorial plans for mixed level factorial experiments (some factors at 4 levels and rest of the factors at 2 levels each) were also obtained. SAS code was developed for the construction of above minimum aberration fractional factorial plans. Catalogues for the above designs were also prepared which would serve as a ready reckoner to the practicing statisticians and the experimenters.

Guide: Dr. Krishan Lal

M.Sc. (Agricultural Statistics)

i) Nirpum Ghosh

Some investigations on the problem of non-response in the context of repeat surveys

In many sample surveys, the same population is sampled repeatedly and the same study variable is measured at each occasion so that development over time can be followed. For example, labour force surveys are conducted monthly to estimate the number of employed. Similarly, surveys are conducted for estimation of major livestock products wherein data are collected over seasons. It is a common experience, in sample surveys, to come across units in the sample which do not yield the required information at the first attempt. In such situations repeated visits to the non-respondents is necessary. Therefore, the situations where some sample units do not provide the necessary information in the context of surveys on two occasions under a two-stage sampling design were studied. Three different non-response cases were considered under two different sampling schemes. Hansen and Hurwitz technique *i.e.* sub-sampling of non-respondents technique was used to tackle the problem of non-response. Different unbiased estimators of population mean along with their variance expressions were developed to take care of non-response. It was shown theoretically that the proposed estimators were more efficient than the estimators obtained from single occasion sampling strategy. With the help of an empirical study it was shown that, for more precision, it is advisable to retain some second stage sampling units on the current occasion. Further, higher the correlation between units on the first and second occasion, more the precision of an estimator for the current occasion over an estimator which does not utilize previous year information. Also, higher the correlation between the non-responding units, more the gain in efficiency.

Guide: Dr. UC Sud

ii) Kallol Sarkar

A study on row-column designs

Row-column designs are used in agricultural and horticultural research for the control of non-treatment variability in experiments both in field and glass house arising due to two sources of variability in the experimental units. Some families of symmetric/ asymmetric factorial row-column designs in complete/ incomplete rows/columns were obtained for experimental situations wherein the experimenter wants to study the effect of two or more factors simultaneously. Further, for experimental situations in which the experimenter wants to compare a set of new (test) treatments with an already existing (control) treatment, some general methods of constructing balanced treatment-control row-column designs in complete/ incomplete rows/columns were developed. A class of structurally incomplete balanced treatment-control row-column designs was also obtained where treatments were applied to a subset of the available experimental units.

Guide: Dr. Cini Varghese

iii) Mrinmoy Ray

A study on time series intervention modeling in agriculture

Time series intervention modeling in the domain of agriculture is employed in the situations where it may be known that certain exceptional external events called 'interventions' could affect the time series phenomenon. As a case study, cotton yield of India at all-India level and for two major states viz. Gujarat and Maharashtra were considered with the intervention being introduction of Bt Cotton variety in 2002. Of the three types of interventions possible viz. step (when event occurring exists for some period), pulse (when event occurs only at particular period) and ramp (when after the event occurs, its effect increases rapidly), step intervention occurred for all the three datasets considered at varied magnitudes and differential slopes over time. Moreover, the performance of autoregressive integrated moving average (ARIMA) intervention models was also investigated on data sets simulated under different possible situations taking cotton yield data at all-India level as the baseline data set. When cotton yields were forecasted, the performance of ARIMA intervention models was found to be superior to the conventional ARIMA models for all the three locations and also for all the simulated situations. Thus, it was concluded that time series intervention modeling could be usefully employed for forecasting purposes.

Guide: Dr. Ramasubramanian V

iv) Samarendra Das

Some investigations on different classification techniques in agriculture

The performance of classification techniques was investigated for the situations wherein certain assumptions were violated. The classification of genotypes in presence of missing values is a challenging task for breeders. The performance of different classification techniques *viz.* Oblique Axes Method (OAM), *k*-th nearest neighbour (KNN), Linear Discriminant Analysis (LDA) and Quadratic Discriminant Analysis (QDA) were compared based on apparent classification error rate (APER) when some observations were missing. The results showed that KNN followed by OAM and LDA performed better in skew-normal situations than normal condition and QDA performed better in normal condition. For maximum consistency and accuracy of classification of skew-normal data, KNN was best among the four classification techniques. The performance of the four classification techniques were also studied under 1%, 5%, 10% and 20% missing observations created randomly in the original data which were imputed by different methods like zero, mean, regression and multiple imputation methods based on the weighted average hit ratios. The results revealed that all the imputation methods were robust against 1% and 5% missing observations. It was found that mean, regression and multiple imputation techniques performed well in case of 10%, 20% or more missing observations. Among the four classification techniques, KNN technique was robust to the different levels of missing observations.

Guide: Dr. AK Paul

v) Kadar Ali Sarkar

A study of nonlinear ARMA model with time-varying coefficients

The data collected over time are called time-series data and for analysis of this data, linear time-series models are used. These models may not be able to capture the asymmetry (when average number of observations in the up cycle is different from that of down cycle) in the data. To deal with asymmetry in time series data, linear autoregressive time-series model may be extended to nonlinear time-series taking the

autoregressive coefficient as a time-varying coefficient. Random coefficient autoregressive (RCAR) model and Fourier autoregressive (F-AR) model were studied. In RCAR model, autoregressive coefficient follows a stochastic process and in F-AR model that follows a deterministic time dependent coefficient. RCAR model was fitted by representing the model into state space form followed by estimation of parameters using Kalman filter. F-AR model was fitted with minimum number of Fourier coefficients. The two models were compared with fitted autoregressive moving average (ARMA) model based on AIC, BIC value and forecasting performance. Quarterly oil sardine fish catch in Kerala for the period 1985-2008 was considered for building the model and 2009-2010 was used for validation.

Guide: Dr. Himadri Ghosh

vi) Upendra Kumar Pradhan

Designs for mixture experiments with process variable

An experiment in which the response is assumed to depend on the relative proportions of the ingredients present in the mixture and not on total amount of the mixture is called the mixture experiment. Sometimes the response in mixture experiments depends not only on the proportion of mixture components present in the mixture but also on the process conditions. The mixture experiments when conducted with process variables are called mixture experiments with process variables. A method of construction of efficient designs for mixture experiments with process variable in minimum number of runs was developed using the projection matrix and designs were obtained for 3, 4 and 5 components of mixture with one process variable. A methodology for obtaining the optimum combination of ingredients in mixture experiments with process variables was developed by using dual optimizing technique with minimum variability and desired/maximum mean yield when replicated data on different runs was available.

Guide: Dr. Krishan Lal

vii) Kanchan Sinha

A study on combining ARIMA and artificial neural networks for time series forecasting

Agricultural price forecasting is one of the challenging areas of time series forecasting. In this study, an effort was made to compare the forecasting capabilities of well known Box-Jenkins or ARIMA methods with nonlinear time delay neural network (TDNN) models using data on monthly wholesale price of oilseed crops traded in different markets in India. The aim of the study was short term price forecasting up to one year with multiple forecast horizons, namely one, three, six and twelve months. In general, TDNN models outperform the ARIMA models for six and twelve months ahead forecasting in terms of root mean square error. Pitman's statistical test was employed in the present study to compare the one step ahead forecasting performance between TDNN and ARIMA models considering the nonprobablistic feature of neural network models. Nonlinearity test provides a fairly good indication for post sample forecast accuracy of these models. It has been seen that the neural network models have clear advantage for predicting the direction of monthly price change for different series. The sequential combination of ARIMA and TDNN models was adopted to harness the unique strength of individual models was improving the forecast accuracy. The results of the study showed that combined models underperform compared to their components' performances which might be due to the failure of the basic assumption of additive relationship between linear and nonlinear components of this approach for the series considered in the experiments.

Guide: Dr. GK Jha

M.Sc. (Computer Application)

i) Jai Prakash Srivastava

Development of software for cropping system experiments

Experimentation plays key role in improvement of agricultural systems. A web based software for Cropping System Experiments has been developed that provides the season wise results on several aspects of the experimentation. The present system has been designed using three-layered architecture. The software provides the season wise results for analysis that includes Character analyzed, Centre name, Experiment type, Raw and Converted data season wise, ANOVA, Mean table, Standard Error, and Critical Difference.

Guide: Sh. HS Sikarwar

ii) Arijit Saha

Ontologies based expert system for maize

Maize (*Zea mays* L) is the most versatile crop with wider adaptability in varied agro-ecologies. An ontology based Expert System for Maize has been developed.

Ontology is the latest knowledge representation technique that allows the domain experts to code their knowledge in a specific domain. The system currently has about 80 maize diseases, 52 insects and 39 varieties of maize. The system works in question-answer mode and allows the farmers to choose options for each of the question asked. At each level the text is supported by pictures. The present system has a dynamic knowledgebase and acts as a tool for transferring the site and crop specific knowledge of various domain experts to the farmers.

Guide: Dr. Sudeep

iii) AKM Samimul Alam

Web based software development for computation of total factor productivity

Total Factor Productivity (TFP) is an important measure to quantify the productivity growth. Modules for TFP computation are not available in any statistical software and commonly used econometric packages. A web based TFP computation software has been developed. The software provides TFP index, output index and input index using Tornqvist index method. Growth curve of each index is also computed and presented with tables and graphs. Facilities for computing index for single crop and index for aggregate crop have been provided through two separate sub-modules. Facilities for computation of TFP by aggregating data of lower spatial units are also provided.

Guide: Dr. Rajni Jain

iv) Monojit Saha

Strengthening expert system for extension using crop forewarning models

Forewarning of incidence of crop pests and diseases plays key role in improvement of agricultural production. Reliable and timely forecasts provide important and useful input for proper, foresighted and informed planning. A Crop Forewarning Module has been developed that provides the sowing date wise results of forewarning on the basis of weather data available in the database provided by Domain Experts. The system acts as a centralized tool for transferring crop specific knowledge of different pests and diseases gathered by various domain experts to the farmers. Farmers can view the desired forewarning results on the basis of crop name, variety name, particular disease and the sowing date of the crop provided by them.

Guide: Dr. RC Goyal

v) Mrityunjoy Mandol

Software package for knowledge extraction from agricultural field experiments

A large number of agricultural experiments are being conducted under the NARS. A web based software for Agricultural Field Experiments Information System has been developed that provides the results for reporting the agricultural experiments for on-station research. The present system has been designed using three-layered architecture. The software provides the results for reporting the agricultural experiments including Character analyzed, Research centre name, Experiment type, Raw and Converted data season wise crop and variety wise seed rate, spacing, amount of fertilizer and pesticide application for particular crop and the yield of the on-station experiments.

Guide: Sh. HS Sikarwar

vi) Maedeh Zirak Javanmard

Web based fuzzy C-means clustering software

Clustering is an explorative data mining task. In real life applications there is very often no sharp boundary between clusters. For those cases fuzzy clustering has important role to play. In order to carry out fuzzy clustering, a web based fuzzy c-means clustering software (wFCM) has been developed using fuzzy clustering algorithm. wFCM has been designed and developed as per web based three-tier architecture in Microsoft .NET environment. User can upload data to wFCM using three different formats; Excel, CSV and image files. Fuzzy clustering results can be downloaded by the user in excel and PDF formats or viewed graphically. Software results are validated using suitable dataset from machine learning repository. This software will be useful for statisticians, researchers, students and teachers for clustering datasets from agricultural research as well as many diverse areas of other sciences.

Guide: Dr. Alka Arora

vii) Satma MC

Online rule generation software using decision tree classifier

The handling of enormous amounts of data produced in agricultural research for taking appropriate and logical decisions through Expert Systems/Decision Support Systems is of major concern now. e-agriculture is a significantly emerging field focusing on agricultural

development through improved information services. Domain experts generate the input rules manually which is a time consuming process. To overcome this, a web based rule generation software (GenRule) has been developed using the ID3 decision tree classifier. Visualization of the rules is also provided in the form of decision tree. The generated rules are accompanied by various evaluation measures for their validity. GenRule provides the facility to classify future data instances. User can register, login, generate the rules, and can see the results and save in excel, text and XML file for future use.

Guide: Dr. Rajni Jain

Research Fellowship

During 2011-12, 15 Ph.D. and 36 M.Sc. students received Research Fellowship. 13 Ph.D. students received IARI Scholarship @ Rs.10,500/- p.m. in addition to Rs.10,000/- per annum as the contingent grant and 02 Ph.D. students received ICAR SRF Fellowship @ Rs.12,000/- p.m. in addition to Rs. 10,000/- per annum as the contingent grant. 14 M.Sc. students received ICAR Junior Research Fellowship @ Rs. 8640/- p.m. besides Rs. 6000/- per annum as the contingent grant and 22 M.Sc. students received IARI Scholarship @ Rs. 7560/- p.m. besides Rs. 6000/- per annum as the contingent grant.

CERTIFICATE COURSE

Senior Certificate Course in Agricultural Statistics and Computing: 5 participants

The Institute continued to conduct Senior Certificate Course in Agricultural Statistics and Computing, organized for the benefit of research workers engaged in handling statistical data collection, processing, interpretation and employed in research institutes of the Council, State Agricultural Universities and State Government Departments, etc. and foreign countries including SAARC countries with the main aim to train the participants in the use of latest statistical techniques as well as use of computers and software packages. The course is comprised of two independent modules of three months duration each.

The course was organised during 20 June 2011 to 26 November 2011 (Module–I: 20 June to 20 August 2011 and Module–II: 01 September to 26 November 2011). Two officers participated in Module–I only and three officers in both the modules.

The main topics covered under the course include Statistical Methods, Official Agricultural Statistics, Use of Computers in Agricultural Research, Sampling Techniques, Econometrics and Forecasting Techniques, Design of Experiments and Statistical Genetics.

NATIONAL / INTERNATIONAL TRAINING PROGRAMMES

Summary of Training Programmes Organised

Category	Training Programmes	No. of Participants
International	**03**	**21**
National	**16**	**359**
CAFT	02	40
Winter School	02	48
NAIP	09	193
Resource Generation	03	78
Through Outsourcing	**02**	**57**
Total21	**437**	

Details of Training Programmes Organised

S.No.	Title	Venue	Duration	Sponsored by	No. of Participants
	International (3: 21 Participants)				
1.	Application of Remote Sensing and GIS in Agricultural Surveys Course Director: Prachi Misra Sahoo Course Co-Director: Tauqueer Ahmad	IASRI, New Delhi	09-23 September 2011	Afro Asian Rural Development Organisation (AARDO)	07
2.	Forecast Techniques in Agriculture Course Director: KN Singh Course Co-Director: Amrender Kumar	IASRI, New Delhi	17-31 October 2011	Department of Census & Statistics, Sri Lanka	07
3.	Application of Remote Sensing and GIS in Agricultural Surveys Course Director: Prachi Misra Sahoo Course Co-Directors: KN Singh & Tauqueer Ahmad	IASRI, New Delhi	18 January to 07 February 2012	Afro Asian Rural Development Organisation (AARDO)	07
	National (16: 359 Participants)				
	Centre of Advanced Faculty Training (2: 40 Participants)				
1.	Biometrics in Agriculture Course Director: SB Lal	IASRI, New Delhi	29 August to 07 September 2011	Education Division of ICAR	24
2.	Online Content Creation and Management in an e-Learning Environment Course Director: Shashi Dahiya	IASRI, New Delhi	03 -23 January 2012	Education Division, ICAR	16
	Winter School (2: 48 Participants)				
3.	Data Mining Techniques and Tools for Knowledge Discovery in Agricultural Database Course Director: Alka Arora	IASRI, New Delhi	03-23 November 2011	Education Division, ICAR	23
4.	Recent Advances in Designing and Analysis of Agricultural Experiments Course Director: Krishan Lal	IASRI, New Delhi	29 November to 19 December 2011	Education Division, ICAR	25
	National Agricultural Innovation Project (9: 193 Participants)				
5.	Data Analysis Using SAS Course Director: Rajender Parsad Course Co-Directors: Seema Jaggi & Rakesh Goel (Pt. DDUVU&GAS)	Deen Dayal Upadhayaya Veterinary University and Gau Anusandhan Sansthan, Mathura, UP	16-21 May 2011	NAIP Consortium Strengthening Statistical Computing for NARS	28
6.	Data Analysis of Natural Resources Management Research Course Director: Rajender Parsad Course Co-Director: LM Bhar	IASRI, New Delhi	20-25 June 2011	NAIP Consortium Strengthening Statistical Computing for NARS	21
7.	Forecast Modelling in Crops Course Director: Ranjana Agrawal Course Co-Director: Amrender Kumar	IASRI, New Delhi	03-12 August 2011	NAIP, ICAR	22

S.No.	Title	Venue	Duration	Sponsored by	No. of Participants
8.	Genetics/Genomics Data Analysis Using SAS Course Director: Rajender Parsad Course Co-Directors: AK Paul & Sunil Archak (NBPGR, New Delhi)	IASRI, New Delhi	19-24 September 2011	NAIP Consortium Strengthening Statistical Computing for NARS	24
9.	Data Analysis in Social Sciences Research using SAS Course Director: Rajender Parsad Course Co-Director: Sivaramane, N	IASRI, New Delhi	10-15 October 2011	NAIP Consortium Strengthening Statistical Computing for NARS	20
10.	Data Analysis and Interpretation in Farm Implementation and Machinery Research using SAS Course Director: Rajender Parsad	IASRI, New Delhi	14-19 November 2011	NAIP Consortium Strengthening Statistical Computing for NARS	18
11.	Data Mining Using SAS Course Director: Rajender Parsad Course Co-Directors: Samir Farooqi & Anshu Bharadwaj	IASRI, New Delhi	06-11 February 2012	NAIP Consortium Strengthening Statistical Computing for NARS	18
12.	Data Analysis Using SAS Course Director: Rajender Parsad Course Co-Directors: Seema Jaggi & Sunil Kumar (NDUA&T, Faizabad)	NDUA&T, Faizabad	19-24 March 2012	NAIP Consortium Strengthening Statistical Computing for NARS	23
13.	Recent Advances in Statistical and Computational Genomics Data Analysis Course Director: AR Rao	IASRI, New Delhi	19-28 March 2012	NAIP Consortium Bioprospecting of Genesand Allele Mining for Abiotic Stress Tolerance	19
	Resource Generation (3: 78 Participants)				
14.	Statistical Techniques for Data Collection and Analysis Course Director: Seema Jaggi Course Co-Director: Tauqueer Ahmad	IASRI, New Delhi	25 April to 27 May 2011	Department of Agriculture, Government of Andhra Pradesh	21
15.	Data Analysis and Interpretation: Use of Statistical Softwares Course Director: Rajender Parsad Course Co-Directors: Krishan Lal & BN Mandal	IASRI, New Delhi	30 May to 17 June 2011	Central Statistical Organisation, Ministry of Statistics & Programme Implementation	37
16.	Agricultural Statistics Course Director: UC Sud, Course Co-Directors: KK Tyagi & Tauqueer Ahmad	IASRI, New Delhi	26-30 September 2011	Central Statistical Organisation, Ministry of Statistics & Programme Implementation	20
	Through Outsourcing (2: 57 Participants)				
1.	Computational Genome Analysis using ANYAYA Association with Bioinformatics Group of C-DAC, Pune	IASRI, New Delhi	22-24 June 2011	NAIP Consortium, National Agricultural Bioinformatics Grid	37
2.	High Performance Bio-Computing and Drug Design Association with Super Computing Facility for Bioinformatics and Computational Biology (SCFBIO)	IIT, New Delhi	12-22 September 2011	NAIP Consortium National Agricultural Bioinformatics Grid	20

BOARD OF STUDIES FOR ACADEMIC YEAR 2011-12

Agricultural Statistics

1.	Dr. Rajender Parsad, Professor (Agricultural Statistics)	Chairman
2.	Dr. VK Bhatia, Director	Ex-officio Member
3.	Dr. Ranjana Agrawal, Principal Scientist	Member
4.	Dr. Girish Kumar Jha, Senior Scientist, IARI	Member
5.	Dr. Lalmohan Bhar, Senior Scientist	Member Secretary
6.	Dr. Mohan Kumar T.L. (Student Representative)	Member

Computer Application

1.	Dr. PK Malhotra, Professor (Computer Application)	Chairman
2.	Dr. VK Bhatia, Director	Ex-officio Member
3.	Dr. RC Goyal, Principal Scientist	Member
4.	Dr. Rajni Jain, Senior Scientist, NCAP	Member
5.	Dr. Sudeep, Senior Scientist	Member Secretary
6.	Smt. Shashi Dahiya, Scientist (SS)	Member
7.	Sh. Shrikumar Bishwas (Student Representative)	Member

Bioinformatics

1.	Dr. Prajneshu, Professor (Bioinformatics)	Chairman
2.	Dr. VK Bhatia, Director	Ex-officio Member
3.	Dr. KC Bansal, Director, NBPGR	Member
4.	Dr. TR Sharma, Principal Scientist, IARI	Member
5.	Dr. RL Sapra, Senior Scientist, IARI	Member
6.	Dr. Anil Rai, Head, Centre for Agricultural Bioinformatics	Member
7.	Dr. Sunil Archak, Scientist, NBPGR	Member
8.	Smt. Anu Sharma, Scientist	Member Secretary
9.	Sh. Chiranjib Sarkar (Student Representative)	Member

CENTRAL EXAMINATION COMMITTEE FOR ACADEMIC YEAR 2011-12

Agricultural Statistics

1. Dr. VK Bhatia, Director
2. Dr. Rajender Parsad, Head, Design of Experiments & Professor (Agricultural Statistics)
3. Dr. VK Gupta, National Professor, ICAR
4. Dr. Prajneshu, Head, Biometrics and Statistical Modelling
5. Dr. Ranjana Agrawal, Principal Scientist
6. Dr. UC Sud, Head, Sample Surveys

Computer Application

1. Dr. VK Bhatia, Director
2. Dr. PK Malhotra, Head & Professor (Computer Application)
3. Dr. RC Goyal, Principal Scientist
4. Dr. Anil Rai, Head, Centre for Agricultural Bioinformatics
5. Dr. Alka Arora, Senior Scientist
6. Dr. Sudeep, Senior Scientist
7. Sh. KK Chaturvedi, Senior Scientist

FACULTY MEMBERS OF P.G. SCHOOL, IARI IN AGRICULTURAL STATISTICS

S. No.	Name	Year of induction
1.	Dr. VK Bhatia, Director	1987
2.	Dr. VK Gupta, National Professor, ICAR	1984
3.	Dr. Rajender Parsad, Head, Design of Experiments & Professor (Agricultural Statistics)	1995
4.	Dr. Prajneshu, Head, Biometrics and Statistical Modelling & Professor (Bioinformatics)	1984
5.	Dr. UC Sud, Head, Sample Surveys	1995
6.	Dr. Anil Rai, Head, Centre of Agricultural Bioinformatics	1995
7.	Dr. KN Singh, Head, Forecasting and Econometric Techniques	2011
8.	Dr. Ranjana Agrawal, Principal Scientist	1988
9.	Sh. SD Wahi, Principal Scientist	1987
10.	Dr. KK Tyagi, Principal Scientist	1995
11.	Dr. Krishan Lal, Principal Scientist	2003
12.	Dr. RL Sapra, Principal Scientist, IARI	2002
13.	Dr. Seema Jaggi, Senior Scientist	1995
14.	Dr. Lalmohan Bhar, Senior Scientist	1998
15.	Dr. Amrit Kumar Paul, Senior Scientist	1998
16.	Dr. Tauqueer Ahmad, Senior Scientist	1998
17.	Dr. AR Rao, Senior Scientist	1998
18.	Dr. Ramasubramanian V, Senior Scientist	1999
19.	Dr. Girish Kumar Jha, Senior Scientist (at IARI)	1999
20.	Dr. Cini Varghese, Senior Scientist	2000
21.	Dr. Himadri Ghosh, Senior Scientist	2004
22.	Dr. Prachi Misra Sahoo, Scientist	2002
23.	Dr. Hukum Chandra, Scientist	2003
24.	Sh. Amrender Kumar, Scientist	2003
25.	Md. Wasi Alam, Scientist	2003
26.	Dr. Prawin Arya, Senior Scientist	2003
27.	Dr. Anil Kumar, Senior Scientist	2010
28.	Dr. Sanjeev Panwar, Scientist (SS)	2011
29.	Dr. Ranjit Kumar Paul, Scientist	2011
30.	Dr. Mir Asif Iquebal, Scientist	2011
31.	Dr. BN Mandal, Scientist	2011
32.	Dr. Susheel Kumar Sarkar, Scientist	2011
33.	Dr. N Okendro Singh, Scientist	2011
34.	Dr. Eldho Varghese, Scientist	2011
35.	Dr. (Smt.) Yogita Gharde, Scientist	2012

FACULTY MEMBERS OF P.G. SCHOOL, IARI IN COMPUTER APPLICATION

S. No.	Name	Year of induction
1.	Dr. PK Malhotra, Head & Professor (Computer Application)	1991
2.	Dr. RC Goyal, Principal Scientist	1995
3.	Dr. Sudeep, Senior Scientist	2002
4.	Dr. Alka Arora, Scientist	2001
5.	Smt. Anu Sharma, Scientist	2004
6.	Smt. Shashi Dahiya, Scientist	2001
7.	Md. Samir Farooqi, Scientist	2001
8.	Sh. KK Chaturvedi, Scientist	2002
9.	Sh. SN Islam, Scientist	2004
10.	Sh. SB Lal, Scientist	2004
11.	Smt. Anshu Bharadwaj, Scientist	2004
12.	Smt. Sangeeta Ahuja, Scientist	2002
13.	Smt. Rajni Jain, Senior Scientist (at NCAP)	2007
14.	Sh. Pal Singh, Scientist	2010

FACULTY MEMBERS OF P.G. SCHOOL, IARI IN AGRICULTURAL BIOINFORMATICS

S. No.	Name	Year of induction
1.	Dr. VK Bhatia, Director, IASRI	2010
2.	Dr. Prajneshu, Head, Biometrics and Statistical Modelling & Professor (Bioinformatics)	2010
3.	Dr. KC Bansal, Director, NBPGR	2010
4.	Dr. Rajender Parsad, Head, Design of Experiments & Professor (Agricultural Statistics)	2010
5.	Dr. Anil Rai, Head, Centre of Agricultural Bioinformatics	2010
6.	Dr. Seema Jaggi, Senior Scientist	2010
7.	Dr. AR Rao, Senior Scientist	2010
8.	Dr. Sudeep, Senior Scientist	2010
9.	Sh. SB Lal, Scientist (SS)	2010
10.	Md. Samir Farooqi, Scientist (SS)	2010
11.	Smt. Anu Sharma, Scientist (SS)	2010
12.	Dr. TR Sharma, Principal Scientist, IARI	2010
13.	Dr. T Mahapatra, Principal Scientist, IARI	2010
14.	Dr. Kishore Gaikwad, Senior Scientist, IARI	2010
15.	Dr. RL Sapra, Principal Scientist, IARI	2010
16.	Dr. T Napolean, Senior Scientist, IARI	2010
17.	Dr. PK Singh, Senior Scientist, IARI	2010
18.	Dr. PS Pandey, Senior Scientist, IARI	2010
19.	Dr. KV Bhat, Principal Scientist, NBPGR	2010
20.	Dr. SS Marla, Principal Scientist, NBPGR	2010
21.	Dr. Sunil Arechak, Scientist, NBPGR	2010
22.	Dr. DC Mishra, Scientist	2011
23.	Dr. (Smt.) Sarika, Scientist	2011
24.	Dr. Sanjeev Kumar, Scientist	2011

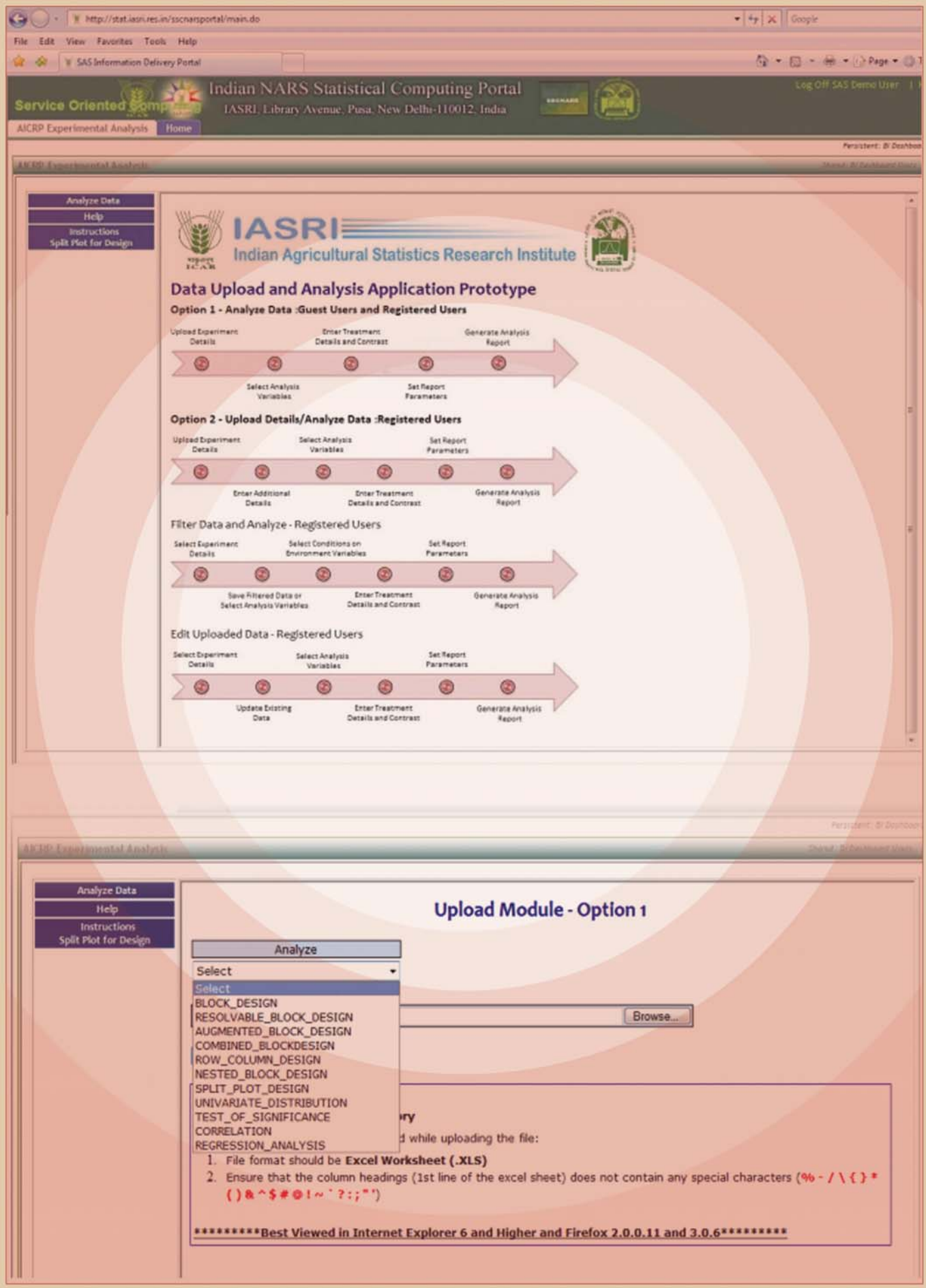
COURSES TAUGHT DURING THE ACADEMIC YEAR 2010–11

Code	Title	Course Instructors
	AGRICULTURAL STATISTICS	
	Trimester – III	
AS-103 / AS-503	Elementary Sampling & Non-Parametric Methods (2+1)	KK Tyagi & Amrender Kumar
AS-563	Statistical Inference (4+1)	Rajender Parsad, LM Bhar & GK Jha
AS-164 / AS-564	Design of Experiments-I (3+1)	Seema Jaggi & VK Gupta
AS-166 / AS-566	Statistical Genetics-I (3+1)	VK Bhatia
AS-608	Advanced Bioinformatics (2+1)	AR Rao & KV Bhat
AS-662	Advanced Designs for Multifactor Experiments (2+1)	Krishan Lal, PK Batra & Rajender Parsad
AS-664	Inferential aspects of Survey Sampling & Analysis of Survey Data (2+1)	UC Sud & Tauqueer Ahmad
AS-667	Forecasting Techniques (1+1)	Chandrahas & Amrender Kumar
AS-299 / AS-691	Seminar (1+0)	Anil Kumar
	COMPUTER APPLICATION	
	Trimester – III	
CA-503	Statistical Computing in Agriculture (1+2)	Samir Farooqi, Amrit Kumar Paul & Anshu Bharadwaj
CA-563	Operating System (2+1)	HO Aggarwal
CA-567	Computer Networks (2+1)	SN Islam & Alka Arora
CA-571	Modelling & Simulation (2+1)	PK Malhotra & Anshu Bharadwaj
CA-299 / CA-691	Seminar (1+0)	Pal Singh

COURSES TAUGHT DURING THE ACADEMIC YEAR 2011–12

Code	Title	Course Instructors
	AGRICULTURAL STATISTICS	
	Trimester – I	
PGS-504	Basic Statistical Methods in Agriculture (2+1)	KK Tyagi, AK Gupta & Anil Kumar
AS-501	Basic Statistical Methods (2+1)	Mir Asif Iquebal & VK Jain
AS-550	Mathematical Methods (4+0)	Cini Varghese & Himadri Ghosh
AS-560	Probability Theory (2+0)	KN Singh
AS-561	Statistical Methods (2+1)	Seema Jaggi & Ranjit Kumar Paul
AS-567	Applied Multivariate Analysis (2+1)	Ranjana Agrawal & AR Rao
AS-568	Econometrics (2+1)	Prawin Arya & GK Jha
AS-569	Planning of Surveys / Experiments (2+1)	UC Sud & DK Sehgal
AS-600	Advanced Design of Experiments (1+1)	Rajender Parsad & Cini Varghese
AS-601	Advanced Sampling Techniques (1+1)	Prachi Misra Sahoo & Hukum Chandra
AS-202 / AS-602	Advanced Statistical Genetics (1+1)	SD Wahi & AK Paul
AS-603	Regression Analysis (1+1)	LM Bhar & N Okendro Singh
AS-604	Linear Models (2+0)	Krishan Lal & VK Gupta
AS-606	Optimization Techniques (1+1)	UC Sud & Prajneshu
AS-299/ AS-691	Seminar (1+0)	BN Mandal
	Trimester – II	
PGS-504	Basic Statistical Methods in Agriculture (2+1)	KK Tyagi, BN Mandal & Amrender Kumar
AS-502	Basic Design of Experiments (2+1)	Anil Kumar, DK Sehgal & Susheel Kumar Sarkar
AS-551	Mathematical Methods in Statistics (4+0)	Cini Varghese, NK Sharma & Prawin Arya
AS-562	Advanced Statistical Methods (2+1)	Seema Jaggi & Ramasubramanian V
AS-565	Sampling Techniques (3+1)	Tauqueer Ahmad & Prachi Misra Sahoo
AS-570	Statistical Modeling (2+1)	Prajneshu & Mir Asif Iquebal
AS-571	Bioinformatics (3+1)	AR Rao, KV Bhat, Rajender Parsad & TR Sharma
AS-572	Statistical Quality Control (2+0)	Wasi Alam
AS-605	Advanced Statistical Inference (1+1)	KN Singh & Anil Rai
AS-607	Stochastic Processes (3+0)	Himadri Ghosh & Sanjeev Kumar
AS-661	Advanced Designs for Single Factor Experiments (2+1)	LM Bhar and VK Gupta
AS-663	Advanced Theory of Sample Surveys (2+1)	Hukum Chandra & Tauqueer Ahmad
AS-299/AS-691	Seminar (1+0)	BN Mandal
	COMPUTER APPLICATION	
	Trimester – I	
CA-111/CA560	Computer Organization and Architecture (3+0)	Shashi Dahiya & HO Aggarwal
CA-502	Introduction to Computer Application (1+1)	Samir Farooqi & PS Pandey
CA-551	Mathematical Foundations in Computer Application (4+0)	NK Sharma & DC Mishra
CA-552	Computer Oriented Numerical Methods (2+1)	HS Sikarwar
CA-561	Principles of Computer Programming (2+1)	Anu Sharma & Sudeep
CA-565	Compiler Construction (2+1)	SB Lal & Soumen Pal
CA-569	Web Technologies & Applications (2+1)	Alka Arora & SN Islam
CA-570	Computer Graphics (2+1)	Pal Singh
CA-575	Artificial Intelligence (2+1)	Sudeep & Rajni Jain
CA-691	Seminar (1+0)	RC Goyal
	Trimester – II	
CA-501	Computer Fundamentals and Programming (3+1)	SN Islam & Pal Singh
CA-562	Object Oriented Analysis and Design (2+1)	Sangeeta Ahuja & Sudeep
CA-564	Data Structures and Algorithms (2+1)	Shashi Dahiya & Soumen Pal
CA-566	Database Management System (2+2)	RC Goyal, Anu Sharma & OP Khanduri
CA-568	Software Engineering (2+0)	Rajni Jain & RC Goyal
CA-572	GIS & Remote Sensing Techniques (2+1)	Prachi Misra Sahoo & Anshu Bharadrwaj
CA-573	Data Warehousing (2+1)	Anil Rai & Samir Farooqi
CA-574	Data Mining & Soft Computing (2+1)	Anshu Bharadwaj, Alka Arora & Rajni Jain
CA-578	Information Security (2+1)	Pal Singh
CA-691	Seminar (1+0)	Anshu Bharadwaj
	BIOINFORMATICS	
	Trimester – I	
BI-501	Molecular Cell Biology (3+0)	P Ananda Kumar, PK Jain & S Barthakur
BI-502	Introduction to Computer Application (1+1)	Samir Farooqi & PS Pandey
BI-503	Mathematical Foundations in Computer Application (4+0)	NK Sharma & DC Mishra
BI-504	Principles of Biotechnology (3+0)	KC Bansal, RC Bhattacharya, Amole Solanki & D Patanayak
BI-505	Principles of Computer Programming (2+1)	Anu Sharma & Sudeep
BI-691	Seminar (1+0)	Anil Rai
	Trimester – II	
BI-506	Database Management System (2+2)	RC Goyal, Anu Sharma & OP Khanduri
BI-507	Bioinformatics (1+1)	TR Sharma, KV Bhat, AR Rao & Rajender Parsad
BI-508	Protein Biosynthesis (3+0)	IM Santha, Suneha Goswami & Archna Sachdev
BI-526	Comparative Genomics (1+1)	KC Bansal, M Grover & Sarika
BI-691	Seminar (1+0)	DC Mishra

Note: Figures in the parentheses indicate the number of credits (Lectures + Practicals)


http://stat.iasri.res.in/sscnarsportal/main.do
File Edit View Favorites Tools Help
SAS Information Delivery Portal
Indian NARS Statistical Computing Portal
IASRI, Library Avenue, Pusa, New Delhi-110012, India
Service Oriented Computing
Log Off SAS Demo User
AICRP Experimental Analysis
Home
Analyze Data
Help
Instructions
Split Plot for Design
IASRI
Indian Agricultural Statistics Research Institute
Data Upload and Analysis Application Prototype
Option 1 - Analyze Data :Guest Users and Registered Users
Upload Experiment Details
Enter Treatment Details and Contrast
Generate Analysis Report
Select Analysis Variables
Set Report Parameters
Option 2 - Upload Details/Analyze Data :Registered Users
Upload Experiment Details
Select Analysis Variables
Set Report Parameters
Enter Additional Details
Enter Treatment Details and Contrast
Generate Analysis Report
Filter Data and Analyze - Registered Users
Select Experiment Details
Select Conditions on Environment Variables
Set Report Parameters
Save Filtered Data or Select Analysis Variables
Enter Treatment Details and Contrast
Generate Analysis Report
Edit Uploaded Data - Registered Users
Select Experiment Details
Select Analysis Variables
Set Report Parameters
Update Existing Data
Enter Treatment Details and Contrast
Generate Analysis Report
Upload Module - Option 1
Analyze
Select
Select
BLOCK_DESIGN
RESOLVABLE_BLOCK_DESIGN
AUGMENTED_BLOCK_DESIGN
COMBINED_BLOCKDESIGN
ROW_COLUMN_DESIGN
NESTED_BLOCK_DESIGN
SPLIT_PLOT_DESIGN
UNIVARIATE_DISTRIBUTION
TEST_OF_SIGNIFICANCE
CORRELATION
REGRESSION_ANALYSIS
Browse...
while uploading the file:
1. File format should be Excel Worksheet (.XLS)
2. Ensure that the column headings (1st line of the excel sheet) does not contain any special characters (% - / \ { } * ( ) & ^ $ # @ ! ~ ` ? : ; " ')
*********Best Viewed in Internet Explorer 6 and Higher and Firefox 2.0.0.11 and 3.0.6*********

6

Awards and Recognitions

AWARDS

Sankhyiki Bhushan Conferred upon Dr. VK Bhatia

- Indian Society of Agricultural Statistics in 2011 conferred the prestigious title of Sankhyiki Bhushan on Dr. VK Bhatia, a distinguished researcher and a visionary scholar for his insightful and outstanding theoretically creative and methodologically innovative contributions in the development of the subject of Statistics and its applications in agricultural research system.

National Award in Statistics for Young Statistician

- Dr. Rajender Parsad received National Award in Statistics for Young Statistician in honour of Prof. C.R. Rao 2010-11 from Ministry of Statistics and Programme Implementation in recognition of his outstanding contributions in the field of Statistics. The Award carries a Citation, Memento and a cash award of Rs. 2.0 lakh and was conferred by Dr. Montek Singh Ahluwalia, Deputy Chairman, Planning Commission on National Statistics Day, 29 June 2011.

Professor PV Sukhatme Gold Medal Award

- Dr. Prajneshu was awarded Professor PV Sukhatme Gold Medal Award 2011 from ISAS for his significant contributions in research in Agricultural Statistics in general and Statistical Modelling in particular.

IARI Merit Medal

- Dr. Eldho Varghese was awarded IARI Merit Medal in the Golden Jubilee Convocation of Indian Agricultural Research Institute for his outstanding research during Ph.D. programme.

Dr. GR Seth Memorial Young Scientist Award

- Dr. Yogita Gharde received Dr. GR Seth Memorial Young Scientist Award from ISAS for her research paper Hierarchical Bayes Small Area Estimation Approach for Spatial Data.

Achievement Award

- Dr. Sudeep received Achievement Award in special recognition of research to the field and also in special appreciation of valuable services to the Conference in the 5th Indian International Conference on Artificial Intelligence (IICA-11) held at Bangalore.
- Dr. Alka Arora received Achievement Award in special recognition of research to the field and also in special appreciation of valuable services to the Conference in the 5th Indian International Conference on Artificial Intelligence (IICA-11) held at Bangalore.

Young Professional Award-2011

- Dr. Anil Kumar conferred upon Young Professional Award-2011 of the Society for Community Mobilization for Sustainable Development in recognition to professional achievement in mobilizing the community for livelihood security.

RECOGNITION

Dr. VK Bhatia

- Received Fellowship of National Academy of Agricultural Sciences on 05 June 2011. On this occasion, Dr. VK Bhatia made a presentation on Some robust estimation of heritability.

- Statistical Coordinator for Department of Agricultural Research & Education.
- Member of Steering Group for Agricultural Statistics by Economic and Social Commission for Asia and the Pacific (ESCAP) of United Nations.
- Chaired the session on sub theme Advances in Statistical Techniques in Dairy Sciences during 65th Annual Conference of ISAS, held at National Dairy Research Institute, Karnal.
- Chairman, Technical Monitoring Committee (TMC) for Improvement of Fishery Statistics, Department of Animal Husbandry, Dairying and Fisheries,

Ministry of Agriculture, Govt. of India.

- Chairman, Working Group on Agriculture and Rural Statistics.
- Co-Chairman, Technical Committee of Direction (TCD) for improvement of Animal Husbandry and Dairying Statistics, Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Govt. of India.
- Member, Technical Committee for Implementing the Forecasting of Agricultural Output using SPACE, Agro-meteorology and Land Based Observations (FASAL), National Crop Forecasting Centre, Department of Agriculture. & Cooperation, Ministry of Agriculture, Government of India.
- Member, High Level Coordination Committee for Improvement of Agricultural Statistics, Karnataka.
- Member, Task Force Committee of the National Agricultural Innovation Project (NAIP), ICAR to review the work of the Project Management Consultants.
- Member, Working Group for Construction of Index Numbers of Area, Production and Yield of Crops, Directorate of Economics and Statistics, Ministry of Agriculture, Government of India.
- Member, Steering Committee to study the modalities for establishment of Consultancy Services Wing (CSW) in the Ministry of Statistics and Programme Implementation.
- Member, Committee on Statistics of Agriculture and Allied Sectors.
- Member of Working Group on Crop Husbandry, Agricultural Inputs, Demand and Supply Projections and Agricultural Statistics for the XII Five Year Plan.

Dr. VK Gupta

- Member, Management Committee of National Academy of Agricultural Research Management, Hyderabad.
- Member, Sectional Committee on Social Sciences for 2011, National Academy of Agricultural Sciences.
- Delivered a PV Sukhatme Centenary presentation on 27 July 2011 at IASRI, New Delhi.
- Chaired the session on sub theme Designs for Multi-factor Experiments and Member during special panel discussion on Higher Education in Agricultural Statistics: Current Status and Challenges during 65th Annual Conference of ISAS held at National Dairy Research Institute, Karnal.
- Chaired the session of Invited talks during 14th Annual Conference of Society of Statistics, Computer and Applications held at Saurashtra University, Rajkot.
- Guests of honour at Inaugural session and delivered the Keynote Address on Some Random Thoughts About Statistical Applications during XI Biennial Conference of the International Biometrics Society (Indian Region), held at Department of Statistics, Pondicherry University.
- Served as an Expert for the evaluation of a short course Advanced Statistical Tools for Analysis of Animal Breeding Data held at NDRI, Karnal.
- Member, Screening Committee for Awards and Fellowship for outstanding and Meritorious Research work in Statistics Ministry of Statistics and Programme Implementation, Government of India.

Dr. Rajender Parsad

- Received Fellowship of National Academy of Agricultural Sciences on 05 June 2011. On this occasion, Dr. Rajender Parsad made a presentation on Experiments with mixtures methodology in agricultural research.

Dr. Prajneshu

- Sessional President for 65th Annual Conference of ISAS, held at National Dairy Research Institute, Karnal.
- Elected as Fellow of National Academy of Agricultural Sciences.

Dr. PK Malhotra

- Co-chaired a session on Use of ICT for agricultural knowledge management during an International Conference on Innovative approaches for agriculture knowledge managemant at Vigyan Bhawan and NASC complex, New Delhi.

Dr. Ranjana Agrawal

- Received scroll of appreciation for developing forecast models for mango disease at XX Group Worker's Meeting of AICRP(STF) at HC&RI, Periyakulam.

Dr. Hukum Chandra

- Received the International Statistical Institute's World Bank Fund Award to attend the ISI World Statistics Congress, Dublin, Ireland.
- Member, Programme Committee & Chairman, session on Small Area Applications and Simulations at Small Area Estimation 2011 Conference held at Trier, Germany.

Offices in Professional Societies/Research Journals

Animal Science Reporter

Dr. Ranjana Agrawal	Research Editor (Bio-statistics)

Annals of Agricultural Research

Dr. Cini Varghese	Member, Editorial Board

Bureau of Indian Standards, New Delhi

Dr. VK Bhatia	Member, Management and Systems Division Council
Dr. Rajender Parsad	Member, Management and Systems Division Council

Committee of the Conference of Central and State Statistical Organizations (COCSSO), Central Statistical Organization, Ministry of Statistics and Programme implementation, GOI

Dr. VK Bhatia	Member, Standing Committee

Farming Systems Research and Development Association

Dr. Anil Kumar	Joint Secretary Member, Editorial Board

Indian Journal of Applied Statistics

Dr. Prajneshu	Member, Editorial Board

Indian Society of Agricultural Marketing

Dr. SP Bhardwaj	Member, Executive Council

Indian Society of Agricultural Economics, Mumbai

Dr. Sushila Kaul	Member, Executive Council

Indian Society of Agricultural Statistics

Dr. VK Gupta	Vice President Chair Editor, JISAS
Dr. VK Bhatia	Honorary Secretary Associate Editor, JISAS
Dr. Rajender Parsad	Joint Secretary Coordinating Editor, JISAS
Dr. UC Sud	Member, Executive Council Associate Editor, JISAS
Dr. Prajneshu	Associate Editor, JISAS Sessional President, 2011
Dr. PK Malhotra	Joint Secretary Coordinating Editor, JISAS
Dr. Hukum Chandra	Member, Executive Council
Dr. Sudeep	Member, Executive Council
Dr. Yogita Gharde	Member, Executive Council

Indian Society of Pulses Research and Development

Dr. MA Iquebal	Editor

Institute of Applied Statistics and Development Studies

Dr. VK Gupta	Member, Governing Body
Dr. VK Bhatia	Member, Governing Body
Dr. Rajender Parsad	Member, Governing Body
Dr. Prajneshu	Member, Governing Body

International Indian Statistical Association - INDIA Joint Statistical Meeting (IISA-INDIA JSM) 2000 Trust

Dr. VK Bhatia	President

International Journal of Agricultural and Statistical Science

Dr. Anil Kumar	Member, Editorial Board

International Statistical Institute, Netherlands

Dr. VK Gupta	Elected Member
Dr. Rajender Parsad	Elected Member
Dr. Hukum Chandra	Elected Member

Journal of Farming Systems Research and Development

Dr. DR Singh	Member, Editorial Board

Journal of Statistical Planning and Inference

Dr. VK Gupta	Associate Editor

Journal of Statistical Theory and Practice

Dr. VK Gupta	Associate Editor
Dr. Prajneshu	Associate Editor

Ministry of Statistics & Programme Implementation

Dr. VK Bhatia	Member, Empowered Committee for Awards and Fellowship for Outstanding and Meritorious Research Work in Statistics
Dr. VK Gupta	Member, Screening Committee for Awards and Fellowship for Outstanding and Meritorious Research Work in Statistics

Model Assisted Statistics and Applications

Dr. Hukum Chandra	Associate Editor

Pusa AgriScience, Journal of IARI, PG School

Dr. Rajender Parsad	Member, Editorial Board

Society of Statistics, Computer and Applications

Dr. VK Gupta	Executive President
Dr. VK Bhatia	Vice President Member, Editorial Board
Dr. Rajender Parsad	Executive Editor, Statistics & Applications
Dr. V Ramasubramanian	Joint Secretary
Dr. LM Bhar	Joint Secretary Managing Editor, Statistics and Applications
Dr. Alka Arora	Member, Executive Council

Swadeshi Science Movement of Delhi

Dr. Sushila Kaul	Member, Executive Council Member, Editorial Board

University of Kumaun, Nainital

Dr. VK Gupta	Member, Board of Studies and Research Degree Committee
Dr. Anil Kumar	Member, Board of Studies and Research Degree Committee

Consortium in News

THE TIMES OF INDIA, KANPUR
TUESDAY, MARCH 20, 2012

TIMES CITY

Researchers' training programme at CSA

Workshop held in N Bengal univers

Our Correspondent

Cooch Behar: A training programme on statistical analysis software for data analysis was held in Uttar Banga Krishi Viswavidyalaya on Monday. The program was conducted by director of the Data Management (DWM), Bhubaneswar, and 25 researchers participated in the same.

Dr Dilip Kumar Panda, a senior scientist at DWM, said this is the modern software for data analysis and is expensive. Indian Council of Agriculture research (ICAR) aims to install this software in all the 46 state agriculture universities across India with the help of World Bank, Panda added.

He further said that more efficient people would be needed to use this modern software and for this they are

A speaker at a workshop on statistical analysis software at Utta Krishi Viswavidyalaya on Monday–BP

Scientific analysis of data must for successful research

IT Correspondent

सि.आई.एफ.आर.आई.-एर उद्योगे शिक्षानवीश कर्मसूची

निजस्व प्रतिनिधि ः६ दिनेर "डाटा एनालेसिस इउजिंग स्यास"- विषयक शिक्षानवीश कर्मसूची सम्पन्न हल एन.आई.पि. प्रोजेक्ट-एर "ष्ट्रेंग थोनिंग ष्टाटिसटिक्याल कम्पुटिंग फर एन.ए.आर.एस"। यौथभावे एই कर्मसूचीर आयोजक छिल सेन्ट्राल इनल्याण्ड फिसारिज रिसार्च इन्सटिटिउट (सि.आई.एफ.आर.आई.) ब्यारাकपुर एवं डिरेक्टर अफ ওয়াটার म्यानेजमेन्ट, भुवनेश्वर सि.आई.एफ.आर.आई, ब्यारাকপুর। ১৪ ফেব্রুয়ারী শিক্ষানবীশ কর্মসূচীর উদ্বোধন করেন সি.আই.এফ.আর.আই.-এর সম্মানীয় নির্দেশক অধ্যাপক এ.পি.শর্মা। ৩৫ জন বিজ্ঞানী, অধ্যাপক প্রযুক্তিবিদেরা উপস্থিত ছিলেন। বিধানচন্দ্র কৃষিবিশ্ববিদ্যালয়, ডব্লুবিইউএ এবং এফ.এস-এর পক্ষে ড. ডি.কে. পান্ডা, সি.সি.পি.আই-এর মৎস্যচাষের বিশিষ্ট গবেষকরা এই কর্মসূচীতে ভাষণ, বিশ্লেষণ সহ বিভিন্নভাবে শিক্ষানবীশদের শিক্ষা দেওয়া হয়। ড. ডি.কে. পান্ডা, ডি.ডব্লু.এম, ভুবনেশ্বর, ড.আর.কে.পাল এবং ড.ডি.এন.ঝা, সি.আই.এফ.আর.আই, ব্যারাকপুর এবং মি.শাশ্বত কে সাহ শিক্ষানবীশ কর্মসূচী পরিচালনা করে।

मथुरा

शु चिकित्सा के वैज्ञानिक तथ्य जा

सीआईआरजी में शुरू हुआ साप्ताहिक प्रशिक्षण

दैनिक सहारा

लखनऊ । बुधवार • 23 फरवरी • 2011

बिना आंकड़ों के शोध करना दुर्लभ कार्य

ICAR

ICAR Reporter

OCTOBER – DECEMBER 2010

झाँसी जागरण

झाँसी
रविवार, 23 जनवरी, 2011

दैनिक जागरण 5

झाँसी : प्रशिक्षण शिविर में मौजूद मुख्य अतिथि सहित अन्य विशेषज्ञ।

कृषि वानिकी आंकड़ों का विश्लेषण सिखाया

स्वदेश

झांसी, रविवार २३ जनवरी २०११ ५

कृषिवानिकी आँकड़ों के विश्लेषण पर प्रशिक्षण संपन्न

झांसी, 22 जनवरी। राष्ट्रीय कृषि नवोन्मेषी परियोजना एन ए आई पी के लिये सांख्यिकीय संगणना के सुदृढ़ीकरण के अन्तर्गत एस ए एस सॉफ्टवेयर के उपयोग द्वारा कृषिवानिकी आँकड़ों के विश्लेषण पर प्रशिक्षण कार्यक्रम 17 जनवरी को प्रारंभ होकर आज संपन्न हो गया।

News in Brief

From the DG's Desk

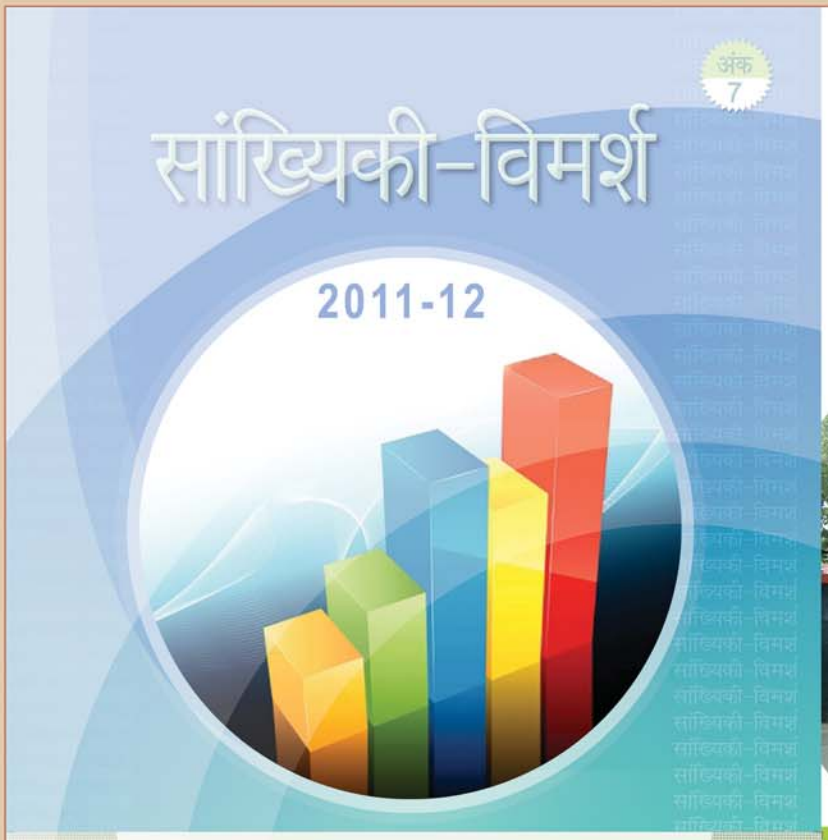
million. A high-end statistical package SAS would enable the researchers in NARS to undertake probing, in-depth, appropriate, intractable analysis of data generated in advanced research areas, and it would also facilitate data sharing over web and creation of analytics over the web useful for All India Co-ordinated Research Projects and other Network Projects of NARS.

Linkages and Collaboration in India and Abroad including Outside Funded Projects

S. No.	Title	Collaborative/ Funding Agency	Date of Start	Date of Completion
ICAR Institutes/ SAUs				
1.	Planning, designing and analysis of experiments planned ON-STATION under PDFSR	PDFSR, Modipuram	01 April 2007	31 March 2012
2.	Planning, designing and analysis of ON-FARM experiments under PDFSR	PDFSR, Modipuram	01 April 2007	31 March 2012
3.	Planning, designing and analysis of data relating to experiments conducted under AICRP on LTFE	AICRP on LTFE IISS, Bhopal	01 April 2007	31 March 2012
4.	Development of forecasting module for podfly, *Melanagromyza obtusa* Malloch in late pigeonpea	IIPR, Kanpur	01 July 2007	30 June 2012
5.	Visioning, Policy Analysis and Gender (V-PAGe) - Sub-Programme II : Technology forecasting	NCAP, New Delhi (NAIP Component-I)	01 June 2007	30 June 2012
6.	Visioning, Policy Analysis and Gender (V-PAGe) Sub-Programme III : Policy analysis and market intelligence	NCAP, New Delhi (NAIP Component-I)	01 June 2007	31 March 2012
7.	Development of gender information system for agriculture	DRWA, Bhubaneswar	01 April 2008	07 September 2011
8.	Machine learning approach for data mining	NCAP, New Delhi	01 August 2008	18 April 2011
9.	Risk assessment and insurance products for agriculture	NCAP, New Delhi (NAIP Component-I)	01 October 2008	31 March 2012
10.	Development of expert system on seed spices	NRCSS, Ajmer	01 February 2009	09 June 2011
11.	Expert system for maize crop	DMR, New Delhi	01 April 2009	30 April 2011
12.	Genomics and molecular markers in crop plants (Sub-project 4: Development of new genomic and EST resources and functional genomics of thermotolerance in mandate crops)	NRCPB, New Delhi	01 April 2009	31 March 2014
13.	Farm power machinery use protocol and management for sustainable crop production	IARI, New Delhi	01 April 2009	31 March 2014

S. No.	Title	Collaborative/ Funding Agency	Date of Start	Date of Completion
14.	Strengthening statistical computing for NARS	NDRI, Karnal; IVRI, Izatnagar; MPUAT, Udaipur; DWM, Bhubaneshwar; ICAR RC NEHR, Barapani; UAS, Bengaluru; NAARM, Hydrabad; CIFE, Mumbai (NAIP Component-I)	20 April 2009	30 June 2012
15.	Bioprospecting of genes and allele mining for abiotic stress tolerance	NRCPB, New Delhi (NAIP Component-IV)	04 May 2009	31 March 2012
16.	Weed assessment and management in the crops and cropping system	IARI, New Delhi	24 October 2009	31 March 2014
17.	Development of innovative convenience food as protein supplement	IARI, New Delhi	24 October 2009	31 March 2014
18.	Weather based forewarning models for Onion Thrips (*Thrips tabaci Lindeman*)	DOGR, Pune	01 April 2010	30 September 2012
19.	Weather based forewarning of mango pests	CISH, Lucknow; RFRS, Vengurle; BCKV, Mohanpur; BAC, Sabour; FRS, Sangareddy	01 April 2010	31 March 2013
20.	Establishment of National Agricultural Bioinformatics Grid	NBPGR, New Delhi; NBAGR, Karnal; NBFGR, Lucknow, UP; NBAIM, Maunath Bhanjan, UP; NBAII, Bangalore (NAIP Component-I)	01 April 2010	31 March 2013
21.	Pest and diseases dynamic vis-a-vis climatic change under the project National Initiative on Climate Resilient Agriculture	NCIPM, New Delhi (NICRA)	01 June 2011	31 March 2012
22.	Enhancing resilience of agriculture to climate change through technologies, institutions and policies	NCAP, New Delhi (NICRA)	29 August 2011	28 August 2014
23.	National initiative on climate resilient agriculture Agroforestry Component	NRCAF, Jhansi (NICRA)	01 June 2011	31 March 2012
24.	Development of web based mushroom expert system	DMR, Solan	01 April 2011	30 September 2012
25.	Strengthening & refinement of Maize AgriDaksh	DMR, New Delhi AICRP Centers (IARI, New Delhi; Coimbatore; Arbhavi; Kolhapur; Godra; Bhubneshwar; Varanasi; Ludhiana; Srinagar; Banswara; Assam)	01 April 2011	31 March 2016
26.	Phenomics of moisture deficit and low temperature stress tolerance in rice	NRCPB, New Delhi IARI, New Delhi Delhi University, New Delhi CRRI, Cuttack; IGKV, Raipur CAU, Barapani ICAR RC-NEHR, Barapani	15 February 2011 (13 May 2011)	14 February 2016
27.	Study of synonymous codon usage and its relation with gene expressivity in genomes of halophilic bacteria	NABIM, Mau	01 August 2011	31 January 2013
28.	Sustainable livelihood through goat farming by disseminating the improved goat production technologies	CIRG, Makhdoom	01 July 2009 (27 September 2010)	23 March 2013
29.	Impact of improved technologies and emerging market conditions on goat production system	CIRG, Makhdoom	01 July 2009 (27 September 2010)	23 March 2013

S. No.	Title	Collaborative/ Funding Agency	Date of Start	Date of Completion
30.	Efficacy of soil sampling strategies for describing spatial variability of soil attributes	IISS, Bhopal	01 August 2010 (01 November 2011)	31 July 2012
31.	Livelihood and nutritional security of tribal dominated rural areas through integrated farming system and technology models	MPUAT, Udaipur IARI, New Delhi (NAIP Component-III)	01 July 2007 (01 August 2011)	31 March 2012
32.	Development of forecasting methodology for fish production from ponds of upland region	DCFR, Bhimtal	01 August 2011 (23 September 2011)	31 January 2013
33.	ePlatform for seed spice growers	NRCSS, Ajmer	17 December 2011	30 September 2013
34.	Strengthening & refinement of Maize AgriDaksh	DMR, New Delhi	01 April 2011	30 September 2013
35.	Implementation of Management Information System (MIS) including Financial Management System (FMS) in ICAR	NAIP Component-I	19 January 2012	31 March 2013
36.	In silico identification of abiotic stress (salinity) responsive transcription factors and their cis-regulatory elements in grapes	NRC, Pune	01 January 2012	31 December 2013
Government of India				
37.	Whole Genome Association (WGA) analysis in common complex diseases: An Indian initiative	UDSC, NII, Delhi University, AIIMS, DMC (DBT Funded)	29 September 2008	28 September 2013
38.	Sampling methodology for estimation of meat production in Meghalaya	Ministry of Agriculture, Department of Animal Husbandry, Dairying & Fisheries, New Delhi	01 May 2009	30 April 2011
39.	District-level poverty incidence estimation from NSSO data using small area estimation techniques	CSO, Ministry of Statistics & Programme Implementation, Government of India	15 September 2010	14 September 2011
40.	Experimental designs in the presence of indirect effects of treatments	DST funded	01 October 2011	30 September 2014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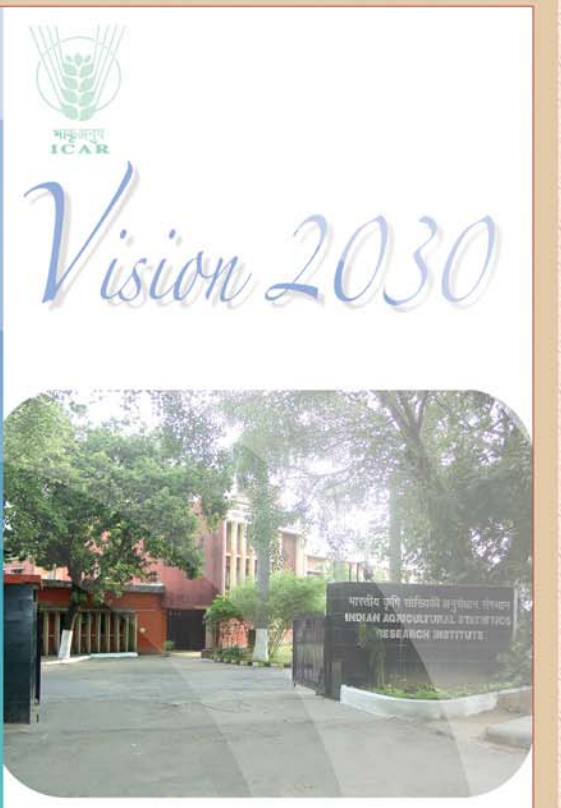
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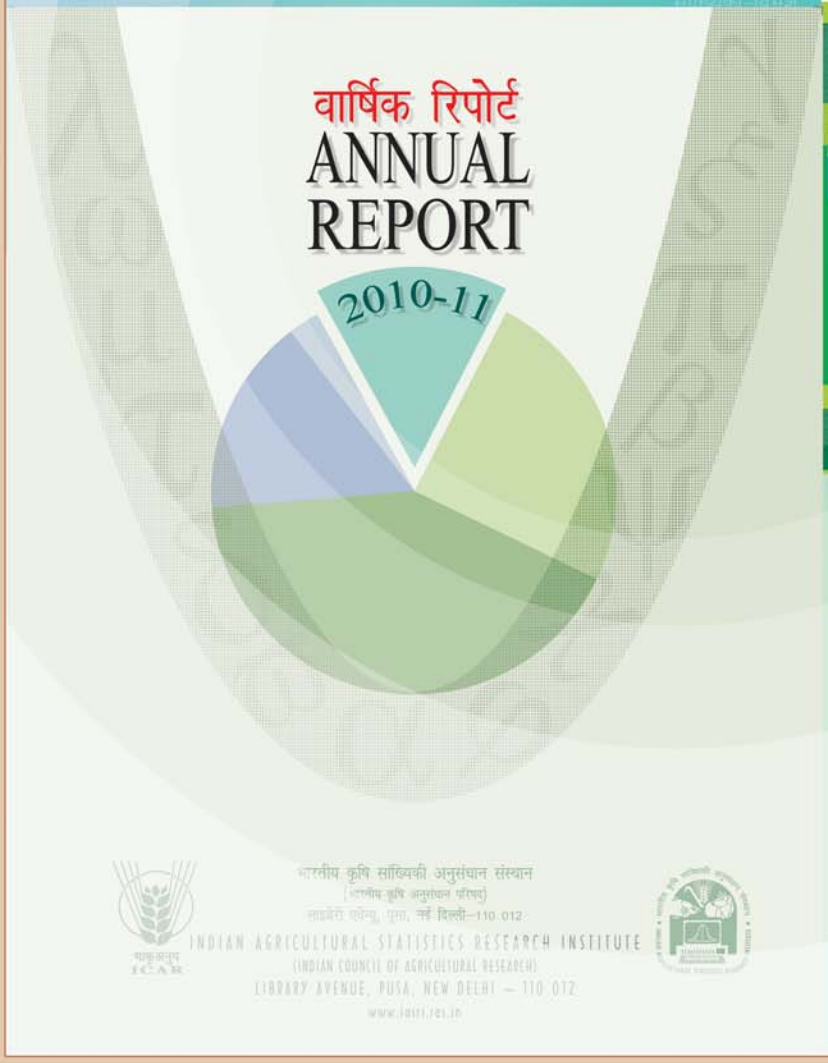
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REPORT
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IASRI
NEWS
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No. 4
January-March, 2012
Research Achievements
Human Resource Development
Panorama of Activities
Awards and Recognition
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Lectures Delivered
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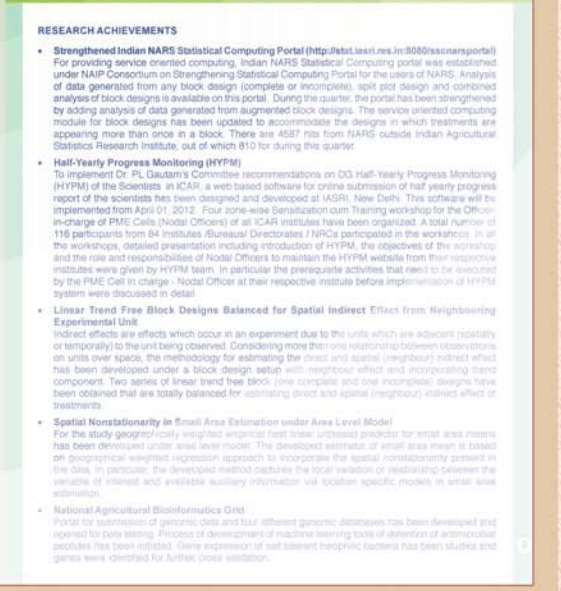
Consultancy/Advisory Services
Personnel
From Director's Desk . . .
This newsletter highlights some of the salient research and training achievements made and other significant activities performed during the period under report.
For providing service oriented computing, Indian NARS Statistical Computing portal has been strengthened by adding the link of augmented block designs. For Half-Yearly Progress Monitoring (HYPM) of the Scientists in ICAR, a web based software for online submission of half yearly progress report of the scientists has been designed and developed. Geographically weighted empirical best linear unbiased predictor for small area means has been developed under area level model. Portal for submission of genomic data and four different genomic databases have been developed and opened for beta testing.


IASRI NEWS
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January - March, 2012
RESEARCH ACHIEVEMENTS
Strengthened Indian NARS Statistical Computing Portal (http://stat.iasri.res.in:8080/sscnarsportal)
For providing service oriented computing, Indian NARS Statistical Computing portal was established under NAIP Consortium on Strengthening Statistical Computing Portal for the users of NARS. Analysis of data generated from any block design (complete or incomplete), split plot design and combined analysis of block designs is available on this portal. During the quarter, the portal has been strengthened by adding analysis of data generated from augmented block designs. The service oriented computing module for block designs has been updated to accommodate the designs in which treatments are appearing more than once in a block. There are 4587 hits from NARS outside Indian Agricultural Statistics Research Institute, out of which 810 for during this quarter.
Half-Yearly Progress Monitoring (HYPM)
To implement Dr. PL Gautam's Committee recommendations on DG Half-Yearly Progress Monitoring (HYPM) of the Scientists in ICAR, a web based software for online submission of half yearly progress report of the scientists has been designed and developed at IASRI, New Delhi. This software will be implemented from April 01, 2012. Four zone-wise Sensitization cum Training workshop for the Officer-in-charge of PME Cells (Nodal Officers) of all ICAR institutes have been organized. A total number of 116 participants from 64 Institutes /Bureaus/ Directorates / NRCs participated in the workshops. In all the workshops, detailed presentation including introduction of HYPM, the objectives of the workshop and the role and responsibilities of Nodal Officers to maintain the HYPM website from their respective institutes were given by HYPM team. In particular the prerequisite activities that need to be executed by the PME Cell in charge - Nodal Officer at their respective institute before implementation of HYPM system were discussed in detail.
Linear Trend Free Block Designs Balanced for Spatial Indirect Effect from Neighbouring Experimental Unit
Indirect effects are effects which occur in an experiment due to the units which are adjacent (spatially or temporally) to the unit being observed. Considering more than one relationship between observations on units over space, the methodology for estimating the direct and spatial (neighbour) indirect effect has been developed under a block design setup with neighbour effect and incorporating trend component. Two series of linear trend free block (one complete and one incomplete) designs have been obtained that are totally balanced for estimating direct and spatial (neighbour) indirect effect of treatments.
Spatial Nonstationarity in Small Area Estimation under Area Level Model
For the study geographically weighted empirical best linear unbiased predictor for small area means has been developed under area level model. The developed estimator of small area mean is based on geographical weighted regression approach to incorporate the spatial nonstationarity present in the data. In particular, the developed method captures the local variation or relationship between the variable of interest and available auxiliary information via location specific models in small area estimation.
National Agricultural Bioinformatics Grid
Portal for submission of genomic data and four different genomic databases has been developed and opened for beta testing. Process of development of machine learning tools of detection of antimicrobial peptides has been initiated. Gene expression of salt tolerant halophilic bacteria has been studies and genes were identified for further cross validation.

List of Publications

Research Papers

1. Abeynayake, NR and Jaggi, Seema (2009). A review of block designs for test treatments-control(s) comparisons. *J. Food Agril.*, **2(1)**, 22-29.
2. Abeynayake, NR, Jaggi, Seema and Varghese, Cini (2011). Neighbour balanced bipartite block designs. *Comm. Statist.-Theory Methods*, **40**, 4041-4052.
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9

Consultancy and Advisory Services

Advisory services for researchers in NARS were pursued rigorously and various training programmes were conducted as consultancy (details given in Chapter 6).

Advisory Services Provided

- **Ms. Samira Zareei, Department of Agricultural Machinery Engineering, Faculty of Agriculture, University of Tabriz, Iran**
  Provided advisory services on the analysis of data pertaining to a factorial experiment for a 3^4 factorial experiments run as a fractional factorial plan in 27 runs and three replications. The data analysis was also done and the results were obtained. The interest was only in main effects but several two-factor interactions were also estimable and the analysis was done by including the estimable two-factor interactions in the model.
- **Dr. Hafiz Munir Ahmed, Senior Scientist, NIFA, Peshawar, Pakistan**
  Advised on the generation of layout of an augmented design with proper randomization. The data generated from an augmented design was also analyzed and the results obtained were discussed for interpretation. The data was generated using an augmented design with 24 genotypes tested along with three different controls which were repeated after every three test entries. The design was run in three blocks of size 16 each. Eight different characters were observed and analyzed.
- **Dr. Anupama Singh, Principal Scientist, Division of Agricultural Chemicals, IARI, New Delhi**
  Suggested a design for a factorial experiment with 6 factors at 6 levels each and 7 factors at 3 levels each to be run in 72 runs with 4 blocks of size 18 each. The design suggested was a mixed orthogonal array of strength two with orthogonal blocking. The layout of the design is $(3^7.6^6//72)$ in 4 blocks of size 18 each.
- **Dr. Satyendra Singh, Senior Scientist (Nematology), Division of Vegetable Protection, Indian Institute of Vegetable Research, Varanasi**
  Advised on the analysis of data generated from an experiment conducted using a factorial RCB design with three factors each at 2 levels.
- **Dr. Axma Dutt Sharma, Division of Germplasm Conservation, NBPGR, New Delhi**
  Advised on creation of standard error bars for experimental data with 17 characters using JMP Statistical Discovery Software.
- **Dr. Ramawatar Nagar, Scientist, National Research Center for Plant Biotechnology, New Delhi**
  Advised on the analysis of data generated from an experiment conducted using a factorial RCB design with 5 factors each at 4 levels. The data was collected on four characters viz. number of auxiliary shoots, auxiliary shoot length, number of leaves and number of nodes.

- **Dr. Ramkrushna G Idapuganti, Scientist, Division of Agronomy, ICAR-Research Complex for NEH Region, Umiam, Meghalaya**

  Advised to use a resolvable block design with factorial treatment structure for an experiment planned to be conducted on a terraced land, where it was not feasible to have complete replication on single terrace, to study the effect of varieties of maize (6 in number) and 4 fertility treatments. The parameters and block contents of the design are v = 24 (6×4), b = 6, r = 3, k = 12, Efficiency factor for F1=F2=1 and interaction F1F2=0.8968.

Block Contents													
Replication I	Block 1	00	10	20	31	41	51	02	12	22	33	43	53
	Block 2	01	11	21	32	42	52	03	13	23	30	40	50
Replication II	Block 1	00	10	21	31	41	52	02	12	23	33	43	5
	Block 2	01	11	22	32	42	53	03	13	20	30	40	51
Replication III	Block 1	00	11	21	31	42	52	02	13	23	33	40	50
	Block 2	01	12	22	32	43	53	03	10	20	30	41	51

- **Ms. Nishu Yadav, Ph.D. student (Technology and Sciences), Department of Food and Nutrition, Halina School of Home Science, Sam Higginbotom Institute of Agriculture, Technology and Sciences, Allahabad**

  Advised on analysis of data pertaining to experiments conducted using 3 factors (milk, temperature and salt) each at 3 levels for chemical analysis, 4 factors (milk, temperature and salt at 3 levels each and storage at 4 levels) using factorial completely randomized design. In this experiment, each of the treatment combinations was replicated thrice.

- **Ms. Roli Katiyar, Ph.D. student (Technology and Sciences), Department of Food and Nutrition, Halina School of Home Science, Sam Higginbotom Institute of Agriculture, Technology and Sciences, Allahabad**

  Advised on analysis of data pertaining to Chemical data with 3 factors (milk, temperature and salt each at 3 levels) and another experiments with 3 factors each at 3 levels and one factor at 6 levels and Sensory data with 3 factors each at 3 levels and 1 factor at 6 levels using factorial completely randomized design with contrast analysis.

- **Dr. RB Singh, IFFCO Foundation, Nehru Place, New Delhi**

  Provided compiled data related to area, production and productivity of different commodities.

- **Mohd. Hashim, Ph.D. (Agronomy) student, IARI, New Delhi**

  Advised on block design with factorial treatment structure for the experiment on Crop diversification and nutrient management in mango based agri-horticulture system. The two factors were crops under mango tree and nitrogen application to mango tree. The crops under mango were cowpea, pearlmillet, soybean and no crop. The three levels of fertilizer to mango tree were control, 50%RD of NP+50%RD of FYM and RD of NP+RD of FYM. The experiment is to be conducted where five different varieties of mango (Pusa Arunima, Pusa Surya, Amarpali, Mallika, Dasheri) with 25 trees for each variety were established. The plantation of each variety was considered as a block and each block was divided into 8 plots with 3 trees per plot. Following block design with factorial treatment structure was suggested:

Block 1	C1F1	C2F1	C3F1	C4F1	C1F2	C2F2	C3F2	C4F2
Block 2	C1F2	C2F2	C3F2	C4F2	C1F3	C2F3	C3F3	C4F3
Block 3	C1F3	C2F3	C3F3	C4F3	C1F1	C2F1	C3F1	C4F1
Block 4	C1F1	C2F1	C3F1	C4F1	C1F2	C2F2	C3F2	C4F2
Block 5	C1F2	C2F2	C3F2	C4F2	C1F3	C2F3	C3F3	C4F3

  This design is obtained by repeating first two blocks of the singular group divisible design S53 with parameters v = 12, b = 3, r = 2, k = 8, m = 3, n = 4, l_1=1, l_2=1. The final parameters of design are v = 12, b = 5, k = 8. He was also given an alternative with 6 plots per block, each block containing 4 trees. The layout of the design is

Block 1	C1F3	C2F2	C3F1	C3F2	C3F3	C4F3
Block 2	C1F2	C2F2	C2F3	C4F1	C4F2	C4F3
Block 3	C1F1	C1F2	C2F1	C2F3	C3F2	C4F3
Block 4	C1F1	C1F2	C1F3	C2F1	C3F3	C4F2
Block 5	C2F1	C3F1	C3F2	C3F3	C4F1	C4F2

- **Dr. Purushottam Sharma, IGFRI, Jhansi**

  Advised for the data analysis on the project Livelihood condition and livestock production system of resource poor farmers, on sampling methodology, statistical analysis, optimization of herd size etc.

- **Dr. AK Mishra, IGFRI, Jhansi**

  Advised for the data analysis on the project Nutritional mapping of crop residue and its implication for livestock feeding on sampling

methodology, estimation of grain straw ratio, prediction of crop residue etc.

- **Ms. Shinoji KC, Scientist, Division of Agricultural Extension, IISS, Bhopal**
  Advised on the use of Kruskal-Wallis test for identifying the major factors behind the shift from inorganic farming to organic farming in Kerala based on the survey conducted on eighty farmers as a part of her Ph.D. thesis work.
- **FAO Consultancy to Government of Sri Lanka**
  Advised on feasibility study on applications of remote sensing and GIS in agricultural census/surveys.
- **Dr. Neeru Bhushan, Senior Scientist, Central Research Institute on Goat, Makhdoom**
  Advised on data analysis of data pertaining to Adaptation of livestock to intend climatic changes through shelter management (ICAR Network Project) and Documentation of animal husbandry's package and practices in peri-urban and urban areas around Lucknow (UPCAR Project). Also provided one month training on SAS, SAS Enterprise Guide and JMP.
- **Rainfed Areas Prioritization Index (RAPI)** on prioritization of rainfed area in the country has been developed in consultation with and guidance of NRAA, CRIDA and IASRI together have come up with Rainfed Areas Prioritization Index by combining natural resource index (NRI) and integrated livelihood index (ILI). Among the identified prioritized 167 districts based on RAPI score, 50 districts deserve immediate attention for enhancing productivity and livelihood as resource-wise they are rich but the productivity and livelihood status are poor. Besides prioritization of rainfed districts of India, the study has highlighted the crop and livestock based interventions to meet the targeted growth rate of 4 per cent per annum.

Projects undertaken in Consultancy Mode

- Study to develop an alternative methodology for estimation of cotton production funded by Directorate of Economics and Statistics (DES), Department of Agriculture & Cooperation, Ministry of Agriculture was carried out during 01 April to 17 September 2011. The relevant study material, reports etc. relating to the project have been reviewed. Preliminary analysis of the picking-wise data acquired during previous study for the States under study namely, A.P. and Maharashtra has been completed. In the process of development of alternative procedures, estimate of average yield of cotton alongwith its percentage standard error for each picking has been obtained for Adilabad, Guntur and Karimnagar districts of A.P. State using the existing procedure. The relative contribution of each picking to the total yield has also been worked out for these three districts. The possibility of using other sampling designs is being examined. Estimation procedure for estimating average yield of cotton using double sampling approach is being developed. Data analysis for Adilabad and Guntur districts using double sampling approach has been completed and is in progress for Karimnagar district.
- A project on Evaluation of agricultural census scheme was initiated on 05 October 2011. The agricultural census related documents were studied. A one day workshop was organized with state officials involved in the agricultural census work with the aim to understand the problems encountered in the field work of the agricultural census. Questionnaires were developed for primary workers, District level officials involved, State level officials involved in the census work and the Officials responsible for the organization of agricultural census work in the Ministry of Agriculture to get their feedback on the census work and discussed with the experts Dr SK Raheja, Dr BBPS Goel, former Directors of IASRI and Dr AK Srivastava, former Joint Director, IASRI and modified as per their suggestions. The agricultural census related reports have been studied. Particularly, the estimation needs to be modified as per the domain estimation theory. Two districts of the AP State were visited to examine the progress of the IX Agricultural census work. Discussions were also held with the officials in the Ministry of Agriculture involved in the census work.


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QRT, RAC, Management Committee and IRC

QUINQUENNIAL REVIEW TEAM (QRT)

Quinquennial Review Team (QRT) to review the work done by the Indian Agricultural Statistics Research Institute for the period 01 January 2006 to 31 March 2011 has been constituted vide Council's Office Order No. 5-10/2011-IA-II(AE) dated 29 June, 2011. The composition of the QRT is:

Dr. Padam Singh — Chairman
Former Member, National Statistical Commission and Head Research and Evaluation, EPOS
Health Consultants (India) Pvt. Ltd.
445, Phase-III, Udyog Vihar, Gurgaon, Haryana

Dr. SK Das — Member
Director General
Central Statistical Office
Ministry of Statistics and Programme Implementation,Sardar Patel Bhawan
Parliament Street, New Delhi

Dr. GM Saha — Member
Visiting Professor
Bayesian and Interdisciplinary Research Unit, Indian Statistical Institute
203, Barrackpore Trunk Road
Kolkata-700108, West Bengal

Prof. Karmeshu — Member
Professor,School of Computer and Systems Sciences
Jawaharlal Nehru University
New Delhi-110067

Dr. RPS Malik — Member
Senior Researcher, IWMI-India
II Floor Office, Block-B
NASC Complex, DPS Marg
Pusa, New Delhi-110012

Dr. TR Sharma — Member
Principal Scientist
National Research Centre on Bio Technology
Lal Bahadur Shastri Building
Pusa Campus, New Delhi-110012

Dr. KN Singh — Member Secretary
Head, Division of Forecasting and Econometric Techniques
IASRI, Library Avenue, Pusa
New Delhi 110012

Various meetings of the newly constituted QRT were held during the period.

Research Advisory Committee (RAC)

The composition of Research Advisory Committee (RAC) of the Indian Agricultural Statistics Research Institute (IASRI) constituted for a period of three years w.e.f. 22 June 2010 is as follows:

Prof. Prem Narain — Chairman
Former Director, IASRI
27 A, Pocket B-3, Lawrence Road
Delhi-110 035

Dr. GM Boopathy Member
Deputy Director General
National Accounts Division
Central Statistical Organization
Sardar Patel Bhavan, Parliament Street
New Delhi-110 001

Dr. SC Gulati Member
Former Professor
Population Research Centre
B-15, Kirti Nagar, New Delhi-110 015

Dr. Sridhar Sivasubbu Member
Institute of Genomics and
Integrative Biology, IGIB Extension
Center at Naraina
IA, 93-94, Naraina Indl Area, Phase-I
Naraina, New Delhi-110 028

Dr. SD Sharma Member
Vice-Chancellor (w.e.f.19 February 2011)
Dev Sanskriti University
Gayatri Kunj, Shantikunj
Haridwar-249411(Uttarakhand)
or
Former Director, IASRI
D-15/02, SF (IInd Floor)
Presidency Floor, ARDEE City
Sector 52, Gurgaon- 122 011 (Haryana)

Dr. VK Bhatia Member
Director, IASRI
Library Avenue, Pusa
New Delhi-110 012

Dr. NPS Sirohi Member
Assistant Director General (Engg.)
Indian Council of Agricultural Research
Krishi Anusandhan Bhavan-II, Pusa
New Delhi-110 012

Dr. VK Singh Member
Director (till 03 May 2011)
Agricultural Statistics and Crop Insurance Department of Agriculture, Govt. of UP
Krishi Bhawan, Madan Mohan Malviya Marg
Lucknow-226 001 (UP)

Dr. Madhusudan Sathe Member
Yashodhan (till 03 May 2011)
2071, Vijay Nagar Colony
Near SP College, Pune-411030

Dr. Rajender Parsad Member Secretary
Head, Division of Design of Experiments
IASRI, Library Avenue
Pusa, New Delhi-110 012

The 13th meeting of the Research Advisory Committee of IASRI was organised during 12-13 December, 2011 under the Chairmanship of Dr. Prem Narain, Former Director, IASRI, New Delhi. The meeting was attended by Dr. SD Sharma, Dr. VK Bhatia, Dr. Sridhar Sivasubbu, Dr. NPS Sirohi, and Dr. Rajender Parsad, Dr. Padam Singh, Member, National Statistical Commission & Head Research and Evaluation, EPOS, Health Consultants (India) and Chairman QRT of IASRI also attended the meeting on special invitation. Dr. VK Gupta, National Professor, ICAR and all Heads of Divisions, IASRI also attended the meeting as special invitees.

Dr. VK Bhatia introduced the Honorable Chairman and other members of the RAC and welcomed all members of the RAC. Thereafter, he apprised the members with the important activities of the Institute. Dr. Padam Singh, Chairman QRT and other members made their opening remarks. Dr. Rajender Parsad, presented the historical development, genesis, functions, research achievements and future research programmes of the Institute. He also presented the proposed research programmes for XII Five Year Plan for getting valuable suggestions from RAC. He spelled out the changes made in Goal, Vision, Mission, Mandate and six research programmes of the Institute in Vision 2030 document published during the year. He also apprised the scientists of the Institute that were involved in 65 research projects during the year. The following action points emerged:

1. A formal mechanism is required to be developed for identification of statistical researchable issues. The Institute should be proactive in having interactions with researchers in NARS. National Conference of Agricultural Statisticians which is being organized triennially may be organized with subject matter divisions of the Council and if need be, it may be made biennial. Collaborative projects with different NARS organizations may be encouraged.
2. Web resources on design of experiments should be further strengthened. Indian NARS Statistical Computing Portal for providing service oriented computing through IP Authentication may further be strengthened by adding more modules on the analytical techniques that are commonly being used in NARS. For dissemination of statistical techniques and identification of statistical

researchable issues efforts like Design Resources Server may be replicated in areas of Sample Surveys, Statistical Modelling and Statistical Genetics.

3. The sample size determination is an important problem and is of concern to all disciplines of agricultural sciences. The Institute should develop a note on sample size determination with solved examples with ready reckoner and disseminate through Institute website. An online calculator for sample size determination may also be developed. Extensive computations may also be done for determining sample size in crop cutting experiments to settle this issue once for all.
4. For handling massive data sets, appropriate statistical and computational methodologies may be developed and an edited book may be brought out by the Institute on Statistical and Computational Methodologies for Massive Data Sets that should include both theory and applications.
5. The research achievements of the Institute in small area estimation may be sent to State Department of Agriculture and Planning Commission.
6. The studies may be undertaken to deal with Statistical Issues in Remote Sensing based on the recommendations of Vaidyanathan Committee Report. Studies may also be carried out to see whether it is possible to reduce the sample size in crop cutting experiments by making use of remote sensing.
7. A mechanism may be developed at the Council level to ensure that all new recruited scientists undergo a training programme on Statistical Techniques with emphasis on application aspects just after their FOCARS training programme.
8. The presentation by Dr. Anil Rai, Head, Agricultural Bioinformatics had indicated an ambitious plan of work during XII Plan that couldn't be addressed with meager and non well-trained staff. The proposed capacity building of the scientists in this area is inadequate. It needs enhancement. This should be taken up seriously and enough provisions should be made in XII Plan for the capacity building of scientists in this new area.
9. The scientists engaged in the area of bioinformatics should work in network mode and in close collaboration with molecular biologists and biotechnologists. The work on system biology; development of tools and protocols for genome sequencing; determination of optimum number of molecular markers for selective breeding etc. may be taken up.
10. Submission of genomic data should be made mandatory in National Agricultural Bioinformatics Grid at the Council level. The Institute should do benchmarking according to International Norms for providing Accession Numbers. Emphasis should be put on customized applications generation on bioinformatics rather than providing freely available software links. Quantifiable returns and deliverables from National Agricultural Bioinformatics Grid may be clearly spelt out.
11. Content Generation, Content Updation and Content Management Policy should be developed by the Council.
12. Information Communication Technology is a very wide term to fit in the mandate of the Institute. Therefore, the phrase "Agricultural Statistics and Information Communication Technology" in the goal and vision of the Institute may be changed to "Statistics and Informatics". Studies on water availability may be made as a part of XII Plan research activities.
13. Vacant scientific positions at IASRI should be filled on priority basis and for this, concerned authorities may be approached. Efforts may be made to revive the direct recruitment at scientist level in the discipline of computer applications.
14. The establishment of ICAR Data Center at IASRI will involve a large number of personnel, particularly of technical type, to run the Center 24 hours of the day of seven days of the week. Efforts may be made to fill vacant positions of Technical Assistants/Officers on top priority basis with the assistance of the ICAR.
15. PG School, IARI, New Delhi and Deputy Director General (Education) ICAR should be approached for developing a mechanism in which the students of Masters' degree programme in Agricultural Statistics and Computer Applications from IARI possessing B.Sc. in Statistics/Mathematics may be given the option to offer remedial courses as extra credit hours in each trimester so that they can complete their degree requirements without

spending one extra year. These courses can be offered as summer courses also. The student intake capacity may also be increased.

16. The ambience of the Institute needs a face lift. Adequate provision should be made in the budget to this end.

Institute Management Committee

The Director of the Institute, who is In-charge of the overall management of the Institute, is assisted in the discharge of his functions by the Institute Management Committee (constituted by the Council) by providing a broad-based platform for decision making process by periodically examining the progress of the Institute activities and by recommending suitable remedial measures for bottlenecks, if any. The present Institute Management Committee comprises of:

Prof. VK Bhatia — Chairman
Director, IASRI (ICAR), Pusa
New Delhi-110 012

Director (Agriculture) — Member (till 03.05.2011)
Government of Delhi, ITO
New Delhi-110 001

Director, Agricultural Statistics — Member (till 03.05.2011)
Government of Uttar Pradesh
Lucknow, Uttar Pradesh

Director, IARI — Member
New Delhi-110 012

Prof. Devi Prasad Tripathi — Non-Official Member (till 03.05.2011)
General Secretary &
Chief Spokesman
National Congress Party
C-9/9782, Vasant Kunj
New Delhi 110 070

Sh. Madhusudan Sathe — Non-Official Member (till 03.05.2011)
Yashodhan
2071 Vijay Nagar Colony
Near SP College, Pune-411 030

Dr. PK Agarwal — Member
National Professor, ICAR
IARI, Pusa, New Delhi-110 012

Dr. Madhuban Gopal — Member
National Fellow
Department of Agricultural Chemicals
IARI, New Delhi-110 012

Dr. Rajni Jain — Member (w.e.f. 04.07.2011)
Senior Scientist
NCAP, New Delhi

Dr. RL Sapra — Member
Principal Scientist (Agril. Stat.)
Division of Genetics
IARI, Pusa, New Delhi-110 012

Dr. NP Sirohi — Member (w.e.f. 19.04.2011)
Assistant Director General (Engg.)
KAB-II, ICAR, Pusa
New Delhi-110 012

Finance and Accounts Officer — Member (till 03.05.2011)
IARI, Pusa, New Delhi-110 012

Head of Office — Member Secretary
IASRI (ICAR)
New Delhi-110 012

Institute Research Committee (IRC)

The Institute Research Committee (IRC) is an important forum to guide the scientists in the formulation of new research projects and to review the progress of on-going research projects periodically. It also monitors the follow up action on the recommendations of the Quinquennial Review Team (QRT), Research Advisory Committee (RAC) in respect of technical programmes of the Institute. Dr. VK Bhatia, Director, IASRI is the Chairman and Dr. Rajender Parsad, In-charge (PME Cell) is the Member Secretary of the IRC.

Two (75th & 76th) meetings of the Institute Research Committee (IRC) were held during 08-09 September 2011 and 23, 24 & 28 March 2012. In the 75th meeting 18 new research projects (09 Institute funded, 04 Institute funded in collaboration with other Institute and 05 outside funded) were approved and progress of 35 (15 Institute funded, 10 in collaboration with other Institutes and 10 outside funded) ongoing research projects were discussed and 07 research projects were declared as completed. In the 76th meeting 25 new research projects (18 Institute funded, 06 Institute funded in collaboration with other Institute and 01 outside funded) were approved and progress of 46 (21 Institute funded, 12 in collaboration with other Institute and 13 outside funded) ongoing research projects was reviewed and 15 research projects were declared completed.

During the year in all 43 new research projects were approved and progress of 81 ongoing research projects was reviewed and 22 research projects were declared completed.

Papers Presented and Participation of the Institute at the Conferences/Workshops, etc.

PAPERS PRESENTED

- **Brainstorming-cum-Workshop Session at CIFT, Kochi on 07 July 2011**
  - Ramasubramanian, V*, Kumar, Amrender and Bhatia, VK. Forecasting technological needs & prioritizing factors in fisheries sector: A preliminary analysis.
- **Annual Review Meeting of FASAL project at IMD, Pune during 01-02 August 2011**
  - Agrawal, Ranjana*. Weather based pre-harvest forecast of crop yield - IASRI approaches. (Invited Talk)
- **Small Area Estimation (SAE 2011) Conference Spatio-Temporal Small Area Modelling at Trier, Germany during 11-13 August 2011**
  - Chandra, H*, Salvati, N, Chambers, R and Tzavidis, N. Small area estimation under spatial nonstationarity. (Invited Paper)
  - Chambers, R* and Chandra, H. A semiparametric bootstrap for clustered data. (Invited Paper)
- **International Statistical Institute World Statistics Congress 2011 (ISI 2011) at Dublin, Ireland during 21-26 August 2011**
  - Chandra, H*, Sud, UC, and Salvati, N. Estimation of district level poor households in the state of Uttar Pradesh in India by combining NSSO survey and census data-An application of small area estimation.
- **XX Group Workers Meeting on AICRP(STF) at HC&RI, Periyakulam during 29 September – 02 October 2011**
  - Agrawal, Ranjana* and Kumar, Amrender. Models for forewarning pests and diseases- An overview.
  - Agrawal, Ranjana*. Weather based forewarning of mango pests.
- **AMI-2011 International Conference on Microbiology Biotechnology for Sustainable Development at Punjab University, Chandigarh during 03-06 November 2011**
  - Rai, Anil, Farooqi, Samir, Sanjukta, RK*, Rai, Niyati, Sharma, Naveen and Mishra DC. Assessment of codon usage bias in salt-stressed, salinibacter ruber.
  - Sanjukta, RK*, Sharma, Naveen, Farooqi, Samir, Mishra, DC and Rai, Anil. Synonymous codon usage pattern among genes of moderately halophilic bacteria, chromohalobacter salexigens DSM 3043.
- **Conference on 4th Meeting of WYE Group on Statistics on Rural Development and Agriculture Household Income at Rio de-Janerio, Brazil during 08-11 November 2011**
  - Sud, UC*. District level estimates of crop yield using improvement of crop statistics scheme data and census data.

- **25th Annual Conference of Indian Society of Agricultural Marketing held at NAARM, Hyderabad during 22-24 November 2011**
  - Bhardwaj, SP*. Significance of market information system in agricultural development.
- **65th Annual Conference of ISAS on Statistics and Informatics for Agricultural Research held at National Dairy Research Institute, Karnal during 03-05 December 2011**

  Invited Talks
  - Bhar, LM*. Block designs for multifactor experiments, in the sub-theme on Designs for multi-factor experiments.
  - Parsad, Rajender* and Gupta, VK. Some applications of design for factorial experiments in NARS, in the sub-theme on Designs for multi-factor experiments.
  - Rao, AR*. Applications of statistical techniques in bioinformatics for animal science, in the sub-theme on Advances in statistical techniques in dairy sciences.
  - Sudeep*. KM tool for development of online expert systems for crops in the sub-theme on Emerging paradigms of knowledge management in agricultural sciences.
  - Varghese, Cini*. Factorial crossover designs, in the sub-theme on Designs for multi-factor experiments.

  Papers Presented for Dr. GR Seth Memorial Young Scientist Award
  - Gharde, Y*, Rai, A and Chandra, H. Hierarchical bayes small area estimation approach for spatial data.
  - Kaustav, Aditya*, Sud, UC and Chandra, Hukum. Estimation of domain mean using two stage sampling with sub-sampling of non-respondents.
  - Varghese, Eldho* and Jaggi, Seema. Response surface methodology in the presence of neighbour effects from adjoining experimental units.

  Contributed Papers
  - Arora, Alka*, Javanmard, Maedeh Zirak and Jain, Rajni. Online software for fuzzy clustering.
  - Arya, Prawin*, Sivaramane, N, Singh, DR, and Kumar, Anil. Market integration in coarse cereals in India: A case of maize and jowar.
  - Chandra, H*, Sud, UC and Gharde, Y. Estimation of crop yield using small area estimation approach.
  - Chaturvedi, A, Alam, W*, Singh, NO and Paul, AK. Robustness of the sequential testing procedures for the parameters of zero-truncated binomial and poisson distributions.
  - Gupta, AK* and Sud, UC. A methodological study on estimation of production of mushroom.
  - Kaul, Sushila*. An overview of contribution of national agricultural science museum in historical and scientific knowledge management of development of agriculture.
  - Mandal, BN*, Gupta, VK and Parsad, Rajender. Algorithmic construction of efficient multilevel k-circulant supersaturated designs.
  - Singh, DR, Sivaramane, N and Arya, Prawin*. Data envelopment analysis for estimation of farm efficiencies in crop production: A case of trans-gangetic plains of India.
  - Singh, KN* and Sahoo, Prachi Misra. Use of geographic information system, remote sensing and global positioning system in nutrient management.
  - Singh, NO*, Kumar, Surinder, Singh, N, Gopimohon and Paul, AK. Fitting of fox model with autoregressive of order one using expected value parameters.
  - Sivaramane, N*, Singh, DR, Arya, Prawin and Kumar, Anil. An investigation into production, consumption and supply-demand scenarios of major pulses in India- A disaggregate analysis.
  - Sudeep*. KM tool for development of online expert systems for crops.
- **Annual Review-cum-Planning-meet of CSISA Research Platforms at NASC Complex New Delhi on 05 December 2011 under CSISA, IRRI, India**
  - Parsad, Rajender*. Statistical analysis of CSISA research platform data. (Invited Talk)
- **National Symposium on Biodiversity and Food Security: Challenges and Devising Strategies held at Indian Institute of Pulses Research, Kanpur during 10-11 December 2011**

- Sarika*, Iquebal, MA and Rai, Anil. In silico analysis and homology modelling of antioxidant proteins of legumes.

- **5th Indian International Conference of Artificial Intelligence (IICAI) at SIT, Tumkur, Bangalore during 14-16 December 2011**
  - Kumar, Amrender* and Agrawal, Ranjana. A prediction model for alternaria blight in mustard crop based on artificial neural network.
  - Jain, Rajni*, Samimul Alam, AKM, Arora, Alka. Software process model for total factor productivity of agriculture.
  - Sudeep*. Ontology based expert system for varietal selection of maize.
- **International Conference held during 16-18 December 2011 at Gujarat University, Ahmadabad**
  - Prajneshu*. Some nonlinear time-series models and their applications. (Invited Talk)
- **Conference on Agricultural Bio-technology organized by Confederation of Indian Industries, IARI, New Delhi jointly with DBT, New Delhi and ICAR, New Delhi during 19-20 December 2011 at IARI, New Delhi**
  - Rai, Anil*. Bioinformatics in agriculture. (Invited Talk)
- **Biennial Group Meeting of AICRP on Integrated Farming Systems held at CARI, Port Blair during 27-29 December 2011**
  - Parsad, Rajender*. Issues related to designing experiments, data submission, data processing and analysis of data. (Invited Talk)
- **99th Indian Science Congress 2012 held at KIIT University, Bhubaneswar, Odisha during 03-07 January 2012**
  - Chandra, H* and Chambers, R. Semi parametric block bootstrap approach for multilevel data. (Invited Paper)
  - Gharde, Y*, Rai, A and Chandra, H. Small area estimation for spatial population-Hierarchical bayes approach.
  - Paul, AK*, Das, Samendra and Wahi, SD. Comparative performance of oblique axes, k-th nearest neighbour, linear and quadratic discriminant procedures under multivariate skew-normal situations.
- **International Symposium on 100 Years of Rice Science and Looking Beyond held at TNAU, Coimbatore during 09-12 January 2012**
  - Singh, DR*, Sivaramane, N and Arya, Prawin. Farm level efficiencies in rice cultivation in different agro-climatic regions of indo-gangetic plains of India.
  - Sivaramane, N, Mathur, VC, Singh, DR* and Jha, Girish. A poster on competitiveness and dynamics of India's rice exports. (Poster Presentation)
- **The 2012 Federal Committee on Statistical Methodology Research Conference held at Washington, DC, USA during 10-12 January, 2012**
  - Berg, E* and Chandra, H. Small area prediction for a unit level lognormal model. (Invited Paper)
- **International Conference on Science Communication for Scientific Temper held at NASC Complex during 10-12 January 2012**
  - Kaul, Sushila*, Saxena, Jagdeep and Sharma, Anil K. ShoWindow of Indian agriculture: Past, present & future.
- **International Conference on Recent Perspectives in Macromolecular Structures and their Functions at Central Agricultural Research Institute, Port Blair, Andaman & Nicobar Islands during 27-28 January 2012**
  - Farooqi, Samir*, Sanjukta, RK, Mishra, DC, Chaturvedi, KK, Rai, Anil, Singh, DP and Sharma, Naveen. Statistical and computational methods for detection of synonymous codon usage patterns in prokaryotes and eukaryotes.
  - Lal, SB, Sharma, Anu, Rai, Anil, Chakraborty, Ohika and Farooqi, Samir*. Pipelines for integrating bioinformatics tools – A review.
  - Rao, AR*, Sahu, TK, Wahi, SD, Singh, UP and Marwaha, Sudeep. A proteomics analysis for salinity stress tolerance across species.
- **14th International Conference and Exhibition on Geospatial Information Technology and Applications organised by India Geospatial Forum 2012 at Epicentre, Gurgaon during 07-09 February 2012**
  - Ahmad, Tauqueer* and Sahoo, Prachi Misra. Estimation of area under agroforestry in Ludhiana district of Punjab state using remote sensing and GIS techniques.

- Sahoo, Prachi Misra*, Ahmad, Tauqueer, Rai, Anil, Singh, KN and Handique, BK. Geospatial technology for crop acreage estimation in north eastern hilly regions.

- **National Conference on Advances and Applications in Statistics organised by the Department of Statistics, Panjab University, Chandigarh during 20-21 February 2012**
  - Ahmad, Tauqueer* and Sahoo, Prachi Misra. Estimation of area under agroforestry in Vaishali district of Bihar state using geospatial techniques.
  - Sahoo, Prachi Misra*, Ahmad, Tauqueer, Rai, Anil and Singh, KN. Geostatistical techniques for extraction of information under cloud cover from satellite images.
- **Review and Planning Workshop on Farmers Participatory Field Trials on Conservation Agriculture: Data Needs, Protocols, Management, Analytical Tools and Techniques at NASC Complex, Pusa New Delhi during 21-22 February 2012**
  - Parsad, Rajender*. Statistical analysis of data from farmers participatory trials using PCA, mixed models in SAS. (Invited Talk)
- **International Conference on Plant Biotechnology for Food Security: New Frontiers held at NASC Complex, New Delhi during 21-24 February 2012**
  - Bhati, Jyotika*, Chaduvula, PK, Kumar, Sanjeev, Marla, SS and Rai, Anil. Genome-wide analysis for identification of salt-responsive genes in oryza sativa.
  - Chaduvula, PK* and Bhati, J, Rai, A, Kumar, Sanjeev, and Marla, S. Functional prediction of salt stress responsive proteins through modeling physicochemical parameters of cereal crops.
  - Chillna, Poonam, Sharma, Anu* and Rai, Anil. Synonymous codon usage of Cytochrome P450 Monooxgenase (Cyps) in agriculturally important insects.
  - Dash, M*, Sahu, TK, Singh, A, Sahoo, BC and Rao, AR. Identification of key residues for salt stress tolerance in detoxifying gene family.
  - Farooqi, Samir*, Sanjukta, RK, Mishra, DC, Chaturvedi, KK, Rai, Anil, Singh, DP and Sharma, Naveen. An in silico approach for understanding salt stress response in Salinibacter ruber.
  - Iquebal, MA, Sarika* and Rai, Anil. In silico identification of antimicrobial peptides in legumes.
  - Lal, SB*, Pandey, Pankaj K, Rai, Punit K, Rai, Anil and Sharma, Anu. Sequence submission portal for genomic sequences in Indian agriculture.
  - Lal, SB, Rai, Punit K, Pandey, Pankaj K*, Rai, Anil, Sharma, Anu and Chaturvedi, KK. Integrated genomic database for Indian agriculture.
  - Marla, Soma S*, Gahoi, Shachi, Alam, Afroz, Kumar, Sanjeev, Rai, Anil, Rawat, Shashi and Chakravorthy, P. Bioinformatics in identification of potential effectors from phytophthora infestans and their relationship with potato resistance genes.
  - Sahu, TK*, Rao, AR, Dora, S and Rai, A. In silico identification of late blight susceptible genes in potato.
  - Singh, A, Sahu, TK, Dash, M, Sahoo, BC and Rao, AR*. An automated in silico analysis of salinity responsive gene families across species.
  - Singh, N*, Sahu, TK, Rao, AR and Mohapatra, T. shRNAPred (version 1.0): An open source and standalone tool for short hairpin RNA (shRNA) prediction.
- **6th National Conference on Computing for Nation Development (INDIA Com 2012) at BVICAM, Delhi during 23-24 February 2012**
  - Jain, Rajni*, Satma, MC, Arora, Alka, Sudeep and Goyal, RC. Software process model for online rule generation using decision tree classifier.
- **14th Annual Conference of Society of Statistics, Computer and Applications organised at the Department of Statistics, Saurashtra University, Rajkot during 24-26 February 2012**

Invited Talks

- Bhar, Lal Mohan* and Ojha, Sankalp. Outliers in multi-response experiments.
- Chandra, H* and Chambers, R. A random effect block bootstrap for clustered data.

- Gupta, VK*. Addition of runs to a two-level supersaturated design.
- Jaggi, Seema*. Neighbour balanced bipartite block designs.
- Jambhulkar, Nitiprasad, N, Krishan Lal*, Parsad, Rajender and Gupta, VK. Multi-level minimum aberration fractional factorial plans.

Contributed Papers

- Kumar, Amrender*, Prasad, YG, Vennila, S, Vasantabhanu, K, Prabhakar, M, Padmakumari, APK and Katti, G. A comparative analysis of classification and regression tree (CART) and neural network (NN) models in prediction of rice yellow stem borer.
- Mandal, BN*, Neenu, S and Srivastava, S. Assessment of spatial variability of soil properties using inverse distance weighted method.
- Ramasubramanian, V*, Kumar, Amrender, Bhatia, VK and Jeeva, J Charles. Technology forecasting in Indian fisheries and prioritizing decision alternatives using analytic hierarchy process.

- **Review Meeting of FASAL at BHU, Varanasi during 01-02 March 2012**

Invited Talks

- Agrawal, Ranjana*. Statistical models for crop yield forecast.
- Singh, KN*. Statistical models for crop forecasting.

- **XI Biennial Conference of the International Biometric Society (Indian Region) on Computational Statistics and Bio-sciences held at Department of Statistics, Pondicherry University, Puducherry during 08-09 March 2012**

Invited Talks

- Bhar, Lalmohan*. Optimal block designs for multiple bio-assays.
- Chandra, H*, Sud, UC and Gharde, Y. Small area crop yield estimation using spatial dependence in area level random effect model.
- Parsad, Rajender*. Experiments with mixtures for agricultural research.

Contributed Papers

- Ahmad, Tauqueer*, Bathla, HVL, Rai, Anil and Sahoo, Prachi Misra. Estimation of area and production of fruits and vegetables in Maharashtra and Himachal Pradesh.
- Bowmik, Arpan*, Jaggi, Seema, Varghese, Cini and Varghese, Eldho. Trend free block design balanced for interference effects.
- Sahoo, Prachi Misra*, Rai, Anil and Ahmad, Tauqueer. Statistical analysis of livelihood security in rural India.
- Varghese, Eldho*, Jaggi, Seema and Varghese, Cini. Neighbour balanced block design with proportional neighbour effects.

- **Global Conference on Women in Agriculture held at NASC Complex, New Delhi during 13-15 March 2012**

Poster Presentation

- Bharadwaj, Anshu*, Dahiya, Shashi and Jain, Rajni. Machine learning approach to identify ICT empowered Indian women farmers.
- Dahiya, Shashi*, Dagar, Sneh, Bharadwaj, Anshu and Jaggi, Seema. An eLearning resource for teaching and training agricultural women.
- Kaul, Sushila*. Women in dairy providing household food security - A case study.

INVITED LECTURES/ SEMINAR TALKS DELIVERED

Dr. VK Bhatia

- A lecture on Variance component estimation and BLUP to the participants of the training programme on SAS for Genetics and Genomics Data at Central Institute of Fisheries Education, Mumbai on 02 March 2012 .

Dr. VK Gupta

- Two lectures on Linear models and sampling theory during Summer School on Decision Support System in Agriculture using Economic Tools held at National Centre for Agriculture Economics and Policy Research, New Delhi during 02-22 August 2011.
- A lecture on Fundamental of design of experiments and Design resources server during training programme on Advanced Statistical Tools for

Analysis of Animal Breeding Data held at Division Dairy Cattle Breeding, NDRI, Karnal during 10-30 March 2012.

Dr. Rajender Parsad

- Three lectures on Fundamentals of designs of experiments, Design resources server and Indian NARS statistical computing portal and MANOVA and Principal component analysis to the participants of the training programme on Data Analysis Using SAS organized at Punjab Agricultural University, Ludhiana by NDRI, Karnal during 11-16 July 2011.
- A lecture on SAS: An overview during Summer School on Decision Support System in Agriculture Using Economic Tools held at NCAP, New Delhi during 02-22 August 2011.
- Two lectures on SAS: An overview and Multivariate analysis: An overview during training programme on Quantitative Methods for Agricultural Policy Research under NAIP Consortium Policy and Institutional Options for Inclusive Growth organized at IARI, New Delhi during 17-22 October 2011.
- Four invited lectures Design resources server; Indian NARS statistical computing portal; Multivariate analytical techniques and Response surface designs to the participants of the training programme on Data Analysis of Dairy Sciences using SAS organized at NDRI, Karnal under NAIP consortium Strengthening Statistical Computing for NARS during 31 October to 05 November 2011.
- A lecture on SAS: An overview and Multivariate analytical techniques using SAS during CAFT training programme on Agricultural Growth, Diversification and Food Security held at Division of Agricultural Economics, IARI, New Delhi during 15 November to 05 December 2011.
- A lecture on Experimental design for perennial fruit crops to the participants of the Winter School on Advances in Rootstocks for Overcoming Biotic and Abiotic Stresses in Fruit Crops organized by the Division of Fruits and Horticultural Technology, IARI, New Delhi during 17 November to 07 December 2011.
- Two lectures on Design resources server and Indian NARS statistical computing portal to the participants of the Workshop-cum-training programme under the consortium Strengthening Statistical Computing for NARS organized at DWM, Bhubaneswar during 03-05 December 2011.
- Four lectures on Design resources server, Indian NARS statistical computing portal Multivariate analytical techniques and Hands on non-parametric tests during training programme on Data Analysis using SAS organized by DWM Bhubaneswar at OUA&T, Bhubaneswar during 16-21 January 2012.
- Two lectures on Design resources server and Indian NARS statistical computing portal during second Workshop-cum-Installation training for Nodal Officers held at CIFE Mumbai on 06 January 2012.
- Two lectures on Design resources server, Indian NARS statistical computing portal and Keynote Address on Strengthening Statistical Computing for NARS during training programme on Data Analysis using SAS organized by UAS, Bengaluru at CPCRI, Kasargod during 16-21 January 2012.
- A lecture on strengthening statistical computing for NARS and Indian NARS statistical computing portal during training programme on Advanced Statistical Tools for Analysis of Animal Breeding Data at NDRI, Karnal during 10-30 March 2012.
- Two lectures on Multivariate techniques during training programme on Quantitative Techniques for Agriculture and Policy Analysis at NCAP, New Delhi during 19-30 March 2012.

Dr. UC Sud

- A lecture on System of agriculture statistics in India and its challenges during training on Official Statistics for Head of Departments of Different Universities organized at National Academy of Statistical Administration at Greater Noida, UP during 23-28 May 2011.
- A lecture on Sampling methodologies and techniques (multivariate, stratified, systematic: Methods, estimates and limitations) during training programme at National Academy of Statistical Administration, Greater Noida, UP on 29 August 2011.
- A lecture on Small area estimation techniques: Applications in the training programme on Training of Applied Statistics for the participants of Ethopia at National Academy of Statistical Administration, Greater Noida, UP during 29 August-09 September 2011.

- A lecture on Official statistics to the participants of a training programme organized by National Academy of Statistical Administration, Greater Noida, UP on 13 October 2011.

Dr. Prajneshu

- A lecture on Nonlinear modelling (and one practical in this area) during Summer School on Decision Support System in Agriculture using Economic Tools held at NCAP, New Delhi during 02-22 August 2011.
- Lecture and conducted practical on Linear and nonlinear statistical models during training programme at National Academy of Statistical Administration, Greater Noida, UP on 08 September 2011.
- A lecture on Applications of statistics in fisheries at Fisheries College, Junagarh Agricultural University, Veraval on 15 December 2011.
- A lecture on Nonlinear growth models and their applications at CPDHE, University of Delhi on 22 December 2011.

Dr. Anil Rai

- A lecture on Analysis of synonymous codon usage pattern in the training programme on Genomics in Agriculture at Indian Institute of Pulse Research, Kanpur on 06 July 2011.
- A lecture on Data warehousing in the seminar on Enterprise Report Delivery roadmap through Data Warehousing and Data Mining organized by Delhi Institute of Advanced Studies, New Delhi on 29 July 2011.
- A talk on Online Decision Support System for agricultural insurance products on Policy Advocacy and Dissemination Workshop under the NAIP project Risk assessment and insurance products for agriculture at MUAFS Nagpur on 13 January 2012.

Dr. KN Singh

- Two lectures on Geo-Informatics and soil fertility information system and Use of remote sensing in nutrient management under NAIP training programme on Recent Trends of Geo-informatics in Land Resources Database Management for Sustainable Agriculture held at National Bureau of Soil Survey and Land Use Planning, Nagpur on 25 November 2012.

Dr. AR Rao

- A seminar on Genome prediction in PIU under NAIP on 13 July 2011.
- A lecture on Recent advances in statistical approaches for prediction of gene in a genome in the Winter School on Molecular Approaches for Allele Mining and Crop Improvement organized by Genetics Division, IARI during 5-25 January 2012.
- Four lectures on statistical Genetics Data analysis using SAS during training programme on Data Analysis using SAS organized by DWM, Bhubaneswar at OUA&T, Bhubaneshwar during 16-21 January 2012.
- Two lectures on Mating designs and G × E interaction in training programme on Tree Breeding organized by UHF, Nauni, Solan during 27 February to 4 March 2012.
- A lecture on Disease informatics – Risk factors, modelling and analysis during training programme on Disease Informatics for the PI/Co-PI of AICRP Animal Disease Monitoring & Surveillance organized at Project Directorate on Animal Disease Monitoring & Surveillance, Bangalore during 28 February to 5 March 2012.

Dr. Krishan Lal

- Five lectures on Design resource server, Design of experiments, Multivariate analysis, Non-linear models using SAS during the training programmme of NAIP Consortium on Strengthening Statistical Computing for NARS at MPUAT, Udaipur during 12-17 September 2011.
- Six lectures on Design resources server, Descriptive statistics, Design of experiments, Combined analysis of data, Principal component analysis and Cluster analysis using SAS during training programme under the NAIP project on Strengthening Statistical Computing for NARS at MPUAT, Udaipur during 16-21 January 2012.

Dr. Seema Jaggi

- Two Invited lectures on Regression analysis and diagnostics and conduct practical using SPSS in a training programme on Data Analysis and Report Writing using Software for ISS officers of the states/UTs at CSO, New Delhi during10-21 October 2011.

- Two Invited lectures on SPSS: An overview, Regression analysis and diagnostics using SPSS during training programme on Quantitative Methods for Agricultural Policy Research under NAIP funded training programme at Division of Agricultural Economics, IARI, New Delhi during 17-22 October 2011.
- Two lectures on Regression analysis and diagnostics using SPSS under CAFT training programme on Agricultural Growth, Diversification and Food Security at division of Agricultural Economics, IARI, New Delhi during 17 November to 5 December 2011.

Dr. Hukum Chandra

- Two lectures on Introduction to R software and Survey data analysis using R software in the training programme on Applied Statistics for the participants of Ethopia at National Academy of Statistical Administration, Greater Noida, UP during 29 August - 09 September 2011.
- Seminar Talk on Small area prediction under transformation at University of Wollongong, Australia on 18 May 2011.

Dr. LM Bhar

- Four lectures on Regression diagnostics, Design resource server, Non-linear models and Probit analysis to the participants of the training programme on Data Analysis using SAS held at BCKV, Kalyani, West Bengal under the Consortium Strengthening Statistical Computing for NARS during 13-18 February 2012.
- Four lectures on Regression diagnostics, Design resource server, Non-linear models and Probit analysis to the participants of the training programme on Data Analysis using SAS held at Indira Gandhi Krishi Vishwavidhyalaya, Raipur during 13-17 March 2012.

Dr. Ramasubramanian V

- Two lectures on Regression analysis and DSS by CART model in the Summer School on Decision Support System in Agriculture using Economic Tools held at NCAP, New Delhi on 11 August 2011.
- One lecture on Technology forecasting methods for decision making in agriculture in the training programme on Agricultural Growth, Diversification and Food Security at Division of Agricultural Economics, IARI, New Delhi on 28 November 2011.

Dr. Prachi Misra Sahoo

- Two lectures on Introduction to GIS and its applications and Introduction to remote sensing and its applications during NAIP training programme on Developing Agricultural Commodity Outlook Models for Policy Analysis held at National Centre for Agricultural Economics and Policy Research, New Delhi during 15-24 March 2012.

Dr. Alka Arora

- A lecture on Clustering: Case studies in agriculture during Summer School on Decision Support System in Agriculture using Economic Tools held at NCAP, New Delhi during 02-22 August 2011.

Md. Samir Farooqi

- A lecture on Overview of SPSS during Summer School on Decision Support System in Agriculture using Economic Tools held at NCAP, New Delhi during 02-22 August 2011.

Dr. Amrit Kumar Paul

- Two lectures on Design resource server and progress of SSC, NARS during 2nd SAS Workshop cum Installation training programme organised at UAS, Bangaluru on 13 December 2011.
- Five lectures on Application of SAS for breeding data analysis, Diallel analysis using SAS, SAS genetics, Running of genetics SAS macro and Design resource server in the training programme Genomic Data Analysis using SAS at UAS, Bangalore on 14 February 2012.
- Four lectures on SAS for Statistical genetics, Diallel analysis using SAS, Running of genetics SAS macro and Design resource server during the training programme Genomic Data Analysis using SAS at CIFE, Mumbai on 29 February 2012.

Dr. Ashok Kumar

- Consumer surplus model during Summer School on Decision Support System in Agriculture using Economic Tools held at NCAP, New Delhi during 02-22 August 2011.

Dr. DR Singh

- Two lectures on Groundwater development and water markets: Performance and prospects and Demand projections for major pulses in a CAFT

training programme on Agricultural Growth, Diversification and Food Security held at Division of Agricultural Economics, IARI, New Delhi during 15 November to 05 December 2011.

Dr. Dwijesh Chandra Mishra

- Four lectures on Basic statistical analysis, Correlation and regression analysis, Multivariate analysis and Analysis of design of experiments in the training conducted under NAIP project Strengthening of Statistical Computing for NARS at Maharana Pratap University of Agriculture and Technology, Udaipur during 01-03 August 2011.

Dr. MA Iquebal

- Two lectures on Introduction to SPSS and Factor analysis using SPSS during refresher course in Business Studies conducted for professional competence of university/college teachers at UGC-Academic Staff College, Guru Jambheshwar University of Science & Technology, Hisar during 25 May to 14 June 2011.
- Two lectures on Logistic regression models, ARIMA models and its use in disease forecasting during training programme on Monitoring and Forecasting of Plant Disease Epidemics under Climate Change Scenario under CAFT in the Division of Plant Pathology, IARI, New Delhi during 10 October to 01 November 2011.
- A lecture on Advanced statistical analysis with special reference to time-series analysis in a Workshop at Guru Jhambeshwar University, Hisar on 26 March 2012 .

Dr. N Sivaramane

- Two lectures on Time series analysis and Demand analysis during training programme on Data Analysis using SAS organized by UAS Bengaluru at CPCRI, Kasargod during 16-21 January 2012.
- Four lectures on Regression diagnostics and remedies for autocorrelation, heteroscedasticity, multicollinearity and influence points; Multiple regression analysis; Applications of limited dependent variable models - logit, probit, multinomial logit and ordinal logit in social sciences and Estimation of household consumption using econometric models during Summer School on Quantitative Techniques in Policy Planning, Monitoring, Modeling, Analysis and Impact Assessment of Hill Agriculture at the Division of Agricultural Economics and Statistics, ICAR Research Complex for NEH Region, Barapani during 03-23 August 2011.
- Two lectures on Testing market co-integration and Limited dependent variable models during training programme on Quantitative Methods for Agricultural Policy Research under NAIP Consortium Policy and Institutional Options for Inclusive Growth organized at IARI, New Delhi during 17-22 October 2011.
- Two lectures on Limited dependent variable models and Future markets and price transmission during CAFT training programme on Agricultural Growth, Diversification and Food Security held at Division of Agricultural Economics, IARI, New Delhi during 15 November to 5 December 2011.

Dr. Ranjit Kumar Paul

- Five lectures on Regression analysis, Cluster analysis, Principal component analysis, Time series analysis and Nonlinear models along with their application to the practical dataset by using SAS in the training programme on Data Analysis using SAS held in ICAR Research Complex for NEH Region, shilling during 19 -24 September 2011.
- Five lectures on Regression analysis, Cluster analysis, Principal component analysis, Time series analysis and Nonlinear models in the training programme on Data Analysis using SAS at ICAR Research Complex for NEH Region, Imphal during 20-25 February 2012.
- One lecture on ARCH and GARCH models in the training programme on Developing Agricultural Commodity Outlook for Policy Analysis at NCAP, New Delhi during 15-24 March 2012.
- Two lectures on Application of ARCH and GARCH models and its practical in E-views during training programme on Quantitative Techniques for Agriculture and Policy Analysis at NCAP, New Delhi during 19-30 March 2012.

Dr. RC Goyal

- An invited talk on DSS on Agricultural Education in the Summer School on Decision Support System on Agricultural using Economic Tools at NCAP, New Delhi on 10 August 2011.
- Two lectures as invited talk on Decision support system on agricultural education and priorities in

computer applications for agricultural research in the Winter School on Extension Strategy on Information Communication Technology for Value Added Agriculture at BCKV, West Bengal during 02-22 November 2011.

Dr. Sushila Kaul

- A Syndicate presentation on Dealing with diversity during a training programme on Harnessing Leadership among Women for Women Scientists & Technologists conducted by Indian Institute of Public Administration, New Delhi during 20-24 February 2012.

Dr. Sudeep

- Four lectures on Designing expert system and content creation during CAFT training on Innovative Communication Interventions for Sustainable Agricultural Development at Division of Agriculture Extension, IARI, New Delhi during 18 January- 07 February 2012.
- A lecture on AgriDaksh - A Tool for development of expert system in the Summer School on Decision Support System in Agriculture using Economic Tools held at NCAP, New Delhi during 02-22 August 2011.
- Two lectures on Maize AgriDaksh in training programme on National Level Training for Tribal Farmers on Seed Production, Cultivation and Value Addition on Maize at Directorate of Maize research, New Delhi on 17 and 24 March 2012.

Dr. Susheel Kumar Sarkar

- Five lectures on Analysis of experimental data during a training programme on Data Analysis using SAS organized at UBKV, Coochbihar, West Bengal during 19-24 September 2011.
- Five lectures on Factor analysis using SPSS, Application of various tests of significance, ANOVA, Correlation and regression analysis during Refresher course in Business Studies conducted for professional competence of university/college teachers at UGC-Academic Staff College, Guru Jambheshwar University of Science & Technology, Hisar during 25 May-14 June 2011.

Dr. Tauqueer Ahmad

- A lecture on Sampling and non-sampling errors and precision of estimates during training programme at National Academy of Statistical Administration, Greater Noida, UP on 30 August 2011.

Sh. Amrender Kumar

- A lecture on Time series modelling during Summer School on Decision Support System in Agriculture using Economic Tools held at NCAP, New Delhi during 02-22 August 2011.
- A lecture on Elements of forecasting methods and its importance in decision support in a training programme on Applied Statistics for the participants of Ethiopia at National Academy of Statistical Administration, Greater Noida, UP during 29 August to 09 September 2011.

Dr. Anil Kumar

- Two lectures on Integrated farming system approach for enhancing livelihood security and Integrated farming system models – An evaluation of feasible alternatives for small land holders during National Training Programme on Precision Dairy Farming at NDRI, Karnal on 20 March 2012.
- Keynote Address on Upcoming Technologies in 1st technical session in an International Conference on Resurging India - Myths and Realities organized by Teerthanker Mahaveer University, Moradabad, Uttar Pradesh on 17 March 2012.

Sh. Pal Singh

- Two lectures on Content creation through HTML and Frontpage at IASRI during CAFT training on Innovative Communication Interventions for Sustainable Agricultural Development at Division of Agriculture Extension, IARI, New Delhi during 18 January-07 February 2012.

Sh. SN Islam

- A lecture on Expert system on wheat during a training programme Participatory Research and Extension Management at DWR, Karnal during 25 November-04 December 2011.

Smt. Anu Sharma

- Two lectures on Multimedia content creation through flash at IASRI during CAFT training on Innovative Communication Interventions for Sustainable Agricultural Development at Division of Agriculture Extension, IARI, New Delhi during 18 January-07 February 2012.

Smt. Anshu Bharadwaj

- Five lectures on Concepts of geo database in ArcGIS, Geoinformatics in precision agriculture: Statistical aspect, Role of geoinformatics in agricultural statistics, Applications of data mining in agriculture and Spatial data mining as national resource person in the NAIP sponsored National Training Programme on Recent Trends of Geoinformatics in Land Resource Database Management for Sustainable Agriculture held at NBSS&LUP, Nagpur during 15-28 November 2011.

Dr. BN Mandal

- Three invited lectures on Use of R in fisheries research data analysis and Design resources server at CMFRI Regional Station, Veraval, Gujarat in the training programme on Methodologies for Fishery Biological Studies, Fishery Data Analysis and Resources Assessment held during 23-29 February 2012.

Dr. Eldho Varghese

- Three Invited lectures on Data analysis and report writing using CSPro, SPSS and STATA to the participants of a training programme on Data Analysis and Report Writing for ISS officers and senior officers of the states/UTs at CSO during 10-21 October 2011.

Sh. Sanjeev Kumar

- A lecture on Machine learning and data mining techniques in bioinformatics in National Workshop at the Centre for Bioinformatics, Department of Computer Science, APSU, Rewa during 03-04 March 2012.

PARTICIPATION

Conferences / Workshops / Seminars / Symposia/ Trainings etc.

- Bina Roy Memorial Seminar 2011 organized by University Women's Association of Delhi on 14 May 2011 at New Delhi.
- Sheel Memorial Lecture on Fish for All delivered by Dr. S Ayyappan, Secretary, DARE and DG, ICAR and Vice President of the National Academy of Agricultural Sciences, NAAS on 21 May 2011 at NASC Complex, New Delhi.
- 18th Dr. BP Pal Memorial Lecture on the Future of Indian Agriculture by Dr. Yoginder K Alagh, Chairman, Institute of Rural Management, Anand and Presided by Dr. MS Swaminathan, Member of Parliament (Rajya Sabha) and Chairman, MS Swaminathan Research Foundation, Chennai on 28 May 2011 at IARI, New Delhi.
- International Conference on Inclusive Museum at Witwatersrand, Johannesburg, South Africa during 30 June to 03 July 2011.
- Workshop on Garuda-NKN meet at CDAC, Bangalore during 15-16 July 2011. (Sudeep)
- Participated as an expert for identifying priority areas for capacity building of NARS in XII Planning the Review Workshop of Directors of Centres of Advanced Faculty Trainings (CAFTs) on 20-21 July 2011 at Plant Pathology Auditorium, IARI, New Delhi.
- 7th International SEZ Convention organized by ASSOCHAM on 27 July 2011 at New Delhi.
- National Consultation on Gender Perspective in Agriculture at NASC Complex, New Delhi during 08-09 August 2011. (Ranjana Agrawal and Alka Arora)
- Workshop on Introduction of Web Application Security on 17 August 2011 held at Indian Computer Emergency Response Team (CERT-in), Department of Information Technology, CGO Complex, New Delhi. (Pal Singh)
- 50th Workshop of Wheat & Barley organised at NASC Complex, New Delhi during 01-04 September 2011. (SN Islam)
- Workshop on Targeted Attacks & Mitigation held at Indian Computer Emergency Team (CERT-in) CGO Complex, New Delhi, Department of Information Technology, Ministry of Communication and Information Technology (Govt. of India) on 04 November 2011. (Pal Singh)
- International Conference on Innovative Approaches for Agriculture Knowledge Management, at Vigyan Bhawan and NASC complex, New Delhi during 09-12 November 2011.
- Interaction Meet with Scientists Trained Abroad & Impact Assessment of International Trainings in Frontier Areas of Agricultural Sciences at NASC

Complex during 28-30 November 2011. (Ramasubramanian V, Anu Sharma, SB Lal and AR Rao)

- 65th Annual Conference of ISAS on the theme Statistics and Informatics for Agricultural research held at National Dairy Research Institute, Karnal during 3-5 December 2011. (BN Mandal and Eldho Varghese)
- ESRI User Conference during 07-08 December 2011 and Pre Conference Tutorial on Cloud Computing on 06 December 2011 held at Hotel Redission, Noida, UP. (Prachi Misra Sahoo)
- FAI Annual Seminar 2011 organised at New Delhi during 07-09 December 2011. (KK Tyagi)
- Internatioinal Conference on Global Economic Situation – New Order Emerging? held at New Delhi during 15-16 December 2011. (DR Singh & Sivaramane, N)
- International Symposium on 100 Years of Rice Science and Looking Beyond held at TNAU, Coimbatore during 9-12 January 2012. (DR Singh)
- International Conference on Science Communication for Scientific Temper organized by NISCAIR at NASC Complex, New Delhi during 10-12 January 2012.
- Workshop on Research Methodology, Sampling Design and Survey Questionnaire at Institute of Economic Growth, Delhi on 18 January 2012. (UC Sud)
- 15th National Conference on e-Governance held at Bhubaneswar during 09-10 February 2012. (PK Malhotra)
- International Conference on Plant Biotechnology for Food Security: New Frontiers held during 21-24 February 2012 at National Agricultural Science Centre Complex, New Delhi. (AR Rao and Anu Sharma)
- Review Workshop of Visioning Policy Analysis And Gender (VPAGe) at NCAP, New Delhi on 03 March 2012. (Ramasubramanian V)
- Meeting for e-course evaluation for the IT in Dairy Industry as external evaluator at NDRI, Karnal during 12-13 March 2012. (Alka Arora)
- Global Conference on Women in Agriculture held at NASC Complex, New Delhi during 13-15 March 2012. (Anshu Bharadwaj and Shashi Dahiya)
- Meeting with FICCI representative in which the sampling design, sample size and methodology for construction of Farmers' Confidence Index were suggested on 15 March 2012 held at IASRI, New Delhi. (VK Bhatia)
- International Conference on Resurging India-Myths and Realities during 17-18 March 2012 organized by Teerthanker Mahaveer University, Moradabad, Uttar Pradesh. (Anil Kumar)
- Question Bank Workshop in Statistics of Staff Selection Commission at SCOPE Complex, New Delhi on 24 March 2012. (Prajneshu)
- National Seminar on Indian Agriculture: Preparedness for Climate Change organized at NASC Complex, New Delhi during 24-25 March 2012. (Cini Varghese and SN Islam)
- Cotton Mechanization Conclave organized by New Holland Group with the PC/Research Engineers of AICRP on FIM and other officials, organized at IASRI on 26 March 2012. (KK Tyagi)

Trainings

- Prachi Misra Sahoo attended ten days training programme on Hyperspectral Remote Sensing in Agriculture: HYPERAGRI in the Division of Agricultural Physics, IARI, New Delhi during 02-11 August 2011.
- Eldho Varghese completed 93rd Foundation Course for Agricultural Research Services (FOCARS) offered by National Academy of Agricultural Research Management, Hyderabad.
- AR Rao, SB Lal, Samir Farooqi, Sanjeev Kumar, Dwijesh Chandra Mishra and Sarika attended training on Computational Genome Analysis using ANVAYA held at IASRI, New Delhi during 22-24 June 2011.
- AK Paul attended the NAIP-National training on Project Formulation, Risk Assessment, Scientific Report Writing and Presentation at Division of Agricultural Engineering, IARI, New Delhi during 26-30 September 2011.

- Ramasubramanian, V attended a Policy Advocacy and Dissemination Workshop of the NAIP project Risk Assessment and Insurance Products for Agriculture organised at Assam Agricultural University, Jorhat, Assam on 07 December 2011 and at Tamilnadu Agricultural University, Coimbatore on 29 December 2011.
- Sushila Kaul attended a training programme on Harnessing Leadership among Women for Women Scientists & Technologists conducted by Indian Institute of Public Administration, New Delhi during 20-24 February 2012.

Meetings

- Group Meeting of OFR Agronomists (AICRP-IFS) on Re-orientation of Technical Programme during 04-05 May 2011 at PDFSR, Modipuram.
- Meeting with Dr. Sudha Midha, Advisor, Ministry of Horticulture, Dr. R Balam, Joint Director, DES and Dr. PK Pramanic, Director Horticulture Mission, West Bengal under the Chairmanship of the Director of the Institute relating to "Horticulture Census" at IASRI on 05 May 2011.
- Meeting on Bioinformatics with Dr. SN Rai, Director, Biostatistics Support Facility, JG Brown Cancer Center and Department of Bioinformatics and Biostatistics, University of Louisville, Louisville, C-DAC Officials and also discussion with the scientists and staff working in the field of Bioinformatics during 18-19 May 2011 at IASRI, New Delhi. (Anil Rai, AR Rao, SB Lal, Anu Sharma, Mohammad Samir Farooqi, Sanjeev Kumar, Dwijesh Mishra, Seema Jaggi and Sarika)
- Meeting of the 8th sub-group on Horticulture Statistics and Marketing Intelligence (XII Plan) in the Division of Vegetable Science, IARI, New Delhi on 19 May 2011.
- Meeting and Group Discussion for modification of the project proposal on "Decision Support System for Enhancing Productivity of Wheat and Grapes under Moisture and High Temperature Stress Conditions in the light of the comments of Empowered Committee Meeting held at NRC Grapes, Pune during 26-27 May 2011.
- Meeting with Dr. Vidya Dhar, Dy. Director General and Agriculture Census Commissioner, DoAC, MoA, Govt. of India, and officials of Agriculture Census Division on 02 June 2011.
- Meeting regarding modus operandi of collaboration between AICRP on micro and secondary nutrients and pollutant elements in soil and plants with Dr AK Shukla, Project Co-ordinator on 09 August 2011.
- 2nd Consultative Meet of Deans of Agricultural Universities on Aligning SAU's Education and Research system with ICAR VISION 2030 held at SD Agricultural University,
- Meeting of the Working Group constituted under the chairmanship of Economic & Statistical Adviser, Directorate of Economics & Statistics, Ministry of Agriculture for the construction of Index Numbers of Area, Production and Yield of crops to implement the recommendations of National Statistical Commission regarding construction of index numbers of area, production and yield of different crops at Krishi Bhawan, New Delhi on 11 October 2011.
- A special meeting with Prof. Vincent Ducrocq, Senior Scientist, National Institute of Agricultural Research (NIRA), Jouy-en-Josas, Paris, France, Dr. Ashok B. Pande, BAIF, Pune and Sh. Ramesh Rawal, Executive Vice President & Trustee on 29 February 2012.

Visit Abroad

Dr. VK Bhatia

- Berlin, Germany to attend ISO/TC/69 Technical Committee/ Sub-Committees and Working Groups during 18-22 July 2011.
- Manila, Philippines to attend the First meeting of the Steering Group for Agricultural Statistics as a Member during 21-23 November 2011.

Dr. UC Sud

- Brazil to participate in 4th Meeting of WYE Group on Statistics on Rural Development and Agriculture Household Income held during 08-11 November 2011 at Rio de-Janerio, Brazil.

Dr. Anil Rai

- FAO, Srilanka to provide Consultancy Services on Feasibility Study on the Use of GIS/Remote Sensing for the Census of Agriculture by Food and Agricultural Organisation during 27 September to 17 October 2011.

Dr. Hukum Chandra

- Australia to do Post Doctoral Research at the University of Wollongong, Wollongong, Australia during July 2010- June 2011.
- Trier, Germany to attend SAE 2011-Small Area Estimation, 2011 Conference during 11-13 August 2011.
- Dublin, Ireland for receiving the International Statistical Institute's World Bank Fund Award and to attend the ISI World Statistics Congress during 21-26 August 2011.

Dr. Ramasubramanian V

- USA to attend International training in the area of Science Policy and Technology Forecasting at University of Houston, USA under NAIP-HRD-L&CD, Social Sciences Division during 18 August to 17 November 2011.

Dr. Sushila Kaul

- South Africa to participate in 4th International Conference on the Inclusive Museum held during 30 June to 03 July 2011 at University of Witwatersrand, Johannesburg, South Africa.

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Workshops, Conferences, Meetings, Seminars and Annual Day Organized

BIRTH CENTENARY OF PROFESSOR PV SUKHATME

Birth Centenary of Professor PV Sukhatme was celebrated on 27 July 2011. Dr. Madan Mohan Pandey, Deputy Director General (Engineering), ICAR, was the Chief Guest and Dr. NPS Sirohi, Assistant Director General (Engineering) was the Guest of Honour. Dr. VK Gupta, ICAR National Professor delivered a special talk on Combinatorics in Controlled Sampling on the occasion. Dr. VK Bhatia, Director IASRI gave a brief outline of contributions of Professor PV Sukhatme. The Chief Guest suggested that this event should be celebrated every year. Dr. NPS Sirohi advised the students to take lead in these celebrations.

TEACHER'S DAY CELEBRATIONS

The Institute celebrated Teacher's Day on 05 September 2011 and honored Dr. AK srivastava, Former Joint Director IASRI. Dr. AK Srivastava delivered a lecture on Historical Development of Sample Surveys. Dr. HS Gaur, Dean and Joint Director (Education), Indian Agricultural Research Institute, New Delhi presided over the function.

ANNUAL DAY CELEBRATIONS

The Institute celebrated its 52nd Annual Day on 02 July 2011. Dr. Arvind Kumar, Deputy Director General (Education), ICAR, was the Chief Guest. He delivered Nehru Memorial Lecture on Issues related to Agricultural Research and Education in the Country.

Dr. Madan Mohan Pandey, Deputy Director General (Engineering), ICAR presided over the function. Nehru Memorial Medal for the session 2008-2010 was awarded to Sh. Hiranmoy Das, M.Sc. (Agricultural Statistics) student and to Sh. Debasis Dutta, M.Sc. (Computer Application) student. VVR Murthy Award for the session 2008-2010 was awarded to Sh. Hiranmoy Das, M.Sc. (Agricultural Statistics) student. The Annual Report of the Institute for the year 2010-11 was also released on this occasion.

INTERACTIVE MEET

Interactive Meet for Discussing the Format and Content of the Agricultural Research Data Book (ARDB) along with the type of value additions done and the type of information to be retained/deleted in ARDB 2011 was organized under the chairmanship of Dr. Madan Mohan Pandey, Deputy Director General (Engineering), ICAR. National Professor ICAR, ADGs of various SMDs, Director, Head of Divisions and scientists of Sample Survey Division participated in the meeting. Dr. KK Tyagi made a presentation concerning ARDB 2011.

CONFERENCES / SYMPOSIA / WORKSHOPS ORGANISED UNDER VARIOUS PROJECTS

S. No.	Title	Venue	Date
1.	Partner's Meet on NAIP Consilium Establishment of National Agricultural Bioinformatics Grid.	IASRI, New Delhi	18-19 April 2011
2.	Partner's Meet of NAIP Consortium on Strengthening Statistical Computing for NARS	IASRI, New Delhi	28 April 2011 & 01 November 2011
3.	Seminar cum discussion meeting with all the scientists of IARI, New Delhi for Sensitization cum Training of Nodal Officers & PIs on Project Information & Management System of ICAR (PIMS-ICAR)	IARI, New Delhi	14 June 2011
4.	Brain storming-cum-Workshop on Forecasting Technological needs for Fishing and Fish Processing Sector in India under V-Page sub program II: Technology Forecasting & Policy Analysis	CIFT, Cochin	07 July 2011
5.	Second Workshop-cum-Installation Training Programme for Nodal Officers of NAIP Consortium on Strengthening Statistical Computing for NARS	IASRI, New Delhi	02-03 November 2011
6.	Workshop related to the project Evaluation of Agricultural Census Scheme	IASRI, New Delhi	04 November 2011
FOR NODAL OFFICERS OF NISAGENET			
7.	Meeting for Sensitization cum Training of UP	College of Veterinary Science and Animal Husbandry, Mathura	May 2011

8.	Mid Term Appraisal cum Training Workshop for the Nodal Officers	CIFE, Mumbai	22-23 September 2011
9.	Mid Term Appraisal cum Training Workshops	SV Agricultural College, Tirupati	25-26 November 2011
SENSITIZATION-CUM-TRAINING WORKSHOPS FOR NODAL OFFICERS OF HYPM			
10.	Web Based System for Half-Yearly Progress Monitoring (HYPM) of the scientists in ICAR	IASRI, New Delhi	09 December 2011
11.	Launching and Implementation of HYPM System at all the Western Region Institutes of ICAR.	CIFE, Mumbai	12 January 2012
12.	Launching and Implementation of HYPM System at all the Eastern Region Institutes of ICAR.	DWMR, Bhubaneswar	06 February 2012
13.	Launching and Implementation of HYPM System at all the Southern Region Institutes of ICAR.	NAARM, Hyderabad	13 February 2012
14.	Launching and Implementation of HYPM System at all the Northern Region & Left over Institutes of ICAR.	IASRI, New Delhi	03 March 2012

OTHER SYMPOSIA/WORKSHOPS

- One day Study Visit was organized on 13 October 2011. On Functions and Activities of IASRI for the participants of training programme on Official Statistics and Related Methodology of International Statistical Education Centre, Kolkata conducted by National Academy of Statistical Administration. The participants were from four countries i.e. Afghanistan, Mongolia, Gambia and Tanzania.
- Following Symposia were organised during 65th Annual Conference of ISAS on the theme Statistics and Informatics for Agricultural Research held at National Dairy Research Institute, Karnal during 03-05 December 2011:
  - Advances in Statistical Techniques in Dairy Sciences (Conveners : Dr. PK Malhotra, IASRI, New Delhi and Dr. DK Jain, NDRI, Karnal
  - Designs for Multi-factor Experiments (Conveners: Dr. Rajender Parsad, IASRI, New Delhi and Dr. R Malhotra, NDRI, Karnal)
  - Emerging Paradigms of Knowledge Management in Agricultural Sciences (Conveners: Dr. Sudeep, IASRI New Delhi and Dr. AK Sharma, NDRI, Karnal)

SEMINARS

Salient outcomes from the completed research projects undertaken on different aspects of Agricultural Statistics and Computer Application were presented in the seminars organized regularly at the Institute. Open seminars were also organized for new research project proposals. Outline of Research Work (ORW) seminars, Course seminars and Thesis seminars were delivered by the students of M.Sc. and Ph.D. (Agricultural Statistics) and M.Sc., (Computer Application). During the period under report, a total of 136 seminar talks were delivered. Out of these, 81 were student seminars, 49 by scientists of the Institute and 06 by Guest Speakers as follows:

Guest Seminars

- Prof. Aloke Dey, INSA Senior Scientist, ISI, New Delhi on Existence of Orthogonal Arrays
- Dr. Kashinath Chatterjee, Professor and Head, Department of Statistics, Visva Bharti University, Santiniketan on The Problem of Model Selection in Fractional Factorial Experiments
- Dr. Patrick S. Schnable, Iowa State University on The Next Generation Sequencing Revolution
- Sh. S Mauria (ADG, IPR), ICAR on IPR Issues in ICAR
- Prof. Vincent Ducrocq, Senior Scientist, National Institute of Agricultural Research (INRA), Paris, France on Advances in Genetic Evaluations of Cattle Population
- Dr. B Jayaram, Professor, IIT, New Delhi on Bhageerat - Targeting the Near Imposible Pushing the Frontiers of Atomic Models for Protein Tertiary Structure Prediction.

Half-Yearly Progress Monitoring System of Scientists

HYPM

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- Research
- Teaching
- Training
- Extension
- Other Prioritized Activities
- Submit Targets
- Download Excel File for Target
- Upload Excel File for Target

Welco

Institute Name	:	Indian Agric stitute, IASRI, New Delhi
Scientist Name	:	Dr. Ramesh
Monitoring Period	:	I (April to S
Year	:	2012-13
Reporting Officer	:	Dr. Pardeep
Reviewing Officer	:	Dr. Vijay Kumar Bhatia
Email	:	rcgoyal@iasri.res.in

Important Notification

1. Please check whether your Name, Email and other details are correct. Change Email ID
2. Make sure that titles of your ongoing research projects are visible against your name as PI or Co-PI (of collaborating center or lead center) List of ongoing research

Welcome Reporting - Nodal Officer

Institute Name : Indian Agricultural Statistics Research Institute, Delhi

Scientist Name	:	Dr. Rajender Parsad
Monitoring Period	:	I (April to September)
Year	:	2012-13
Reporting Officer	:	Dr. Vijay Kumar Bhatia
Reviewing Officer	:	Dr. Vijay Kumar Bhatia
Email	:	rajender@iasri.res.in,rajender1066@yahoo.co.

- Assign Reporting Officer to Scientists
- Assign Reviewing Officer to scientists
- Changing Reporting Officer
- Changing Reviewing Officer
- Report on Reporting and Reviewing Officer
- Add Institute General Information

SPAR 3.0

Statistical Package for Agricultural Research

Distinguished Visitors

INDIAN

Dr. S Ayyappan
Secretary, DARE & Director General
Indian Council of Agricultural Research
New Delhi

Sh. SK Das
Director General
Central Statistical Organisation, New Delhi

Dr. Bangali Baboo
National Director, NAIP, ICAR, New Delhi

Dr. MM Pandey
DDG (Engineering), ICAR, New Delhi

Dr. AK Singh
DDG (NRM), ICAR, New Delhi

Dr. Arvind Kumar
DDG (Education), ICAR, New Delhi

Dr. Padam Singh
Former Member, National Statistical Commission &
Head, Research & Evaluation
EPOS, Health Consultants (India) Pvt. Ltd.
Udyog Vihar, Gurgaon, Haryana

Prof. BK Sinha
Former Member, National Statistical Commission &
Professor, Indian Statistical Institute, Kolkata

Dr. Aloke Dey
INSA Senior Scientist
Indian Statistical Institute, New Delhi

Prof. Prem Narain
Former Director, IASRI, New Delhi

Dr. BBPS Goel
Former Director, IASRI, New Delhi

Dr. SK Raheja
Former Director, IASRI, New Delhi

Dr. SD Sharma
Vice-Chancellor
Dev Sanskriti Vishwavidhyalya, Haridwar

Dr. NPS Sirohi
ADG (Engineering), ICAR, New Delhi

Dr. Kusumakar Sharma
ADG (HRD), ICAR, New Delhi

Dr. TP Rajendran
ADG (Plant Protection), ICAR, New Delhi

Dr. C Devakumar
ADG (HRD), ICAR, New Delhi

Dr. V Venkatasubramanian
ADG (Agricultural Extension), ICAR, New Delhi

Dr. S Mauria
ADG (IP&TM), ICAR, New Delhi

Dr. RC Agrawal
National Co-ordinator, NAIP, ICAR, New Delhi

Dr. AP Srivastava
National Co-ordinator, NAIP, ICAR, New Delhi

Dr. Sudhir Kochhar
National Co-ordinator, NAIP, ICAR, New Delhi

Dr. S Srinivasan
Former Director
CIRCOT, Mumbai

Dr. Ramesh Chand
Director, NCAP, New Delhi

Dr. KC Bansal
Director, NBPGR, New Delhi

Dr. HS Gaur
Dean and Joint Director (Education), IARI, New Delhi

Dr. KT Sampat
Director, NIANP, Bangaluru, Karnataka

Dr. OM Bambawale
Director, NCIPM, New Delhi

Dr. TP Trivedi
Project Director, DKMA, ICAR, New Delhi

Dr. Prabhu Das
Project Director, PDNDMS, Karnataka

Dr. RK Shukla
Director
National Council of Applied Economic Research-Centre for Macro Consumer Research
(NCAER-CMCR)

Dr. Kashinath Chatterjee
Professor and Head
Department of Statistics
Visva Bharti University, Santiniketan

Dr. AK Srivastava
Former Joint Director, IASRI, New Delhi

Dr. RP Mishra
Principal Scientist & In -charge (Training)
NAIP, ICAR, New Delhi

Dr. A Dhandapani
Principal Scientist, NAARM, Hyderabad

Dr. B Jayaram
Professor
IIT, New Delhi

Dr. Vidya Dhar
DDG & Agriculture Census Commissioner,
Government of India

Dr. AK Mathur
Advisor (Statistics), Department of Animal Husbandry Dairying & Fisheries
Ministry of Agriculture, Govt. of India

Dr. BB Singh
DDG (FOD), NSSO, Allahabad

Dr. AK Srivastava
DDG (FOD), NSSO, Faridabad

Dr. KV Palanichamy
Director, Biostatistics and Statistical Programming
Kendle India, Ahmedabad.

Dr. Arun Singh
Joint Director, Office of the Registrar General,
Govt. of India

Dr. BVS Sisodia
Department of Agricultural Statistics
Narendra Deva University of Agriculture & Technology
Kumarganj, Faizabad (UP)

Prof. MC Agarwal
Professor(Statistics)
Department of Statistics
Delhi University, New Delhi

Dr. VK Singh
Director, Agriculture Statistics & Crop Insurance
Uttar Pradesh

Sh. Rajiv Lochan
Advisor, Directorate of Economics & Statistics
Ministry of Agriculture, New Delhi

Dr. Dalip Singh
Directorate of Economics & Statistics
New Delhi

Dr. Madhuban Gopal
National Fellow, IARI, New Delhi

Dr. VK Sharma
Former Principal Scientist, IASRI, New Delhi

Dr. Randhir Singh
Former Principal Scientist, IASRI, New Delhi

Dr. R Srivastava
Former Principal Scientist, IASRI
New Delhi

Dr. RK Tyagi
Regional Centre, CIFRI, Allahabad (UP)

Dr. Sanjay Chaudhary
Professor (DA-IICT), Gandhinagar

Dr. TV Prabhakar
Professor (IIT), Kanpur

Dr. Seema Bathla
Associate Professor
Centre for the Study of Regional Development
School of Social Sciences, JNU, New Delhi

Dr. TR Sharma
NRCPB, New Delhi

Dr. RPS Malik
IWMI-India, NASC Complex
New Delhi

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Assistant Director
Directorate of Economics & Statistics
Government of Andhra Pradesh, Khairatabad
Hyderabad-500 004

Smt. Tumken Aagu
PTO, I/C Assistant Director (AC)
Directorate of Agriculture, Govt. of Arunachal Pradesh
Naharlagun-791 110

Sh. Rattan Singh
Director, Land Records
Directorate of Land Records, 28-SDA Complex
Kasumpti, Shimla-171 009 (Himachal Pradesh)

Sh. KL Choudhary
Director (Agriculture Census)
Government of Rajasthan, B - Block, 3rd Floor
Yojana Bhavan, Tilak Marg, Jaipur 302 005
(Rajasthan)

Prof. Karmeshu
Professor
School of Computer and Systems Sciences
Jawaharlal Nehru University
New Delhi-110 067

Prof. GM Saha
Visiting Professor
Bayesian and Interdisciplinary
Research Unit, Indian Statistical Institute
203, Barrackpore Trunk Road
Kolkata -700 108, West Bengal

Professor Sridhar Sivasubbu
Institute of Genomics and Integrative Biology
IGIB Extension Center at Naraina
IA 93-94, Naraina Inds Area, Phase 1
Naraina, New Delhi-110 028

Dr. Sudha Midha
Advisor (Horticulture)
D/o Agriculture & Cooperation.
M/o Agriculture, Shastri Bhawan
New Delhi

Dr. PK Pramanic
Director, Horticulture Mission
West Bengal

Dr. Ravindra Singh
DDG, National Academy of Statistical Administration
MOSPI, Noida

Dr. Ashok B Pande
BAIF, Kamdhenu Nagar, Uruli Kanchan, Pune

FOREIGN

Dr. SN Rai
Director, Biostatistics Support Facility
JG Brown Cancer Center and
Department of Bioinformatics and Biostatistics
University of Louisville, Louisville

Dr. Patrick Schnable Baker
Professor of Agronomy & Director
Centre for Plant Genomics and
Centre for Carbon Capturing Crops
Iowa State University, USA

Prof. Vincent Ducrocq
Senior Research Scientist
National Institute of Agricultural Research (INRA)
Paris, France

Decision Support System

for

RISK ASSESSMENT & INSURTANCE PRODUCTS FOR AGRICULTURE

(BASIC AND STRATEGIC RESEARCH)

Home

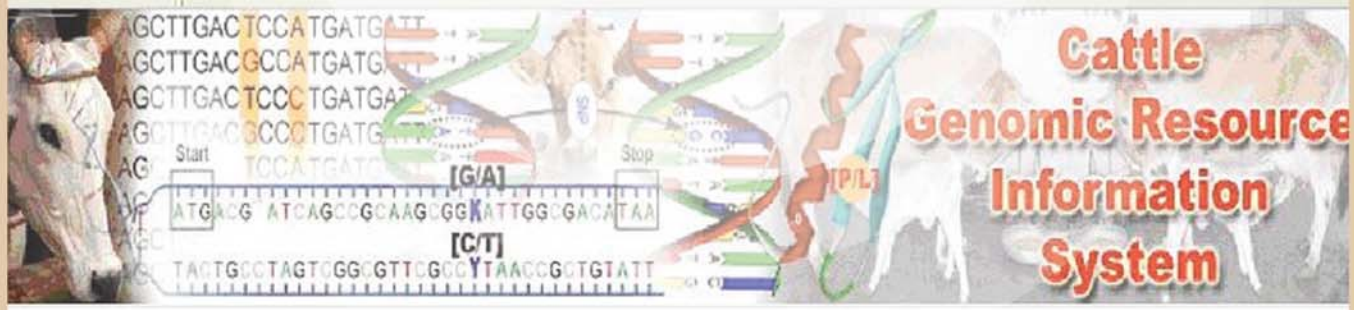
Logout

Farmer's Detail Information

Welcome bharat ! Please fill the following Details:

Household Characteristics:

HHSize:	5-10	HHType:	Self Employed in Agriculture
Dwelling Unit Type:	Owned	Cooking Source:	Others
Lighting Source:	Others	Meals Served to Non-HHMembers:	3
Possess Ration Card:	No / Yes	Type Of Ration Card:	Others
Beneficiary Food For Work:	No / Yes	Beneficiary ICDS:	No / Yes
Beneficiary Annapoorna:	No / Yes	Beneficiary Midday Meal:	No / Yes
Ceremony Perform:	No / Yes		



- Home
- Single Nucleotide Polymorhism
- Splice Sites
- Economically Important Genes
- Disease Causing Genes
- Resistance Genes

Cattle are an asset to small and minor farmers, who supplement their farm revenue by producing milk and other dairy products. These are the most common type of large domesticated ungulates, a prominent modern member of the subfamily Bovinae and the most widespread species of the genus *Bos*. They are also used as draft animals i.e. pulling carts, plows etc.

The Indian cattle species are known for their toughness and immunity towards tropical diseases having great demand in the international market. Extra endeavors are being taken to improve cattle breed, primarily for yielding more milk. With 283 milion cattle India alone accounts for more than 1/6th of the world's total cattle population, as per the 2003 animal census. Hence management and analysis of cattle resource information is very important and of immediate concern. Thus, the "Cattle Genomic Resource Information System" is developed to manage the genomic information primarily based on the SNPs, disease causing, resistance and other economically important genes that can be utilized by numerous researchers and scientists to actively pursue research at molecular and genomic level. The genomic resource information is collected from different public domains like NCBI, UCSC Genome browser, EMBL etc.

LIST OF APPROVED RESEARCH PROJECTS

DEVELOPMENT AND ANALYSIS OF EXPERIMENTAL DESIGNS FOR AGRICULTURAL SYSTEM RESEARCH

On-going

1. Designs for single factor and multi-factor experiments and their applications in agricultural systems research. (ICAR National Professor Scheme)
   VK Gupta
2. Analysis of experimental designs with *t*-family of error distributions. (SIX1006)
   Krishan Lal, Rajender Parsad (till 31.03.2011), VK Gupta, LM Bhar
3. Development of innovative convenience food as protein supplement. (Collaboration with IARI, New Delhi) (CIP0912) (IASRI association w.e.f. 24.10.2009)

IARI, New Delhi	SK Jha, Shruti Sethi, RK Pal, Abhijit Kar, VR Sagar, Charanjit Kaur, DVK Samuel, Amar Singh
IASRI, New Delhi	**Krishan Lal**

4. Weed assessment and management in the crops and cropping systems. (Collaboration with IARI, New Delhi) (CIP1011) (IASRI association w.e.f. 29.12.2010)

IARI, New Delhi	Rajvir Sharma, TK Das, Jitender Kumar, Pankaj, Livleen Shukla, Sangeeta Paul, Renu Pandey, Mahesh Chand Meena
IASRI, New Delhi	**Amrit Kumar Paul**

5. Sustainable livelihood through goat farming by disseminating the improved goat production technologies. (Collaboration with CIRG, Makhdoom) (CIP1012) (IASRI association w.e.f. 27.09.2010)

CIRG, Makhdoom	Brij Mohan, Ashok Kumar, Khushyal Singh, Vijay Kumar, MK Singh, AK Goel, Ramchandran N, UB Choudhary, RB Sharma, HA Tiwari
IASRI, New Delhi	**Anil Kumar**

6. Impact of improved technologies and emerging market conditions on goat production system. (Collaboration with CIRG, Makhdoom) (CIP1013) (IASRI association w.e.f. 27.09.2010)

CIRG, Makhdoom	MK Singh, Khushyal Singh, V Kumar
IASRI, New Delhi	**Anil Kumar**

Completed Projects

7. Generalised row-column designs for agricultural experiments. (SIX1001)
   Cini Varghese, Seema Jaggi
8. A study on fertilizer response ratios for various crops and crop sequences. (SIX1003)
   NK Sharma, PK Batra (till 31.07.2011)
9. Response surface methodology incorporating neighbour effects. (SIX1008)
   Eldho Varghese, Seema Jaggi

10. A study on multiple Bio-essays. (SIX1007)
    LM Bhar, VK Gupta
11. Planning, designing and analysis of experiments planned ON STATIONS under the Project Directorate for Farming Systems Research. (SIX0703)
    Anil Kumar, Aloke Lahiri (till 30.09.2011), OP Khanduri, Rajendra Kumar (since 01.10.2011)
12. Planning, designing and analysis of ON FARM research experiments planned under the Project Directorate for Farming Systems Research. (SIX0704)
    NK Sharma, PK Batra (till 31.07.2011), OP Khanduri (since 01.02.2008)
13. Planning, designing and analysis of data relating to experiments conducted under AICRP on long-term fertilizer experiments. (SIX0705)
    DK Sehgal, Krishan Lal (since 01.08.2007), SMG Saran (01.11.2007-30.06.2010), Shashi Dahiya (since 01.08.2008)
14. Agricultural field experiments information system. (SIX0706)
    OP Khanduri (PI since 01.07.2011, Co-PI till 30.06.2011), PK Batra (PI till 30.06.2011, Co-PI 01.07.2011-31.07.2011), DK Sehgal, Soumen Pal (since 01.04.2011), Rajender Parsad (01.08.2008-31.03.2011), Sudeep (01.08.2008-31.03.2011)

New Initiated

15. Efficient designs for drug testing in veterinary trials. (SIX1104)
    Cini Varghese
16. Application of optimization techniques for construction of incomplete block designs. (SIX1116)
    BN Mandal, Rajender Parsad, VK Gupta
17. Efficacy of soil sampling strategies for describing spatial variability of soil attributes. (Collaboration with IISS, Bhopal) (CIP1124) (IASRI association w.e.f. 01.11.2011)

IISS, Bhopal	Neenu S, Sanjay Srivastava, Y Muralidharudu
IASRI, New Delhi	**BN Mandal**

18. Livelihood and nutritional security of tribal dominated rural areas through integrated farming system and technology models. (NAIP-Component-3-IARI) (CIP1118) (IASRI association w.e.f. 01.08.2011)

MPUAT, Udaipur	IJ Mathur
IARI, New Delhi	JP Sharma
IASRI, New Delhi	**Anil Kumar**

19. Experimental designs in the presence of indirect effects of treatments. (DST Funded) (SOX1115)
    Seema Jaggi, Cini Varghese, Anu Sharma, Eldho Varghese
20. Mating-Environmental designs under two-way blocking set up. (SIX1202)
    Eldho Varghese, Cini Varghese
21. Main-effects linear trend-free multi-level factorial experiments. (SIX1205)
    Susheel Kumar Sarkar, Krishan Lal, VK Gupta

FORECASTING AND REMOTE SENSING TECHNIQUES AND STATISTICAL APPLICATIONS OF GIS IN AGRICULTURAL SYSTEMS

On-going

22. Development of forecasting module for podfly, *Melanagromyza Obtusa* Malloch in the late pigeonpea (Collaboration with IIPR, Kanpur) (CIP0710) (IASRI association w.e.f. 01.01.2009.

IIPR, Kanpur	SK Singh
IASRI, New Delhi	**Ranjana Agrawal,** Amrender Kumar (till 23.09.2011)

23. Weather based forewarning models for onion thrips (*Thrips tabaci* Lindeman). (Collaboration with DOGR, Pune) (CIL1004)

IASRI, New Delhi	**Amrender Kumar,** SC Mehta(till 31.01.2011), Ranjana Agrawal
DOGR, Pune	PS Srinivas (till 18.03.2011), Jayanthi Mala BR (since 19.03.2011)

24. Weather based forewarning of mango pests. (Collaboration with CISH, Lucknow) (CIL1005)

IASRI, New Delhi	**Ranjana Agrawal**
CISH, Lucknow	Rakesh Chandra, G Pandey, AK Misra
RFRS, Vengurle	BR Salvi, MB Dalvi, AY Munj
AES, Paria	NI Shah, Hemant Sharma, GB Kalariya
BCKV, Mohanpur	SK Ray, A Samanta
BAC, Sabour	Rajesh Kumar, SN Ray, Mithelesh Kumar
FRS, Sangareddy	A Bhagwan, B Mahindar, D Anitha Kumari

New Initiated

25. Study to develop methodology for crop acreage estimation under cloud cover in the satellite imageries. (SIX1119)
Prachi Misra Sahoo, Tauqueer Ahmad, KN Singh, AK Gupta

26. National initiative on climate resilient agriculture (NICRA)-Agro forestry Component. (Collaboration with NRCAF, Agroforestry, Jhansi) (COP1111)

NRCAF, Jhansi	Ram Newaj, Ajit
IASRI, New Delhi	**Tauqueer Ahmad,** Prachi Misra Sahoo

27. An econometric study of water markets in canal command area of North-Western Rajasthan. (SIX1122)
DR Singh, Sivaramane N, Prawin Arya

28. Weather based yield forecast for rice and wheat using non-linear regression techniques. (SIX1129)
Sanjeev Panwar, N Okendro Singh

29. Development of forecasting methodology for fish production from ponds of upland region. (Collaboration with DCFR, Bhimtal) (CIL1109)

IASRI, New Delhi	**N Okendro Singh,** Sanjeev Panwar (since 23.09.2011), LM Bhar (till 24.09.2011), Ranjana Agrawal (till 23.09.2011)
DCFR, Bhimtal	Prem Kumar

30. Pest and diseases dynamic vis-a-vis climatic change under NICRA. (Collaboration with NCIPM, New Delhi) (COP1105)

NCIPM, New Delhi	S Vennila
IASRI, New Delhi	**Amrender Kumar**

DEVELOPMENT OF TECHNIQUES FOR PLANNING AND EXECUTION OF SURVEYS AND ANALYSIS OF DATA INCLUDING ECONOMIC PROBLEMS OF CURRENT INTEREST

On-going

31. Farm power machinery use protocol and management for sustainable crop production. (Collaboration with IARI, New Delhi) (CIP0906) (IASRI association w.e.f. 08.02.2010)

IARI, New Delhi	Indra Mani, Dipankar De, MS Kalra, JK Singh, Adarsh Kumar, PK Sahoo, PK Sharma, Alka Singh, JP Sinha (since 25.02.2011), Satish Lande (since 25.02.2011)
IASRI, New Delhi	**Tauqueer Ahmad**

32. Visioning, Policy Analysis and Gender (V-PAGe) Sub-Prog. II: Technology Forecasting. (NAIP Component I: Consortium Partner) (COP0708)

NCAP, New Delhi	Ramesh Chand, P Ramasundaram
IASRI, New Delhi	**VK Bhatia,** Ramasubramanian V, Amrender Kumar, Anil Rai (till 31.03.2011), Satya Pal (till 31.12.2010), KK Chaturvedi (till 01.09.2010), Ranjana Agrawal (till 19.11.2008) IARI, New Delhi,
IARI, New Delhi	Girish Kumar Jha (till 01.07.2008)

33. Visioning, Policy Analysis and Gender (V-PAGe) Sub-Prog. III: Policy Analysis and Market Intelligence. (NAIP Component I: Consortium Partner) (COP0709)

NCAP, New Delhi	Ramesh Chand, P Ramasundaram, Pratap Singh (till 31.05. 2008)
IASRI, New Delhi	**VK Bhatia,** AK Vasisht (till 01.03.2010), DR Singh, Ashok Kumar, SP Bhardwaj, Prawin Arya, Sushila Kaul (till 30.03.2010), Anil Rai (till 31.07.2010), KK Chaturvedi (till 3107.2010), N Sivaramane (18.08.2009-26.03.2012)
IARI, New delhi	NP Singh (till 30.06.2008)

34. Risk assessment and insurance products for agriculture. (NAIP Component I: Consortium Partner) (COP0808)

NCAP, New Delhi	BC Barah (till 01.12.2010), SS Raju (since 01.12.2010)
IASRI, New Delhi	**Anil Rai,** PK Malhotra (till 31.03.2011), KK Chaturvedi (on studyleave since 01.09.2010), Ramasubramanian V

Completed Projects

35. Sampling methodology for estimation of meat production in Meghalaya. (Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, Govt. of India) (SOX0909)

    AK Gupta (PI since 04.07.2010, Co-PI 01.05.2009-03.07.2010), Hukum Chandra (PI till 03.07.2010), UC Sud, DC Mathur (till 01.06.2010)

36. District-level poverty incidence estimation from NSSO data using small area estimation techniques. (Funded by CSO, MOS&PI, Govt.of India) (SOX1009)

    UC Sud, Tauqueer Ahmad, VK Jain

New Initiated

37. On small area inference using survey weights. (SIX1107)

    Yogita Gharde, Hukum Chandra, VK Jain

38. Spatial non-stationarity in small area estimation under area level model. (SIX1114)

    Hukum Chandra, UC Sud, Yogita Gharde

39. Study of sample sizes for estimation of area and production of foodgrain crops. (SIX1125)

    KK Tyagi, AK Gupta, VK Jain, Kaustav Aditya

40. Study of asymmetry in retail-wholesale price transmission for selected essential commodities. (SIX1123)
    SP Bhardwaj, Ashok Kumar, Sanjeev Panwar

MODELING AND SIMULATION TECHNIQUES IN BIOLOGICAL SYSTEMS

On-going

41. Genomics and molecular markers in crop plants (Sub-project 4: Development of new genomic and EST resources and functional genomics of thermotolerance in mandate crops). (Collaboration with NRCPB, New Delhi) (CIP1010) (IASRI association w.e.f. 28.10.2010)

NRCPB, New Delhi	NK Singh, Kishore Gaikwad
IASRI, New Delhi	**AR Rao**

42. Whole Genome Association (WGA) analysis in common complex diseases: An Indian initiative. (DBT Funded) (COP0807)

UDSC, New Delhi	BK Thelma
NII, New Delhi	Ramesh C. Juyal
DU, New Delhi	Sanjay Jain
IASRI, New Delhi	**AR Rao,** SD Wahi (since 22.06.2010)
AIIMS, New Delhi	Ashok Kumar
DMC, New Delhi	Ajit Sood

43. Bio-prospecting of genes and allele mining for abiotic stress tolerance. (NAIP Component IV: Consortium Partner) (COP0910)

NRCPB, New Delhi	T Mohapatra (Consortium PI)
IASRI, New Delhi	**AR Rao** (Consortium CCPI), SB Lal (till 09.09.2011), Sudeep, SD Wahi

New Initiated

44. Estimation of survival functions of a family of lifetime distributions under singly censored observations:Classical vs Bayesian approach. (SIX1103)
    Wasi Alam

45. Forecasting models using functional data analysis and nonlinear support vector regression techniques. (SIX1117)
    Mir Asif Iquebal, Prajneshu

46. Development of weather-based crop yield forecasting models using GARCH and wavelet techniques. (SIX1120)
    Ranjit Kumar Paul, Himadri Ghosh, Prajneshu

47. Enhancing resilience of agriculture to climate change through technologies, institutions and policies (Funded by NICRA). (COP1112)

NCAP, New Delhi	Pratap Singh Birthal, Suresh A Kurup, Shiv Kumar
NAARM, Hyderabad	GP Reddy
IASRI, New Delhi	**Ranjit Kumar Paul**

48. A study of stochastic volatility models through particle filtering. (SIX1201)
    Bishal Gurung, Himadri Ghosh

49. Buffalo genome information resources. (DBT Funded) (Collaboration with NDRI, Karnal)(COP 1215)

NDRI, Karnal	Sachinandan De
IASRI, New Delhi	**AR Rao**

DEVELOPMENT OF INFORMATICS IN AGRICULTURAL RESEARCH

On-going

50. Project Information and Management System of ICAR (PIMS-ICAR). (SIX0901)

    RC Goyal, PK Malhotra, Sudeep, Alka Arora, Pal Singh

51. Phenomics of moisture deficit and low temperature stress tolerance in rice. (Collaboration with NRCPB) (Funded by NRCPB, New Delhi) (IASRI association w.e.f. 13.05.2011) (COP1106)

NRCPB, New Delhi	P Ananda Kumar
IARI, New Delhi	Viswanathan Chinnusamy
IASRI, New Delhi	**Sudeep,** SD Wahi, Alka Arora
IIT, New Delhi	S Chaudhury
DU, South Campus	JP Khurana
CRRI, Cuttack	ON Singh
IGKV, Raipur	G Chandel
CAU, Barapani	Wricha Tyagi
RC-NEHR, Barapani	A Pattanaik

52. Strengthening Statistical Computing for NARS. (NAIP Component I: Consortium Leader with 08 other Consortium Partners) (COL0908)

    VK Bhatia, Consortium Leader; **Rajender Parsad,** CPI; PK Malhotra (till 31.03.2011), VK Gupta (till 06.06.2010), VK Mahajan (till 31.03.2011), Seema Jaggi, Samir Farooqi, Ramasubramanian V, LM Bhar, AK Paul, N Sivaramane

53. Establishment of National Agricultural Bioinformatics Grid (NABG) in ICAR (NAIP Component-I: Consortium Leader with 5 Consortium Partners) (COL1002)

    VK Bhatia, Consortium Leader, **Anil Rai,** CPI, PK Malhotra (till 31.03.2011), KK Chaturvedi (on study leave since 01.09.2010), SB Lal, Anu Sharma, Samir Farooqi, Sudeep (till 31.03.2011), Hukum Chandra, AR Rao, Seema Jaggi, Sanjeev Kumar (since 01.09.2011)

Completed Projects

54. Development of expert system on seed spices. (Collaboration with NRC on Seed Spices, Ajmer) (CIL0904)

IASRI, New Delhi	**SN Islam,** Hari Om Agarwal
NRC on Seed Spices, Ajmer	RK Kakani, Krishna Kant, OP Aishwat, MA Khan, GK Tripathi

55. Software for survey data analysis (SSDA 2.0). (SIX0903)

    SB Lal, Anu Sharma, VK Mahajan (till 31.03.2011), Hukum Chandra (on study leave 04.07.2010-18.06.2011), Anil Rai (01.02.2009 to 15.03.2012)

56. Development of gender information system for agriculture. (Collaboration with DRWA, Bhubaneswar) (CIP0803)

DRWA Bhubaneswar	HK Dash, M Srinath, Sabita Mishra
IASRI, New Delhi	**SB Lal,** Anu Sharma (till 31.03.2011), Anil Rai (till 31.03.2011)

57. Expert system for Maize crop (Collaboration with Directorate of Maize Research, New Delhi) (CIL0907)

IASRI, New Delhi	**Hari Om Agarwal,** Sudeep, HS Sikarwar, Pal Singh (since 01.02.2010)
DMR, New Delhi	Virendra Kumar Yadav, Sain Dass (till 30.06.2010), Jyoti Kaul, Sangit Kumar, P Kumar, KP Singh, Chitermal Parihar (since 01.02.2010)

58. Machine learning approach for data mining. (SIX0805)

IASRI, New Delhi	**Anshu Bharadwaj,** Shashi Dahiya
NCAP, New Delhi	Rajni Jain

59. Development of web enabled statistical package for agricultural research (SPAR3.0). (SIX0905)
Sangeeta Ahuja

60. National information system on agricultural education network in India (NISAGENET-III). (SIX0902)
RC Goyal, Alka Arora (since February 2011), Shashi Dahiya (since February 2011), Pal Singh (since February 2011), Soumen Pal (since February 2011)

61. Management system for post graduate education. (SIX0804)
Sudeep, Hari Om Agarwal (till 29.02.2012), Pal Singh (till 23.09.2011)

New Initiated

62. Development of methodology for estimation of compound growth rate and its web-based solution. (SIX1102)
Soumen Pal, Himadri Ghosh, Prajneshu

63. Analysis and determination of antimicrobial peptides: A machine learning approach. (SIX1121)
Sarika, Mir Asif Iquebal

64. Development of web enabled Statistical Package for Factorial Experiments (SPFE 2.0). (SIX1126)
Sangeeta Ahuja, PK Malhotra

65. Exploration of central data warehouse for knowledge discovery. (SIX1127)
Anshu Bharadwaj, SN Islam, DR Singh

66. Development of web based mushroom expert system. (Collaboration with Directorate of Mushroom Research, Solan). (CIP1110)

DMR, New Delhi	Mahantesh Shirur, B Vijay, RC Upadhyay, VP Sharma, OP Ahlawat, Satish Kumar, Shwet Kamal, Goraksha C Wokchaure, K Manikandan
IASRI, New Delhi	**Hari Om Agarwal** (till 29.02.2012), Pal Singh, Harnam Singh (till 01.02.2012), Yogesh Gautam

67. Strengthening & refinement of Maize AgriDaksh. (Collaboration with DMR, New Delhi). (CIP1113)

DMR, New Delhi	Virendra Kumar Yadav, KP Singh, P Kumar, Vinay Mahajan, KS Hooda, Jyoti Kaul, Ashok Kumar, Aditya Kumar Singh, Ishwar Singh, Meena Shekhar, DP Choudhary, Avinash Singode, CM Parihar, Chikkappa G Karjagi, Ambika Rajendran
IASRI, New Delhi	**Sudeep,** Hari Om Agarwal (till 29.02.2012), HS Sikarwar (till 01.02.2012), Yogesh Gautam
AICRP Centers	Robin Gogoi (IARI), G Nallathambi (Coimbatore), Mruthunjaya C Wali (Arbhavi), SR Kulkarni (Kolhapur), SM Khanorkar (Godra), Dev Raj Lenka (Bhubaneswar), JP Shahi (Varanasi), SPS Brar (Ludhiana), Bashir Ahmad Alaie (Srinagar), Dilip Singh (Banswara), NS Barua (Assam)

68. e-Platform for seed spice growers. (Collaboration with NRCSS, Ajmer) (CIL1128)

IASRI, New Delhi	**SN Islam,** Shashi Dahiya, Anshu Bharadwaj, SP Bhardwaj
NRCSS, Ajmer	RS Mehta, MK Vishal, MA Khan

69. Study of synonymous codon usage and its relation with gene expressivity in halophilic bacteria. (Collaboration with NABIM, Mau). (CIL1108)

IASRI, New Delhi	**Samir Farooqi,** Dwijesh Chandra Mishra
NABIM, Mau	DP Singh, KK Meena

70. Web based software for codon usage analysis for gene expression identification. (SIX1204)

Anu Sharma, SB Lal, Dwijesh Chandra Mishra

71. Implementation of Management Information System (MIS) including Financial Management System (FMS) in ICAR. (NAIP) (COL1203)

VK Bhatia, Alka Arora, Sudeep, Shashi Dahiya, Soumen Pal

72. In silico identification of abiotic stress (salinity) responsive transcription factors and their cis-regulatory elements in grapes. (Collaboration with NRC for Grapes, Pune). (CIP1213)

NRC for Grapes, Pune	Anuradha Upadhyay, Ajay Kumar Upadhyay
IASRI, New Delhi	**Sarika**

Annexure-II

VARIOUS COMMITTEES

Prioritization, Monitoring & Evaluation Cell

Dr. Rajender Parsad, Head, Design of Experiments	Officer In-charge
Dr. UC Sud, Head, Sample Surveys & RFD Nodal Officer	Member
Dr. Seema Jaggi, Senior Scientist	Member
Dr. Tauqueer Ahmad, Senior Scientist	Member
Dr. Sivaramane N, Scientist	Member

Consultancy Processing Cell (CPC)

Dr. Prajneshu, Head, Biometrics & Statistical Modelling	Chairman
Dr. PK Malhotra, Head, Computer Applications	Member
Dr. Rajender Parsad, Head, Design of Experiments and In-charge PME	Member
Head of Office (Ex-officio)	Member
Finance and Accounts Officer (Ex-officio)	Member
Sh. PP Singh, Technical Officer (T 7-8)	Member Secretary

Institute Technology Management Committee (ITMC)

Dr. VK Bhatia, Director, IASRI	Chairman
Dr. Rajender Parsad, Head, Design of Experiments and In-charge, PME Cell & ITMU	Member Secretary
Dr. PK Malhotra, Head, Computer Application	Member
Dr. Anil Rai, Head, Centre for Agricultural Bioinformatics (Technical Expert–A Scientist of the Institute)	Member
Dr. Seema Jaggi, Senior Scientist (Technical Expert–A Scientist of the Institute)	Member
Dr. Madhuban Gopal, Principal Scientist & National Fellow, IARI (IPR Expert–A Scientist from ICAR Institute in the Zone)	Member

Institute Technology Management Unit (ITMU)

Dr. Rajender Parsad, Head, Design of Experiments & In-charge PME Cell	Officer In-charge
Dr. Tauqueer Ahmad, Senior Scientist	Member
Sh. PP Singh, Technical Officer (T 7-8)	Member

Result Framework Document (RFD) Committee is chaired by Director, all Head of Divisions, Finance & Accounts Officer and Administrative Officer/ Assistant Administrative Officer are its Members and Dr. UC Sud, Head, Division of Sample Surveys and RFD Nodal Officer acts as Member Secretary.

Project Monitoring Committee (PMC) is chaired by Director, all Head of Divisions are its members and In-charge PME Cell acts as Member Secretary.

Institute Joint Staff Council

Dr. VK Bhatia, Director	Chairman
Official-side Representatives	
Dr. PK Malhotra, Head, Computer Application	Member
Dr. UC Sud, Head, Sample Surveys and Welfare Officer	Member
Dr. Rajender Parsad, Head, Design Experiments & In-charge PME Cell	Member
Dr. KK Tyagi, Principal Scientist	Member
Sh. Vijay Kumar, F&AO	Member
Senior Administrative Officer	Member
Sh. SK Singh, Technical Officer (T7-8)	Member Secretary
Staff-side Representatives	
Sh. KB Sharma, Assistant	Secretary
Sh. Rajesh Kumar, T-2	Member
Sh. Virender Kumar, Technical Officer (T-5)	Member
Sh. Mukesh Kumar, LDC	Member
Sh. Rajnath, Skilled Supporting Staff	Member
Sh. Ashok Kumar, Skilled Supporting Staff	Member

Institute Grievance Committee

Official-side Representatives	
Dr. VK Bhatia, Director	Chairman
Dr. (Smt.) Ranjana Agrawal, Principal Scientist	Member
Sh. Vijay Kumar, F&AO	Member
Head of Office (Ex-officio)	Member
Sh. Manosh Choudhary, Assistant Administrative Officer	Member Secretary
Staff-side Representatives	
Sh. Pal Singh, Scientist (SS)	Member
Sh. Satya Pal Singh, Technical Officer (T-6)	Member
Sh. Basant Kumar, UDC	Member
Sh. Mohan Singh, Skilled Supporting Staff	Member

ICAR Staff Welfare Fund Scheme

Dr. UC Sud, Head, Sample Surveys & Welfare Officer	Chairman
Dr.(Mrs.) Seema Jaggi, Senior Scientist	Member
Head of Office (Ex-officio)	Member
Sh. Vijay Kumar, F&AO	Member
Sh. KB Sharma, Assistant & Secretary, IJSC	Member
Sh. Mahendra Pandit, Skilled Supporting Staff	Member
Assistant Administrative Officer (Admn. II) (Ex-officio)	Member Secretary

Women Cell

Dr. Ranjana Agrawal, Principal Scientist	Chairperson
Dr. Seema Jaggi, Senior Scientist	Member
Ms. Vijay Bindal, Technical Officer (T 7-8)	Member
Smt. Sushma Banati, Senior PS	Member
Smt. Sushma Gupta, Assistant Administrative Officer	Convenor

International Training Hostel (ITH)/Panse Guest House

A total of 1286 Trainees/Guests from ICAR Institutes, SAU's/Officials from Central/State Governments/Private Organisations and Foreign Trainees from various institutes stayed at ITH and about 1725 guests stayed at Panse Guest House during the period under report. Smt. Sushma Banati the In-charge of the Guest Houses, assisted by Sh. Sunil Kumar.

Hostel Executive Committee for the year 2011-12

Warden	Ranjana Agrawal
Prefect	Nirupam Ghosh
Assistant Prefect /Mess Secretary	Upendra Pradhan
Cashier	Pratyush Dasgupta
Cultural Secretary	Suvojit Das
Assistant Cultural Secretary	Shwetank Lall
Maintenance Secretary	Sreekumar Biswas
	Ranganath HK
	Satish Kumar Yadav
Health Secretary	Mrinmay Ray
Assistant Health Secretary	Amit Kairi
Sports Secretary	Sumit Chowdhury
Assistant Sports Secretary	Tanuj Misra
Common Room Secretary	Prakash Kumar
Assistant Common Room Secretary	Himadri Shekhar Roy
Computer Lab Secretary	Kamalakanta Katari
Assistant Computer Lab Secretary	Chiranjib Sarkar
Auditors	Rohan Kumar Raman
	Rupam Kumar Sarkar
	Kanchan Sinha, Chandan Deb
Comunication Secretary	Chiranjit Mazumdar
	Pradip Basak, Achal Lama
Warden's Nominee	Arpan Bhowmik

Institute Recreation Club

Dr. VK Bhatia, Director	President
Sh. OP Khanduri, Senior Scientist	Vice President
Sh. RS Tomar, Technical Officer	Secretary
Sh. Sunil Bhatia, Technical Officer	Treasurer

Sh. Raj Kumar Verma, UDC	Member
Sh. Mukesh Kumar, LDC	Member
Sh. Sunil Kumar-I, LDC	Member
Smt. Vijay Laxmi Murthy, P.A.,	Lady Member

Institute Sports Committee

Dr. VK Bhatia, Director	President
Dr. KN Singh, Head, Forecasting and Econometric Techniques	Vice President
Sh. OP Khanduri, Senior Scientist	Vice President
Senior Administrative Officer	Member
Finance & Accounts Officer	Member
Sh. Chander Vallabh, AAO	Convener
Sh. PS Rai, AAO	Member
Sh. RS Tomar, Technical Officer	Member
Sh. KB Sharma, Assistant & Secretary, IJSC	Member
Sh. Rambhool, UDC	Member
Smt. Meena Nanda, Technical Officer	Lady Member

IASRI Employees Co-operative Thrift and Credit Society Limited

Dr. VK Bhatia, Director	Patron
Sh. UC Bandooni	President
Ms. Vijay Bindal	Vice-President
Sh. Pratap Singh	Secretary
Sh. Pradeep Kumar	Treasurer
Mrs. VL Murthy	Member
Mrs. Savita Wadhwa	Member
Sh. Manoj Kumar	Member
Sh. GM Pathak	Member
Sh. Sudarshan Sharma	Member (till 31.12.2011)
Sh. Parbhu Dayal	Member
Sh. Rajnath	Member

Annexure-III

IASRI PERSONNEL

Director
Dr. VK Bhatia

National Professor (Strength of ICAR)
Dr. VK Gupta

Head, Division of Design of Experiments
Dr. Rajender Parsad

Head, Division of Sample Survey
Dr. UC Sud

Head, Division of Biometrics and Statistical Modelling
Dr. Prajneshu

Head, Centre for Agricultural Bioinformatics [CABin]
Dr. Anil Rai

Head, Division of Forecasting and Econometric Techniques
Dr. KN Singh

Head, Division of Computer Applications
Dr. PK Malhotra

Professor (Agricultural Statistics)
Dr. Rajender Parsad

Professor (Computer Applications)
Dr. PK Malhotra

Professor (Bioinformatics)
Dr. Prajneshu

Warden, Sukhatme Hostel
Dr. (Smt.) Ranjana Agrawal

In-Charge, Prioritization, Monitoring & Evaluation (PME) Cell
Dr. Rajender Parsad

Vigilance Officer
Dr. PK Malhotra

Transparency Officer & Nodal Officer
Dr. Prajneshu

Welfare Officer
Dr. P.K. Batra (till 31.07.2011)
Dr. UC Sud (w.e.f. 01.08.2011)

In-Charge, National Agricultural Science Museum
Dr. (Smt.) Sushila Kaul

Senior Administrative Officer
Sh. PS Sayal (till 31.7.2011)

Finance and Accounts Officer
Sh. Vijay Kumar

Librarian
Sh. Praveen Kumar Saxena

Public Information Officer
Sh. PS Syal (till 31.07.2011)
Smt. Sushma Gupta (w.e.f. 03.08.2011)

Annexure-IV

NATIONAL AGRICULTURAL SCIENCE MUSEUM (NASM)

National Agricultural Science Museum (NASM) was conceived by the ICAR and executed by the National Council of Science Museums, Ministry of Culture, Govt. of India during 2004. The responsibility of up-keep and maintenance of NASM rests with Indian Agricultural Statistics Research Institute (ICAR), Pusa, New Delhi. NASM is situated at NASC Complex, DPS Marg, Opposite Dasghara Village, Pusa Campus, New Delhi. The Museum is looked after by a Central Management Committee constituted at the ICAR Headquarter level and is composed of

Dr. MM Pandey, Deputy Director General (Engineering)	Chairman
Dr. AK Vasisht, Assistant Director General (PIM)	Member
Dr. RC Agrawal, Registrar General, PPV&FR	Member
Dr. VK Bhatia, Director, IASRI	Member
Dr. Sushila Kaul, Incharge, NASM	Member Secretary

Under the guidance of this Committee, day-to-day activities of the Museum relating to up-keep and maintenance are looked after by Dr. Sushila Kaul, Scientist In-charge NASM along with technical and administrative staff of IASRI.

The fully air-conditioned Museum remains open to visitors on all days from 10:30 hrs. to 16:30 hrs. except Mondays – the weekly holidays. It is not closed even for lunch break. There is a nominal fee of Rs. 10 per head but the groups of farmers, children from schools/colleges are exempted from entrance fee.

Participation of NASM in Different Events

- 7th Food and Technology Expo at Pragati Maidan, New Delhi during 29-30 July 2011
- India International Trade Fair at Pragati Maidan, New Delhi during 14-27 November 2011
- Pusa Krishi Vigyan Mela at Indian Agricultural Research Institute, New Delhi during 1-3 March 2012

Distinguished Visitors

Dignitaries from the following countries visited the Museum:

Afghanistan, Argentina, Australia, Bangladesh, Burundi, Canada, Chile, China, Costa Rica, Democratic Republic of Congo, Ecuador, Egypt, France, Gambia, Germany, Ghana, Jordan, Kenya, Luxembourg, Malaysia, Mongolia, Mozambique, Nepal, Netherland, New Zealand, Norway, Peru, Seychelles, South Africa, Spain, Sri Lanka, Sudan, Switzerland, Thailand, Turkey, UK, USA, Venezuela and Zimbawe

In all 22,836 visitors visited the Museum and 2,913 tickets were sold. There were students from 46 schools from Delhi, 04 schools from Haryana, 03 schools from Uttar Pradesh. Students from Universities of 08 states and farmers from 14 states of India also visited the Museum. Farmers belonging to different parts of India, students of various schools/colleges, State Agricultural Universities/Colleges in India/abroad, trainees of trainings conducted from different ICAR Institutes and many important delegations also visited the Museum. Visitors found NASM very informative and they gained vital knowledge from the exhibits displayed in the Museum.

Acronyms

AARDO	Afro-Asian Rural Development Organization
ABL	Agricultural Bioinformatics Lab
AES	Agricultural Experimental Station
AICRP	All India Coordinated Research Project
AIIMS	All India Institute of Medical Sciences
BAC	Bihar Agricultural College
BCKV	Bidhan Chandra Krishi Viswavidyalaya
CAFT	Centre of Advanced Faculty Training
CAS	Centre of Advanced Studies
CAZRI	Central Arid Zone Research Institute
CGIAR	Consultative Group on International Agricultural Research
CIFE	Central Institute of Fisheries Education
CIMMYT	*Centro Internacional de Mejoramiento de Maíz y Trigo* (International Maize and Wheat Improvement Center)
CIRG	Central Institute for Research on Goats
CISH	Central Institute for Subtropical Horticulture
CPCRI	Central Plantation Crops Research Institute
CRIDA	Central Research Institute for Dryland Agriculture
CSO	Central Statistical Organization
CSUAT	Chandra Shekhar Azad University of Science & Technology
DARE	Department of Agricultural Research and Education
DBT	Department of Biotechnology
DMC	Detroit Medical Center
DMR	Directorate of Maize Research
DOGR	Directorate of Onion and Garlic Research
DST	Department of Science and Technology
DU	Delhi University
DWM	Directorate of Water Management
DWR	Directorate of Wheat Research
DWS	Directorate of Weed Science Research
ESCAP	Economic and Social Commission for Asia and the Pacific
FAO	Food and Agricultural Organisation
FOCARS	Foundation Course for Agricultural Research Services
FRS	Fruit Research Station
FSR	Farming Systems Research
GCES	General Crop Estimation Surveys

GIS	Geographical Information System
GPS	Global Positioning System
IARI	Indian Agricultural Research Institute
IASRI	Indian Agricultural Statistics Research Institute
ICAR	Indian Council of Agricultural Research
ICARDA	International Center for Agricultural Research in the Dry Areas
IFFCO	Indian Farmers Fertiliser Cooperative Limited
IIMC	Indian Institute of Mass Communication
IIPR	Indian Institute of Pulses Research
IISS	Indian Institute of Soil Science
IMD	India Meteorological Department
INARIS	Integrated National Agricultural Resources Information System
IRRI	International Rice Research Institute
ISAS	Indian Society of Agricultural Statistics
ISI	International Statistical Institute
ISS	Indian Statistical Services
IVRI	Indian Veterinary Research Institute
JCC	Junior Certificate Course
JNKVV	Jawaharlal Nehru Krishi Vishwa Vidyalaya
LTFE	Long Term Fertilizer Experiments
MOS &PI	Ministry of Statistics and Programme Implementation
MPUAT	Maharana Pratap University of Agriculture and Technology
NAARM	National Academy of Agricultural Research Management
NAAS	National Academy of Agricultural Sciences
NABARD	National Bank for Agriculture and Rural Development
NAIP	National Agricultural Innovation Project
NARP	National Agriculture Research Project
NARS	National Agricultural Research System
NASA	National Academy of Statistical Administration
NASM	National Agricultural Science Museum
NASS	National Agricultural Statistics System
NBAGR	National Bureau of Animal Genetic Resources
NBAII	National Bureau of Agriculturally Important Insects
NBAIM	National Bureau of Agriculturally Important Microorganisms
NBFGR	National Bureau of Fish Genetic Resources
NBPGR	National Bureau of Plant Genetic Resources
NCAER	National Council of Applied Economic Research
NCAP	National Centre for Agricultural Economics and Policy Research
NCMRWF	National Centre for Medium Range Weather Forecasting
NDRI	National Dairy Research Institute

NDUAT	Narendra Deva University of Agriculture and Technology
NESAC	North Eastern Space Applications Centre
NICRA	National Institute on Climate Resilient Agriculture
NII	National Institute of Immunology
NRCPB	National Research Centre on Plant Biotechnology
NRCSS	National Research Centre on Seed Spices
NSSO	National Sample Survey Organisation
OUAT	Orissa University of Agriculture & Technology
PDFSR	Project Directorate of Farming System Research
PSCC	Professional Statisticians' Certificate Course
RARS	Regional Agricultural Research Station
RCNEHR	Research Complex North Eastern Hilly Region
RFRS	Regional Fruit Research Station
RSM	Response Surface Methodology
SAARC	South-Asian Association for Regional Co-operation
SAC	Space Application Centre
SAU	State Agricultural University
SCC	Senior Certificate Course
SSD	Super Saturated Design
STCR	Soil Test Crop Response Correlation
STF	Special Task Force
UAS	University of Agricultural Sciences
UNDP	United Nations Development Programme
UP	Uttar Pradesh
USDA	United States Department of Agriculture
V-Page	Vision Policy Analysis and Gender

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