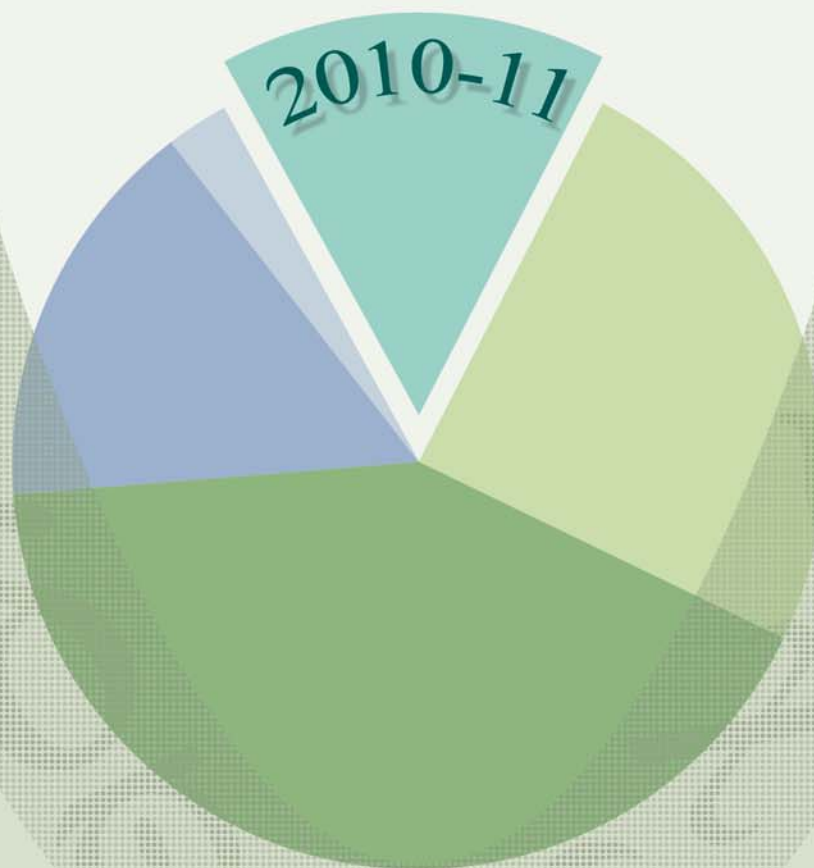वार्षिक रिपोर्ट
ANNUAL REPORT

2010-11

वार्षिक रिपोर्ट
ANNUAL REPORT

2010-11

भारतीय कृषि सांख्यिकी अनुसंधान संस्थान
(भारतीय कृषि अनुसंधान परिषद)
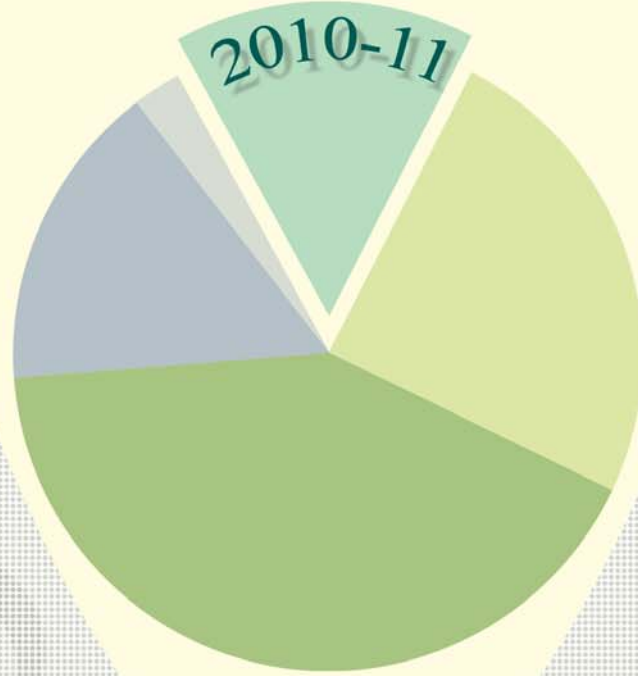लाइब्रेरी एवेन्यू, पूसा, नई दिल्ली–110 012

INDIAN AGRICULTURAL STATISTICS RESEARCH INSTITUTE
(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)
LIBRARY AVENUE, PUSA, NEW DELHI – 110 012
www.iasri.res.in

Advisors / Directors

Dr. P.V. Sukhatme	September 1940 – July 1951
Dr. V.G. Panse	August 1951 – March 1966
Dr. G.R. Seth	April 1966 – October 1969
Dr. Daroga Singh	November 1969 – May 1971
Dr. M.N. Das (A)	June 1971 – October 1973
Dr. Daroga Singh	November 1973 – September 1981
Dr. Prem Narain	October 1981 – February 1992
Dr. S.K. Raheja (A)	February 1992 – November 1992
Dr. R.K. Pandey (A)	December 1992 – May 1994
Dr. P.N. Bhat (A)	June 1994 – July 1994
Dr. O.P. Kathuria	August 1994 – May 1995
Dr. R.K. Pandey (A)	June 1995 – January 1996
Dr. Bal B.P.S. Goel	January 1996 – October 1997
Dr. S.D. Sharma	October 1997 – August 2008
Dr. V.K. Bhatia	August 2008 onwards

Preface

It gives me immense pleasure in bringing out the Annual Report 2010-11 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 46 research projects in the Institute (01 National Professor Scheme, 22 Institute funded, 12 funded by other outside agencies and 11 in collaboration with other Institutions). 11 projects have been completed and 12 new projects have been initiated. This year Institute has taken two major initiatives under NAIP. First NAIP consortium Strengthening Statistical Computing for NARS targets at providing research guidance and capacity building in statistical computing and creation of sound and healthy statistical computing environment. For providing service oriented computing, Indian NARS Statistical Computing Portal has also been initiated with the facility of analyzing data generated from block designs and split plot designs from IP Authenticated machines of NARS. Through this consortium, Institute has developed strong linkages with all NARS organizations. Supercomputing facilities are being developed under the second consortium Establishment of National Agricultural Bioinformatics Grid (NABG) for undertaking research in the field of Agricultural Bioinformatics. This facility would provide computational framework to support biotechnological research in the country. The Institute has also developed Maize AgriDaksh (Expert System on Maize Crop) and Expert System on Seed Spices and transferred them to the stakeholders

Twenty seven training programmes were organised (One under Center of Advanced Faculty Training; one Winter School; one for ISS Probationers; one for CSO officials; three International Training programmes, one for officials of SAARC countries sponsored by CSO, one for Yemen participants and one sponsored by AARDO; Sixteen training programmes under various research projects and four other training programmes). In all 553 participants were trained in these training programmes. A travel training-cum-Workshop was also organized at CCSHAU, Hisar. One National Conference of Agricultural Research Statisticians, Two Launch Workshops, one Workshop in Hindi, Four Zonal Workshops under PIMS-ICAR and Two under NISAGENET, and Five Interactive meets were also organised. Institute also celebrated the first World Statistics Day on 20 October 2010.

Scientists of the Institute published 49 research papers in National and International refereed Journals along with 09 popular articles, 02 book chapters and 25 projects/technical reports/reference manuals.

I am happy to note that some of our colleagues received academic distinctions during the year. Dr. Vinod Kumar Gupta conferred upon the prestigious title of Sankhyiki Bhushan, Dr. Rajender Parsad received Prof PV Sukhatme Gold Medal Award, Dr. Ranjana Agrawal received Akhil Bhartiya Vishesh Mahila Puraskar, and Dr. Anil Kumar received Young Scientist Award. Dr. VK Bhatia and Dr. Rajender Parsad are elected as Fellow of National Academy of Agricultural Sciences.

The scientists of the Institute were deputed for presentation of their papers in various national/international conferences. This year four scientists were deputed to present their papers to Turkey, Germany and Uganda. Five scientists received foreign training in niche areas of research.

To promote Hindi, a poster presentation of research papers in Hindi was organized.

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 Research Coordination and Management Unit for coordinating various activities and Hindi Section for Hindi Translation of the required material.

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)
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
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
	•	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 EconometricsTechniques
	•	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

Vision

Statistics and ICT for enriching the quality of Agricultural Research

Mission

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

Mandate

- To undertake basic, applied adaptive, strategic and anticipatory research in Agricultural Statistics and related fields and use these researches in meeting challenges and improving quality of agricultural research.

- To conduct post-graduate teaching and in-service, customized and sponsored training courses in Agricultural Statistics and Computer Applications at National and International level so as to be a lead centre of excellence in Human Resource Development.

- To provide methodological support in strengthening National Agricultural Statistics System by establishing linkages with State departments of agriculture and allied fields, other research institutions, industry, etc.

- 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 and undertaking sponsored research and consultancy for National and International organizations.

विशिष्ट सारांश

भारतीय कृषि सांख्यिकी अनुसंधान संस्थान (भा.कृ.सां.अ.सं.) की स्थापना सन् 1959 में कृषि सांख्यिकी अनुसंधान संस्थान के रूप में हुई तभी से यह संस्थान कृषि सांख्यिकी में अनुसंधान के साथ-साथ शिक्षण/प्रशिक्षण का महत्वपूर्ण दायित्व निभा रहा है। सूचना प्रौद्योगिकी के क्षेत्र में हो रही प्रगति के दृष्टिगत इस संस्थान ने स्वयं को कृषि अनुसंधान की वर्तमान आवश्यकताओं के अनुरूप ढाल लिया है। इस परिवर्तित परिवेश में, संस्थान को सौंपे गये कार्य हैं – कृषि सांख्यिकी में मौलिक, अनुप्रयुक्त और अनुकूली शोध करना, कृषि सांख्यिकी एवं संगणक अनुप्रयोग में स्नातकोत्तर एवं सेवाकालीन प्रशिक्षण पाठ्यक्रम चलाना, परामर्श सेवाएँ प्रदान करना, अनुसंधान हेतु कृषि सांख्यिकी के सूचना कोष के रूप में कार्य करना, कृषि सांख्यिकी एवं संगणक अनुप्रयोग में श्रेष्ठ शिक्षा व प्रशिक्षण के एक उन्नत केन्द्र के रूप में संस्थान को विकसित करना, भारतीय कृषि अनुसंधान परिषद् के अन्य संस्थानों एवं राज्य कृषि विश्वविद्यालयों (रा.कृ.वि.) एवं राज्य कृषि/पशुपालन विभागों के साथ सम्पर्क बढ़ाना, राष्ट्रीय कृषि सांख्यिकी प्रणाली को विकसित करने एवं सुदृढ़ बनाने में सहायता करना तथा इन विषयों में राष्ट्रीय एवं अन्तरराष्ट्रीय संगठनों के द्वारा प्रायोजित अनुसंधान करना एवं प्रशिक्षण प्रदान करना।

इस वर्ष संस्थान के विभिन्न प्रभागों – परीक्षण अभिकल्पना, जैवमिति एवं सांख्यिकीय मॉडलिंग, पूर्वानुमान एवं अर्थमिति तकनीक, प्रतिदर्श सर्वेक्षण, संगणक अनुप्रयोग एवं कृषि जैव-सूचना केन्द्र में अनेक अनुसंधान परियोजनाएँ चलायी गयीं। संस्थान में कुल 46 अनुसंधान परियोजनाओं के अन्तर्गत अनुसंधान कार्य किया गया जिनमें से 01 परियोजना राष्ट्रीय आचार्य योजना से, 22 संस्थान द्वारा वित्त पोषित, 12 अन्य बाह्य एजेन्सियों द्वारा वित्त पोषित थीं तथा 11 परियोजनाएँ अन्य संस्थानों के सहयोग से चलायी गयीं। इस वर्ष कुल 11 परियोजनाएँ पूर्ण की गयीं तथा 12 नयी परियोजनाएँ आरम्भ की गयीं।

प्रतिवेदनाधीन अवधि में संस्थान द्वारा राष्ट्रीय कृषि नवोन्मेषी परियोजना के अन्तर्गत दो प्रमुख पहल की गयीं – राष्ट्रीय कृषि अनुसंधान प्रणाली (एन.ए.आर.एस.) के लिए सांख्यिकीय संगणना का सुदृढ़ीकरण एवं राष्ट्रीय जैव-सूचना ग्रिड की स्थापना।

एन.ए.आर.एस. के लिए सांख्यिकीय संगणना का सुदृढ़ीकरण पर एन.ए.आई.पी. कन्सोर्टियम (www.iasri.res.in/sscnars) आरम्भ किया गया जिसके अन्तर्गत

- सांख्यिकीय संगणना एवं संगणनात्मक सांख्यिकी में अनुसंधान सम्बन्धी मार्गदर्शन करना तथा उन्नत सांख्यिकीय संगणना का सुदृढ़ वातावरण तैयार करना है।

- एन.ए.आर.एस. के शोधकर्ताओं को सांख्यिकीय संगणना सुविधाएँ उपलब्ध कराने के लिए 151 संस्थानों के लिए एक सामान्य उद्देश्य वाला सांख्यिकीय सॉफ्टवेयर पैकेज अधिप्राप्त किया गया जो कि तीन वर्षों के अद्यतन एवं अपग्रेड्स सहित एन.ए.आर.एस. में सतत् उपयोग के लिए है। इसमें एक एस.ए. एस. इण्टरप्राइज बिजनेस इण्टेलीजेन्स सर्वर भी शामिल है।

- हाई–एण्ड सांख्यिकीय संगणना सुविधाओं के उपयोग में शोधकर्ताओं के सामर्थ्य निर्माण के लिए एस.ए.एस. : एक सिंहावलोकन पर 30 कार्य–दिवसीय एवं एस.ए.एस. जेनेटिक्स/जे.एम.पी. जिनोमिक्स पर 5 कार्य–दिवसीय, एस.ए.एस. के उपयोग द्वारा आँकड़ों का विश्लेषण विषय पर 6 दिवसीय प्रशिक्षण कार्यक्रमों के माध्यम से 83 एन.ए.आर.एस. संगठनों के 209 अनुसंधानकर्त्ताओं को प्रशिक्षक के रूप में प्रशिक्षित किया गया। एक सप्ताह की अवधि के 43 प्रशिक्षण कार्यक्रमों के माध्यम से एन.ए.आर.एस. के 892 शोधकर्ताओं (496 भा.कृ. अनु.प. के संस्थानों से एवं 396 रा.कृ.वि.वि.से) को एस.ए.एस. के उपयोग द्वारा आँकड़ों का विश्लेषण में प्रशिक्षित किया गया। इससे हाई–एण्ड सांख्यिकीय संगणना एवं सांख्यिकीय तकनीकों के उपयोग में कृषि वैज्ञानिकों की सामर्थ्य निर्माण में मदद मिली है और हाई इम्पैक्ट फैक्टर वाले जर्नलों में शोध कार्य को प्रकाशित करने के लिए उनका मार्ग प्रशस्त हुआ है।

- भारतीय एन.ए.आर.एस. प्रयोक्ताओं को सेवा उन्मुख संगणना उपलब्ध कराने के लिए एक पोर्टल स्थापित किया गया जो एन.ए.आर.एस. प्रयोक्ताओं के लिए आई.पी. प्रमाणीकरण के माध्यम से, http://stat.iasri.res.in:8080/sscnarsportal पर उपलब्ध है। भारतीय एन.ए.आर.एस. का कोई भी शोधकर्ता अपने सम्बन्धित संस्थान के नोडल अधिकारी से यूजरनेम तथा पासवर्ड प्राप्त कर सकता है। इस पोर्टल पर किसी भी ब्लॉक अभिकल्पना (पूर्ण अथवा अपूर्ण) एवं स्पिलिट प्लॉट अभिकल्पना से प्राप्त आँकड़ों का विश्लेषण किया जा सकता है।

वैश्विक स्तर पर कृषि जैव-सूचना के क्षेत्र में अनुसंधान एवं विकास के साथ तालमेल रखने के लिए दूसरी पहल राष्ट्रीय कृषि जैवसूचना ग्रिड (एन.ए.बी.जी.) की स्थापना आरम्भ की गयी जो कृषि जैवसूचना

के क्षेत्र में डाटाबेस, डाटा वेयरहाउस, सॉफ्टवेयर एवं टूल्स, एल्गोरिथ्म्स, जीनोम ब्राउज़र तथा सिस्टमेटिक एवं समेकित पद्धति के माध्यम से हाई–एण्ड संगणनात्मक सुविधाएँ विकसित करने में मदद करेगा । इस परियोजना के अन्तर्गत पांच विभिन्न डोमेन संगठनों, एन.बी.पी.जी.आर., नई दिल्ली; एन.बी.ए.जी.आर., करनाल; एन.बी.एफ.जी.आर., लखनऊ; एन.बी.ए.आई.एम., मऊ एवं एन.बी.ए.आई.आई, बंगलुरू को सम्मिलित करते हुए सुपरकम्प्यूटिंग सुविधाएँ विकसित की जाएँगी । यह राष्ट्रीय सुविधा होगी जो देश में जैव–प्रौद्योगिकीय अनुसंधान को सक्षम करने के लिए संगणनात्मक फ्रेमवर्क उपलब्ध कराएगा । एन.ए.बी.जी. का उद्देश्य कृषि जैवसूचना में शोध एवं विकास के लिए सामर्थ्य निर्माण करना भी है।

कुछ अन्य प्रमुख अनुसंधानिक उपलब्धियाँ इस प्रकार हैं :

- ऐसी परीक्षणात्मक परिस्थितियों, जिनमें परीक्षणात्मक इकाइयों में चरशीलता के दो क्रॉस वर्गीकृत स्रोतों को नियंत्रित करने की आवश्यकता है तथा जिनमें ट्रीटमेन्ट्स की संख्या पुनरावृत्ति की संख्या से काफी अधिक है, के लिए व्यापकीकृत अपूर्ण ट्रोजन–टाइप अभिकल्पनाएँ प्राप्त की गयीं । ट्रीटमेन्ट्स की संख्या (v)≤30, पंक्तियों की संख्या (m), स्तम्भों की संख्या (n), सेलों का आकार (k), तथा पुनरावृत्ति की संख्या (r) की सूची तैयार की गई ।

- पशु-चिकित्सा प्रसाधनों के मूल्यांकन के लिए बायोइक्यूवीलेन्स परीक्षण संचालित किये गये । बायोइक्यूवीलेन्स परीक्षणों के लिए दक्ष प्रसरण संतुलित अभिकल्पनाएँ प्राप्त कर सूचीबद्ध की गई ।

- जैविक अस्तित्व वाले परीक्षणों में प्रायः विभिन्न समयावधियों में प्रत्येक परीक्षण इकाई पर ट्रीटमेन्ट्स के सीक्वेंस का उपयोग शामिल होता है, क्रॉसओवर अभिकल्पनाओं का उपयोग करते हुए संचालित किये जाते हैं । लीनियर प्रोग्रामिंग पद्धति का उपयोग करते हुए सर्क्युलर संतुलित एवं सर्क्युलर स्ट्रांग्ली संतुलित क्रॉसओवर अभिकल्पनाएँ प्राप्त करने के लिए एक एल्गोरिथ्म विकसित किया गया।

- डिज़ाइन रिसोर्सेज़ सर्वर पर आर्थोगोनल अरेज का एक नया लिंक जोड़कर सुदृढ़ बनाया गया तथा किसी भी कारक के अधिकत्तम 12 स्तरों के बहुउपादानीय ट्रीटमेन्ट संरचना सहित ब्लॉक अभिकल्पनाओं एवं χ^2–ऑप्टिमल मल्टीलेवल सुपरसेचुरेटेड़ अभिकल्पनाओं एवं k-सर्क्युलेन्ट मल्टीलेवल सुपरसेचुरेटेड अभिकल्पनाओं की सूचियों को अद्यतन किया गया।

- मल्टीपल पैरेलल लाइन असेज के लिए वैटिड ए-ऑप्टिमल ब्लॉक अभिकल्पनाएँ विकसित की गयी।

- वर्ष 1999–2000 से 2008–09 के दौरान देश के विभिन्न क्षेत्रों के किसानों के खेतों में संचालित 'रिस्पॉन्स ऑफ़ न्यूट्रिएन्ट्स' परीक्षणों के आँकड़ों से एन.ए.आर.पी. जोन, राज्य एवं राष्ट्रीय स्तर पर चावल–गेहूँ फ़सल के सीक्वेंस के लिए उर्वरक अनुक्रिया अनुपात (एफ.आर.आर.) प्राप्त किये गये । 6 राज्यों में संचालित 1406 परीक्षणों के आँकड़ों का उपयोग करते हुए विभिन्न उर्वरक संयोजनों जैसे नियंत्रण पर N, NP, NK, NPK; P पर N एवं NK, K पर N एवं NP आठ उर्वरक अनुक्रिया अनुपात प्राप्त किये गये । चावल की फ़सल के लिए NPK का उर्वरक अनुक्रिया अनुपात 6.96 कि.ग्रा/कि.ग्रा. (महाराष्ट्र) से 19.41कि.ग्रा/कि.ग्रा. (बिहार) के बीच था । महाराष्ट्र, उत्तराखण्ड एवं झारखण्ड को छोड़कर अधिकांश राज्यों में चावल की फ़सल के नियंत्रण पर NPK का एफ.आर.आर. 12 कि.ग्रा/कि.ग्रा. से अधिक था। चावल-गेहूँ फ़सलीय सीक्वेंस में गेहूँ का उर्वरक अनुक्रिया अनुपात चावल की तुलना में, लगभग सभी राज्यों में, निम्न स्तर पर था ।

- मेघालय में माँस के उत्पादन के आकलन के लिए एक प्रतिचयन पद्धति विकसित की गयी।

- 49वें मानक मौसम विज्ञान सप्ताह अर्थात् दिसम्बर माह के प्रथम सप्ताह से आरम्भ संबंधी आँकड़ों मौसम का प्रयोग करते हुए द्वितीय "लश पर पाउड़ी मिल्ड्यू के प्रथम बार प्रकट होने के लिए पूर्व चेतावनी मॉडल विकसित किये गये । विभिन्न मॉडलों में अधिकतम सापेक्ष आर्द्रता, अधिकतम तापमान, हवा की गति एवं उनके इण्टरेक्शन्स महत्वपूर्ण पाए गये । इन मॉडलों का प्रयोग करते हुए 50वें smw पर सबसे पहला पूर्वानुमान प्राप्त किया जा सकता है जिसे बाद में संशोधित भी किया जा सकता है ।

- अरैखीय काल श्रेणी मॉडलों की श्रेणी में आवधिक अस्थिरता दर्शाने वाले आँकड़ों की व्याख्या करने के लिए चरघातांकी स्व-समाश्रयी मॉडलों का उपयोग किया जा सकता है । पूर्वानुमानों से एक स्टेप से ज्यादा आगे के पूर्वानुमान के लिए 'कन्डीशनल एक्सपेक्टेशन्स' की अवधारणा का उपयोग करते हुए विश्लेषणात्मक फार्मूले विकसित किये गये । केरल में ऑयल सरडाइन कैचेज की मॉडलिंग एवं पूर्वानुमान के लिए चरघातांकी स्व-समाश्रयी मॉडल की व्याख्या की गयी ।

- विषय वस्तु विशेषज्ञों द्वारा लगभग 50 भरी हुई प्रश्नावलियों से बारानी कृषि में प्रौद्योगिकियों की कल्पना/कारकों की प्राथमिकता के लिए रैखिक संयोजन भारित स्कोरिंग, बहुविमीय स्केलिंग एवं विश्लेषणात्मक अनुक्रम प्रक्रिया विधियों का उपयोग किया

गया । परिणामों से ज्ञात हुआ कि बारानी क्षेत्रों में उच्च उत्पादकता प्राप्त करने के लिए फ़सलों की स्थायित्वता को उच्चतम अनुसंधान प्राथमिकता दी जानी चाहिए तथा उसके बाद अर्ली मैच्योरिटी, ब्रॉड एडॉप्शन, स्ट्रेस रसिस्टेन्स एवं उच्च उपज क्षमता को प्राथमिकता दी जानी चाहिए ।

- दूरी संतुलित प्रतिचयन योजनाओं का गुण है कि सेकेन्ड आर्डर इन्क्लूजन प्रायिकताएँ दो समीपस्थ इकाइयों के बीच की दूरी का गैर-ह्रासमान फलन होती हैं और उस समष्टि से प्रतिचयन के लिए उपयुक्त है जिसमें समय अथवा स्थान में इकाइयों की प्राकृतिक आर्डरिंग के कारण समीपवर्ती इकाइयाँ सदृश प्रेषण उपलब्ध कराती हैं । रैखिक पूर्णांक प्रोग्रामिंग का प्रयोग करते हुए डिस्टेन्स बैलेन्सड सैम्पलिंग योजनाएं प्राप्त की गयी ।

- मेंथा तेल के भावी व्यापार पर अध्ययन से ज्ञात हुआ कि प्रथम अन्तर पर दो कीमत श्रृंखलाएं अर्थात् भावी एवं वर्तमान, स्थिर हो जाती है । गत वर्षों की तुलना में वर्ष 2008 और 2009 में वित्तीय विक्षोभ में सतत् अस्थिरता बहुत गंभीर थी । भावी मूल्य श्रृंखला की तुलना में, स्पॉट मूल्य श्रृंखला में सतत् अस्थिरता के उच्च स्तर को दर्शाया गया।

- आँकड़ों में उपस्थित अधिकतम विविधता को स्पष्ट करने के लिए अपेक्षित मॉलीक्यूलर मार्कर्स के संयोजनों एवं इष्टतम संख्या का निर्धारण एवं पहचान करने के लिए एक एल्गोरिथ्म विकसित किया गया । नमी स्ट्रेस, सबमर्जेन्स, खारापन, फ़सल के लिए ठण्डा एवं गर्मी, पशु, मछली, एवं सूक्ष्म जीव प्रजातियों जैसे विभिन्न ट्रेट्स के एबायोटिक स्ट्रेस रिलेटेड जीन्स पर जीनोमिक सीक्वेन्स सूचना की एक लाइब्रेरी तैयार की गयी । प्रजातियों में एबायोटिक स्ट्रेस टॉलरेन्स ट्रेट्स के लिए उत्तरदायी जीन्स के फाइलोजेनेटिक विश्लेषण का अध्ययन किया गया तथा संरचनात्मक विजुअलाइजेशन के माध्यम से संरक्षित क्षेत्रों के लिए तुलना की गयी । चावल के लिए कोर जर्मप्लाज्म के एकत्रिकरण पर एक डाटाबेस तैयार किया गया और ऑनलाइन प्रविष्टि प्रपत्र तैयार किये गये ।

- विभिन्न वाटर मार्किट्स के अन्तर्गत ग्राउण्ड वाटर मार्किट्स एवं महत्वपूर्ण फ़सलों की लागत एवं प्रतिदाय की संरचना एवं निर्धारकों के अध्ययन से ज्ञात होता है कि ग्राउण्ड वाटर मार्किट्स गंगा के उच्च, मध्यम एवं निम्न मैदानी इलाकों के इलेक्ट्रिक ट्यूबवेल कमांड वाले क्षेत्रों में सक्रिय रूप से कार्यरत हैं ।

- परमिसनेट तंत्र को पासपोर्ट सूचना, व्यक्ति विशेष का यूजरनेम एवं पासवर्ड, व्यक्ति विशेष को सूचना अद्यतन करने का अधिकार देना, मानवशक्ति नियोजन रिपोर्टों एवं मॉनीटरिंग रिपोर्टों का सुदृढ़ीकरण जैसे नये मॉड्यूल्स से समृद्ध किया गया । यद्यपि व्यक्ति विशेष द्वारा पासपोर्ट सम्बन्धित सूचना को सम्बन्धित नोडल अधिकारी से यूजरनेम एवं पासवर्ड की जानकारी लेकर अद्यतन किया जा सकता है ।

- शैक्षणिक सत्र 2009-10 से भा.कृ.अ.सं. के पी.जी. स्कूल में क्रियान्वित स्नातकोत्तर शिक्षा के लिए ऑनलाइन प्रबन्धन तंत्र को, पेन्डिंग वर्क स्टेटस, को प्रयोक्ता के होमपेज़ पर दर्शाना एवं ऑटो ई-मेल सुविधा के साथ सुदृढ़ बनाया गया । वर्तमान में, इस तंत्र में 522 छात्र तथा 503 संकाय सदस्य पंजीकृत हैं । इस तंत्र में 23 विषयों में 1126 पाठ्यक्रम सूचीबद्ध हैं ।

- ऑनलाइन विशेषज्ञ तंत्र के निर्माण के लिए एग्रिदक्ष विकसित किया गया । इसमें नॉलेज मॉडल क्रिएशन, ज्ञान प्राप्ति समस्या की पहचान, नॉलेज रिट्रिव करने, विशेषज्ञों से प्रश्न पूछने एवं प्रशासन के मॉड्यूल्स हैं । एग्रिदक्ष डोमेन विशेषज्ञों को, नॉलेज इन्जीनियर्स एवं प्रोग्रामर्स के कम से कम हस्तक्षेप से, उनकी फ़सल के ऑन लाइन विशेषज्ञ तंत्र को निर्माण करने में सक्षम बनाता है । मक्का एग्रिदक्ष प्रथम तंत्र है जो एग्रिदक्ष का प्रयोग करते हुए मक्का अनुसंधान निदेशालय, नई दिल्ली के सहयोग से विकसित किया गया । मक्का एग्रिदक्ष मक्के की फ़सल पर आई.सी.टी. आधारित सलाह उपलब्ध कराता है तथा इसमें विचार-विमर्श की सहायता से विशेषज्ञों के साथ इण्टरेक्ट किया जा सकता है। मक्का एग्रिदक्ष http://expert.iasri.res.in/agridaksh पर ऑन लाइन उपलब्ध है ।

- राष्ट्रीय बीज मसाला अनुसंधान केन्द्र, अजमेर के सहयोग से 04 प्रमुख तथा 06 गौण बीज मसालों की फ़सल प्रबन्धन के लिए 'बीज मसालों पर विशेषज्ञ तंत्र' विकसित किया गया । यह किस्म के चयन, खेत तैयार करने, उर्वरक डालने, सिंचाई की शिड्यूलिंग, कीट/रोगों/निमेटोड्स से पौध सुरक्षा के लिए विशेषज्ञ सलाह उपलब्ध कराता है । यह तंत्र http://iasri.res.in/expss पर उपलब्ध है ।

- भा.कृ.अ.प. का परियोजना सूचना एवं प्रबन्धन तंत्र जो http://pimsicar.iasri.res.in/ पर उपलब्ध है, को वेब सक्षम तंत्र के रूप में विकसित किया गया जो भा.कृ.अनु.प. के अन्तर विभागीय एवं विभागीय दोनों स्तरों पर अनुसंधान परियोजनाओं में डुप्लीकेशन को चेक करने में मदद करता है । अनुसंधान गतिविधियों के डुप्लीकेशन की पहचान करने में मदद करने के लिए, डुप्लीकेट डिटेक्शन मॉड्यूल के विकास के लिए ऑटो एक्स्ट्रैक्टेड कीवर्ड आधारित सर्च पद्धति का प्रयोग किया गया ।

- ऑन-लाइन इण्टरेक्टिव स्नातकोत्तर पाठ्यक्रमों की बढ़ती हुई मांग को पूरा करने के लिए एक ई-लर्निंग प्लेटफार्म 'ई-लर्निंग एग्रिकल्चर' विकसित किया गया एवं उसे कृषि विज्ञान के स्नातकोत्तर पाठ्यक्रमों के लिए क्रियान्वित किया गया । यह http://www.elearnagri.iasri.res.in/home पर उपलब्ध है। यह तंत्र कृषि शिक्षाविदों को उनके पाठ्यक्रम कण्टेन्ट्स ऑनलाइन उपलब्ध करने का अवसर प्रदान करता है ।

- पार्शियली बैलेंस्ड ब्लॉक अभिकल्पनाओं की सूची तैयार करने, संरचना करने एवं आँकड़ों के विश्लेषण के लिए क्लाईन्ट-सर्वर आर्किटेक्ट का उपयोग करते हुए एक वेब आधारित सॉफ्टवेयर तैयार किया गया ।

संस्थान के वैज्ञानिकों द्वारा राष्ट्रीय एवं अन्तरराष्ट्रीय स्तर के जर्नलों में कुल 49 शोध पत्र, 09 लोकप्रिय लेख, 02 पुस्तक अध्याय एवं 25 परियोजना/तकनीकी रिपोर्टें/संदर्भ मैनुअल्स प्रकाशित किये गये ।

राष्ट्रीय प्राध्यापक, डॉ. विनोद कुमार गुप्ता को भारतीय कृषि सांख्यिकी संस्था द्वारा 'सांख्यिकी भूषण' की प्रतिष्ठित उपाधि से सम्मानित किया गया । डॉ. विजय कुमार भाटिया एवं डॉ. राजेन्द्र प्रसाद 01 जनवरी 2011 से राष्ट्रीय कृषि विज्ञान अकादमी के फेलो चुने गये।

डॉ. राजेन्द्र प्रसाद को भारतीय कृषि सांख्यिकी संस्था द्वारा वर्ष 2009-10 के लिए 'प्रो. पी.वी. सुखात्मे स्वर्ण पदक' प्रदान किया गया ।

डॉ. रंजना अग्रवाल को वैज्ञानिक लेख 'मौसम चरों पर आधारित' फ़सलों का पूर्वानुमान' के लिए केन्द्रीय सचिवालय, हिन्दी परिषद् द्वारा अखिल भारतीय महिला विशेष पुरस्कार (2008-09) से पुरस्कृत किया गया ।

डॉ. अनिल कुमार को हाई-टेक बागबानी संस्था द्वारा युवा वैज्ञानिक पुरस्कार 2010 प्रदान किया गया ।

पाण्डिचेरी विश्वविद्यालय, पाण्डिचेरी में आयोजित 'इण्टरनेशनल कॉन्फेंस ऑन फाइनेन्शियल डेरीवेटिव्स' में एस.पी. भारद्वाज, एवं ए.के. वशिष्ट, द्वारा लिखित 'मार्किट एफिशियेन्सी इन कमोडिटी फ्यूचर्स - ए केस स्टडी' नामक शोध पत्र को रुपये 5000/- का श्रेष्ठ शोध पत्र पुरस्कार प्रदान किया गया । डॉ विजय कुमार भाटिया, डॉ लालमोहन भर, डॉ हुकुम चन्द, डॉ हिमाद्रि घोष, डॉ प्रज्ञेषु एवं डॉ रामासुब्रमण्यन को भारतीय कृषि सांख्यिकी संस्था द्वारा जर्नल ऑफ इण्डियन सोसायटी ऑफ एग्रीकल्चरल स्टेटिसटिक्स में 2009-10 के दौरान प्रकाशित श्रेष्ठ शोधपत्र पुरस्कार प्रदान किए गए।

डॉ विजय कुमार भाटिया एवं डॉ यू.सी. सूद को युगाण्डा में आयोजित कृषि सांख्यिकी पर पाँचवें अन्तरराष्ट्रीय सम्मेलन के लिए प्रतिनियुक्त किया गया। डॉ सुशीला कौल एवं श्रीमती संगीता आहुजा को क्रमश: टर्की एवं जर्मनी में आयोजित अन्तरराष्ट्रीय सम्मेलनों में शोधपत्र प्रस्तुत करने के लिए प्रतिनियुक्त किया गया। डॉ प्रज्ञेषु आगन्तुक अध्येता के रूप में नार्थ कैरोलिना विश्वविद्यालय, ग्रीन्सबोरो, यूएसए गये।

संस्थान के पाँच वैज्ञानिकों ने प्रौद्योगिकीय पूर्वानुमान, फ़सल विज्ञान जैव सूचना, पॉलिसी विश्लेषण के लिए मल्टीमार्किट मॉडलिंग एवं दूरसंवेदी एवं भौगोलिक सूचना तंत्र के प्रयोग पर राष्ट्रीय कृषि न्वोन्मेषी परियोजना के अन्तर्गत विदेशों में गहन प्रशिक्षण प्राप्त किया।

इस वर्ष निम्नलिखित 27 प्रशिक्षण कार्यक्रम आयोजित किये गये जिसमें 553 प्रतिभागियों को प्रशिक्षण दिया गया ।

- (i) दक्षेश राष्ट्रों के अधिकारियों के लिए भारत में कृषि सांख्यिकी प्रणाली (ii) येमेन के प्रतिभागियों के लिए खाद्य सुरक्षा के लिए पूर्व-चेतावनी तंत्र एवं (iii) एफ्रो-एशियन ग्रामीण विकास संगठन सदस्य राष्ट्रों के प्रतिभागियों के लिए कृषि सर्वेक्षण में सुदूर संवेदन एवं जी.आई.एस. का अनुप्रयोग पर तीन अन्तरराष्ट्रीय प्रशिक्षण कार्यक्रम ।

- उन्नत संकाय प्रशिक्षण केन्द्र के अन्तर्गत कृषि में सांख्यिकीय मॉडलिंग विषय पर एक 21 दिवसीय प्रशिक्षण कार्यक्रम ।

- कृषि में विशेषज्ञ तन्त्रों का विकास पर शीतकालीन स्कूल ।

- भारतीय सांख्यिकी सेवा (आई.एस.एस.) के XXXवें बैच के परिवीक्षाधीन अधिकारियों के लिए सांख्यिकीय पैकेजों से आँकड़ों का विश्लेषण विषय पर सी.एस.ओ. द्वारा प्रायोजित 24 दिवसीय प्रशिक्षण कार्यक्रम ।

- केन्द्रीय सांख्यिकी संगठन के सेवारत अधिकारियों एवं राज्य सरकारों/संघ शासित क्षेत्रों के वरिष्ठ अधिकारियों के लिए लघु क्षेत्र आकलन पर एक पुनश्चर्या प्रशिक्षण कार्यक्रम ।

- विभिन्न अनुसंधान परियोजनाओं के अन्तर्गत संचालित 16 प्रशिक्षण कार्यक्रम

  - एन.ए.आर.एस. के लिए सांख्यिकी संगणना के सुदृढ़ीकरण पर एन.ए.आई.पी. कन्सोर्टियम के अन्तर्गत 12 प्रशिक्षण कार्यक्रम (i) एस ए एस ई बी आई सर्वर के लिए एस ए एस प्लेटफार्म का प्रशासन प्रशिक्षण (ii) एस ए एस इन्स्टालेशन प्रशिक्षण (iii) एस ए एस : एक सिंहावलोकन (iv) एस ए एस जेनेटिक्स/JMP जीनोमिक्स (v) एस ए एस का प्रयोग करते हुए कृषिवानिकी परीक्षणों के आँकड़ों का विश्लेषण (vi) एस ए एस का प्रयोग करते हुए आँकड़ों के विश्लेषण पर शोधकर्ताओं के लिए 7 प्रशिक्षण कार्यक्रम।

- बायो प्रोस्पेक्टिंग ऑफ़ जीन्स ऐण्ड एलील माइनिंग फॉर एबॉयोटिक स्ट्रेस टोलरेन्स पर एन.ए.आई.पी. कन्सोर्टियम के अन्तर्गत 'सांख्यिकीय एवं संगणनात्मक जीनोमिक्स डाटा विश्लेषण' पर एक प्रशिक्षण कार्यक्रम ।
- V-PAGe पर एन.ए.आई.पी. कन्सोर्टियम के अन्तर्गत 'प्रौद्योगिकीय पूर्वानुमान पद्धतियों पर एक प्रशिक्षण कार्यक्रम।
- राष्ट्रीय कृषि जैवसूचना ग्रिड के अन्तर्गत कृषि अनुसंधान के लिए जैवसूचना संसाधन एवं साधनों पर दो प्रशिक्षण कार्यक्रम।

● भा.कृ.अनु.प. मुख्यालय के अधिकारियों के लिए तीन अन्य प्रशिक्षण कार्यक्रम, एक अंशकालिक – दो दिवसीय विशेष कम्प्यूटर प्रशिक्षण कार्यक्रम तथा दो पूर्णकालिक – दो दिवसीय विशेष कम्प्यूटर प्रशिक्षण कार्यक्रम आयोजित किये गये ।

● नेशनल काउन्सिल ऑफ़ एप्लाइड इकोनोमिक रिसर्च-सेन्टर फ़ॉर मैक्रो कन्ज्यूमर रिसर्च में समाजार्थिक अध्ययन हेतु अनुसंधान पद्धति पर एक प्रशिक्षण कार्यक्रम ।

● रिजाल्वेबल डिज़ाइन्स एवं डिज़ाइन रिसोर्सेस सर्वर पर एक यात्रा कार्यशाला एवं प्रशिक्षण चौधरी चरण सिंह कृषि विश्वविद्यालय, हिसार में आयोजित की गयी, जिसमें 50 सहभागी थे।

राष्ट्रीय कृषि अनुसंधान सांख्यिकीविदों के सोलहवें सम्मेलन का आयोजन किया गया ।

दो लाँच कार्यशालाएँ आयोजित की गयीं – (i) एन.ए.आर.एस. के लिए सांख्यिकीय संगणना के सुदृढ़ीकरण पर एन.ए.आई.पी. कन्सोर्टियम तथा (ii) राष्ट्रीय कृषि जैवसूचना ग्रिड ।

संस्थान द्वारा 20 अक्टूबर 2010 को प्रथम विश्व सांख्यिकी दिवस मनाया गया तथा इस अवसर पर एक संगोष्ठी आयोजित की गयी ।

भा.कृ.सां.अ.सं., नई दिल्ली; राष्ट्रीय कृषि अनुसंधान प्रबंधन अकादमी, हैदराबाद; जल अनुसंधान निदेशालय, भुवनेश्वर एवं केन्द्रीय कृषि अभियांत्रिकी संस्थान, भोपाल में भा.कृ.अनु.प. के संस्थानों के नोडल अधिकारियों के लिए PIMS-ICAR पर 04 सेंसीटाइजेशन प्रशिक्षण कार्यशालाएँ आयोजित की गयीं।

रा.कृ.वि.वि. के नोडल अधिकारियों के लिए भा.कृ.सां.अ.सं., नई दिल्ली एवं आनन्द कृषि विश्वविद्यालय, आनन्द में NISAGENET पर 03 सेंसीटाइजेशन प्रशिक्षण कार्यशालाएँ आयोजित की गयीं।

पाँच संगोष्ठियाँ आयोजित की गयीं – (i) एन.ए.आर.एस. की आर. ऐण्ड डी. दक्षता में सुधार लाने में भा.कृ.सां.अ.सं. की भूमिका (ii) भा.कृ.अनु.प. के प्राकृतिक संसाधन प्रबंधन विभाग के संस्थानों की आर. ऐण्ड डी. दक्षता में भा.कृ.सां.अ.सं. की भूमिका को बढ़ाना (iii) भा.कृ.अ.प. के पशु विज्ञान प्रभाग के साथ एन.ए.आर.एस. की अनुसंधान एवं विकास दक्षता को बढ़ाने में भा.कृ.सां.अ.सं. की भूमिका (iv) भा.कृ.अनु.प. में सूचना प्रोद्योगिकी के प्रयासों का समाकलन (v) भा.कृ.अनु.प. में सूचना एवं संचार प्रौद्योगिकी ।

संस्थान की शिक्षण एवं प्रशिक्षण सम्बन्धी गतिविधियाँ, जिनमें समस्त स्नातकोत्तर अध्यापन कार्यक्रमों का नियोजन, आयोजन एवं समन्वयन शामिल है, भारतीय कृषि अनुसंधान संस्थान के स्नातकोत्तर स्कूल के सहयोग से चलायी गयीं । इस वर्ष कुल 10 छात्रों {06 एम.एससी. (कृषि सांख्यिकी) एवं 04 एम.एससी. (संगणक अनुप्रयोग)} ने अपना डिग्री पाठ्यक्रम पूरा किया । 20 नये छात्रों {05 पीएच.डी. (कृषि सांख्यिकी), 09 एम.एससी. (कृषिसांख्यिकी) एवं 06 एम. एससी. (संगणक अनुप्रयोग)} को प्रवेश दिया गया ।

कृषि सांख्यिकी एवं संगणक में एक उच्च प्रमाण-पत्र पाठ्यक्रम आयोजित किया गया । इस प्रमाण-पत्र पाठ्यक्रम में भारत एवं श्रीलंका के 22 अधिकारियों ने सहभागिता की ।

हिन्दी को प्रोत्साहन देने के लिए संस्थान में एक 'शोध-पत्र-पोस्टर-प्रदर्शन प्रतियोगिता' आयोजित की गयी जिसमें हिन्दी पोस्टर तैयार करने में उल्लेखनीय योगदान देने वाले कर्मियों को पुरस्कृत किया गया ।

ORGANOGRAM
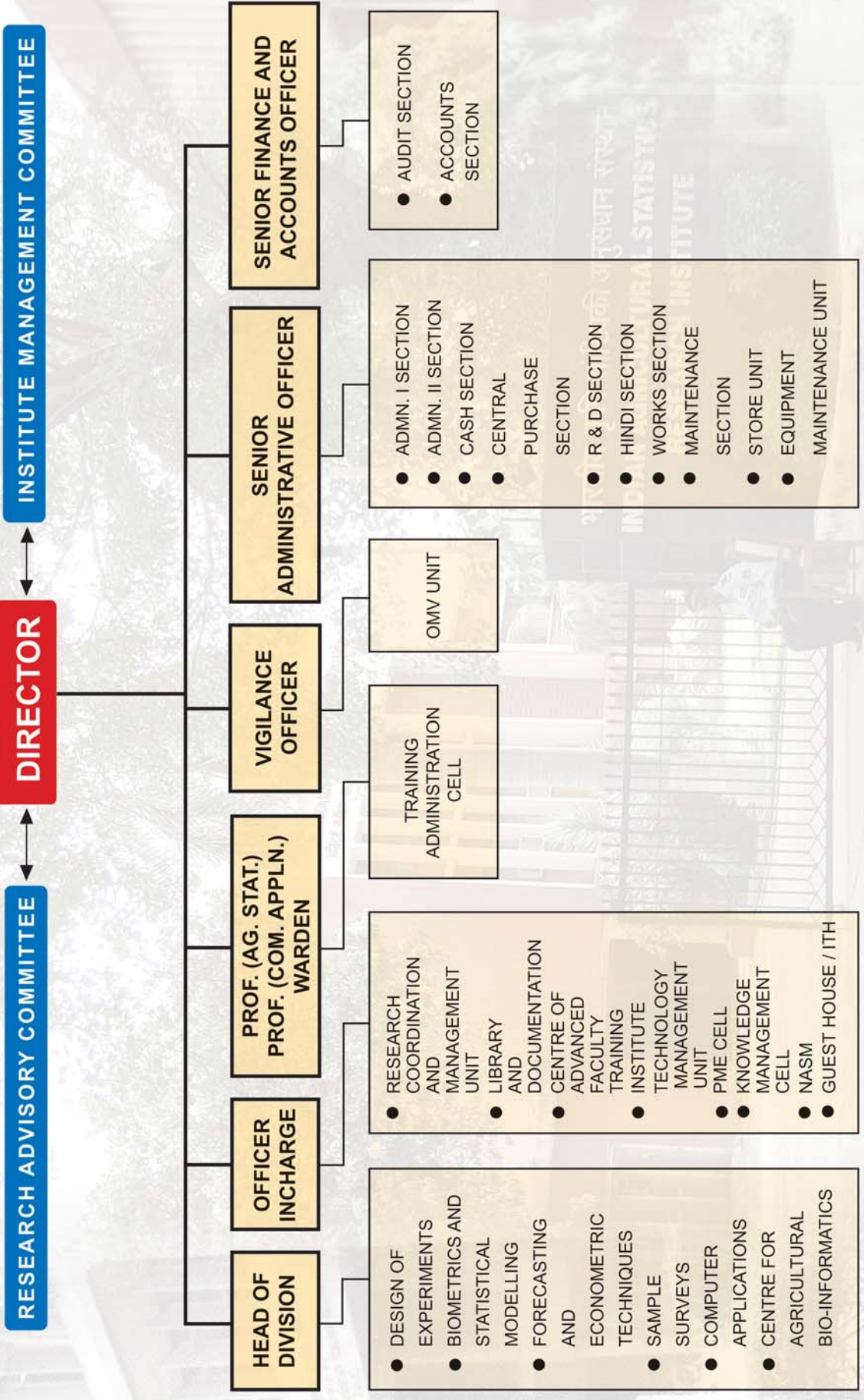
RESEARCH ADVISORY COMMITTEE

INSTITUTE MANAGEMENT COMMITTEE

DIRECTOR

HEAD OF DIVISION

- DESIGN OF EXPERIMENTS
- BIOMETRICS AND STATISTICAL MODELLING
- FORECASTING AND ECONOMETRIC TECHNIQUES
- SAMPLE SURVEYS
- COMPUTER APPLICATIONS
- CENTRE FOR AGRICULTURAL BIO-INFORMATICS

OFFICER INCHARGE

- RESEARCH COORDINATION AND MANAGEMENT UNIT
- LIBRARY AND DOCUMENTATION
- CENTRE OF ADVANCED FACULTY TRAINING
- INSTITUTE TECHNOLOGY MANAGEMENT UNIT
- PME CELL
- KNOWLEDGE MANAGEMENT CELL
- NASM
- GUEST HOUSE / ITH

PROF. (AG. STAT.) PROF. (COM. APPLN.) WARDEN

- TRAINING ADMINISTRATION CELL

VIGILANCE OFFICER

- OMV UNIT

SENIOR ADMINISTRATIVE OFFICER

- ADMN. I SECTION
- ADMN. II SECTION
- CASH SECTION
- CENTRAL PURCHASE SECTION
- R & D SECTION
- HINDI SECTION
- WORKS SECTION
- MAINTENANCE SECTION
- STORE UNIT
- EQUIPMENT MAINTENANCE UNIT

SENIOR FINANCE AND ACCOUNTS OFFICER

- AUDIT SECTION
- ACCOUNTS SECTION

Executive Summary

Indian Agricultural Statistics Research Institute (IASRI) established in 1959 as an Institute of Agricultural Research Statistics is mainly responsible for conducting research and education/training in Agricultural Statistics. With the advances in information technology, the Institute has adapted itself to the current needs of agricultural research. In the changed scenario, the mandate of the Institute is to undertake basic, applied and adaptive research in Agricultural Statistics, to conduct post graduate and in-service training courses in Agricultural Statistics and Computer Applications, to provide consultancy services, to act as a repository of information on Agricultural Statistics for research, to develop the Institute as an Advanced Centre of Excellence in education and training in Agricultural Statistics and Computer Applications and to liaise with other ICAR Institutes and SAUs, State Agricultural/ Animal Husbandry Departments, to assist in the development and strengthening of National Agricultural Statistics System and to undertake sponsored research and training of national and international organizations in these disciplines.

A number of research projects were undertaken during the year in different Divisions of the Institute namely Design of Experiments, Biometrics and Statistical Modeling, Forecasting and Econometrics Techniques, Sample Surveys, Computer Applications and Centre for Agricultural Bio-informatics [CABin]. Research was carried out under 46 research projects in the Institute, of which 01 National Professor Scheme, 22 Institute funded, 12 funded by other outside agencies and 11 in collaboration with other Institutes in various thrust areas. This year 11 projects were completed and 12 new projects were initiated.

The Institute has taken two major initiatives under NAIP, Strengthening Statistical Computing for NARS and Establishment of National Agricultural Bioinformatics Grid.

NAIP Consortium on Strengthening Statistical Computing for NARS (www.iasri.res.in/sscnars) has been initiated that targets

- At providing research guidance in statistical computing and computational statistics and creating sound and healthy statistical computing environment.

- To provide enabling statistical computing facilities to the researchers of NARS, a general purpose statistical software package has been procured with 151 licenses including one SAS Enterprise Business Intelligence Server for perpetual use with three years updates and upgrades.

- For capacity building of the researchers in the usage of high end statistical computing facility, 209 trainers have been trained through 30 working days training programmes on SAS: A Comprehensive Overview, 5 days programme on SAS Genetics/ JMP Genomics and 6 days training programme on Data Analysis Using SAS across 83 NARS organizations. 892 researchers of NARS (496 from ICAR Institutes and 396 from SAUs) have been trained through 43 training programmes of one

week duration each. This capacity building effort in the usage of high end statistical computing and statistical techniques has paved the way for publishing their research in high impact factor journals.

- For providing a service oriented computing to Indian NARS users, a Portal has been established which is available to NARS users through IP Authentication at http://stat.iasri.res.in:8080/sscnarsportal. Any researcher from Indian NARS may obtain User name and Password from Nodal Officers of their respective NARS organizations. Analysis of data generated from any block design (complete or incomplete) and split plot design is available on this portal.

In order to keep pace with the research and developments in agricultural bioinformatics at global level, another initiative has been taken for establishing National Agricultural Bioinformatics Grid (NABG) which in turn would help in developing databases, data warehouse, software and tools, algorithms, genome browsers and high-end computational facilities through systematic and integrated approach in the field of agricultural bioinformatics. Supercomputing facilities involving five different domain organizations, namely NBPGR, New Delhi; NBAGR, Karnal; NBFGR, Lucknow; NBAIM, Mau and NBAII, Bengaluru will be developed. This will be national facility which will provide computational framework to support biotechnological research in the country. NABG is also aimed for capacity building for research and development in agricultural bioinformatics.

Some other salient research achievements are:

- Generalized incomplete Trojan-type designs have been obtained for experiments where it is required to control two cross classified sources of variability in the experimental units and the number of treatments may be substantially larger than the number of replicates. A catalogue consisting of number of treatments (v) $\leq$ 30, number of rows (m), number of columns (n), cell size (k) and number of replications (r) has been prepared.

- Bioequivalence trials are conducted for evaluation of veterinary medical products. Efficient variance balanced designs for bioequivalence trials have been obtained and catalogued.

- Experiments with biological entities often involve application of a sequence of treatments to each experimental unit over varying periods of time and are conducted using crossover designs. An algorithm for obtaining efficient circular balanced or circular strongly balanced crossover designs using linear programming approach has been developed.

- Design Resources Server has been strengthened by adding new link on orthogonal arrays. The catalogues of block designs with factorial treatment structure in 3-replications for number of levels for any factor at most 12 and that of χ^2-optimal multi-level supersaturated designs (SSDs) and k-circulant multi-level SSDs have also been updated.

- Weighted A-optimal block designs for multiple parallel line assays have been obtained.

- Fertilizer Response Ratios (FRR) for rice-wheat crop sequence at NARP zone, State and National level have been obtained from the data of the experiment "Response of Nutrients" conducted at various regions of country at farmer's field during 1999-2000 to 2008-09. Eight fertilizer response ratios for different fertilizer combinations such as N, NP, NK, NPK over control, P over N and NK, K over N and NP have been worked out using data of 1406 trials across 6 states. FRR of NPK over control of rice crop varies from 6.96 kg/kg (Maharashtra) to 19.41 kg/kg (Bihar). In most of the states, FRR of NPK over control of rice crop is more than 12kg/kg except Maharashtra, Uttarakhand and Jharkhand. The fertilizer response ratios of wheat in rice-wheat crop sequence is at lower level than rice in almost all states.

- Developed sampling methodology for estimation of meat production in Meghalaya.

- Forewarning models for time of first appearance of powdery mildew on second flush have been developed using weather starting from 49th standard meteorological week (smw) i.e. first week of December. Maximum relative humidity, maximum temperature, wind speed and their interactions are found important in different models. Using these models earliest forecast can be obtained at 50th smw which can be subsequently revised.

- In the class of nonlinear time-series models, Exponential Autoregressive (EXPAR) models may be employed to describe those data sets that depict periodic fluctuations. Formulae for carrying out more than one-step ahead forecasts are developed

analytically using the concept of 'conditional expectations'. EXPAR model is illustrated for modelling and forecasting of Oil Sardine catches in Kerala.

- Linear combination weighted scoring, multidimensional scaling and analytical hierarchical process methods have been used for envisioning technologies/ prioritizing factors in rainfed agriculture from around 50 filled-in questionnaires from subject matter experts. The results revealed that stability of crops should be given highest research priority followed by early maturity, broad adoption, stress resistance and high yield potential in achieving high productivity in rainfed areas.

- Distance balanced sampling plans have the property that the second order inclusion probabilities are non-decreasing function of distance between two contiguous units and are useful for sampling from populations in which nearer units provide similar observations due to natural ordering of units in time or space. Several families of distance balance sampling plans have been obtained using linear integer programming.

- Study on future trading in mentha oil concludes that the two price series i.e. future and spot, becomes stationary at first difference. Persistent volatility is much severe in the financially disturbed years 2008 and 2009 as compared to the previous years. Spot price series showed higher level of persistent volatility as compared to future price series.

- Developed an algorithm to determine and identify optimum number and combination of molecular markers required for explaining the maximum diversity present in the data. Genomic sequence information on abiotic stress related genes of different traits, *viz.*, moisture stress, submergence, salinity, cold and heat for crop, animal, fish and microbe species has been collected and a library is created. Phylogenetic analysis of the genes responsible for abiotic stress tolerance traits across species has been studied and compared for conserved regions through structural visualization. A database on core collection of germplasm for rice has been designed and online entry forms are developed.

- The study of structure and determinants of groundwater markets, costs and returns for important crops under different water markets indicated that groundwater markets are actively

functioning in electric tubewell command areas in Upper, Middle and Lower-Gangetic plains.

- PERMIS*net*-II system has been enriched with new modules such as passport information, username and password for individual, updating rights to individuals, strengthening of manpower planning reports and monitoring reports. The passport information can, however, be updated by individual users after getting username and password from their respective nodal officers.

- Online mangement system for PG Education implemented in PG School, IARI from the academic year 2009-10, has been strengthened with Pending Work Status that appears on the home page of the user and auto generated e-mail facility. At present the system has 522 registered students and 503 faculty members. The system has 1126 courses listed in 23 disciplines.

- Developed AgriDaksh, a tool for building online expert system, that has modules on Knowledge Model Creation, Knowledge Acquisition, Problem Identification, Knowledge Retrieval, Ask Questions to Experts and Administration. AgriDaksh enables domain experts to build online expert system in their crops with minimal intervention of knowledge engineers and programmers. Maize AgriDaksh is the first system developed in collaboration with Directorate of Maize Research, New Delhi using AgriDaksh. Maize AgriDaksh provides ICT based advisories on Maize Crop and allows interaction with experts using Internet. Maize AgriDaksh is available online at http://expert.iasri.res.in/agridaksh.

- Developed Expert System on Seed Spices (EXPSS) for crop management of 4 major and 6 minor seed spices in collaboration with NRC Seed Spices, Ajmer. It provides expert advice on variety selection, field preparation, fertilizer application, schedule of irrigation, plant protection from pests/ diseases/nematodes. EXPSS is available at http://iasri.res.in/expss.

- Project Information and Management System of ICAR hosted at http://pimsicar.iasri.res.in/ has been developed as a web enabled system to help in taking decisions to check duplication in research projects both at divisional as well as inter divisional level of ICAR. Auto extracted keyword based search approach has been used for the development of the Duplicate Detection Module capable to assist

in identification of duplication of research activities at divisional and inter divisional level of ICAR.

- To fulfill the increasing demand of online interactive PG courses, an eLearning platform "eLearnAgriculture" has been designed and developed and implemented for the post graduate courses in Agriculture Sciences and is available at http://www.elearnagri.iasri.res.in/home. The system provides an opportunity to the agricultural educationists to create and link their course contents online.
- A web based software for cataloguing, generation and analysis of PBIB designs has been developed using client server architecture.

Scientists of the Institute published 49 research papers in National and International refereed Journals along with 09 popular articles, 02 book chapters and 25 projects/technical reports/reference manuals.

Dr. VK Gupta was conferred upon the prestigious title of Sankhyiki Bhushan by Indian Society of Agricultural Statistics. Dr. VK Bhatia and Dr. Rajender Parsad have been elected as Fellow of National Academy of Agricultural Sciences from 01 January 2011.

Dr. Rajender Parsad received Prof. PV Sukhatme Gold Medal Award for the year 2009-10 from Indian Society of Agricultural Statistics.

डॉ. रंजना अग्रवाल को वैज्ञानिक लेख 'मौसम चरों पर आधारित फ़सलों का पूर्वानुमान' के लिये केन्द्रीय सचिवालय हिन्दी परिषद् द्वारा अखिल भारतीय महिला विशेष पुरस्कार (2008–09) से पुरस्कृत किया गया ।

Dr. Anil Kumar received Young Scientist Award 2010 by the Hi-Tech Horticultural Society.

Research paper entitled Market efficiency in commodity futures - A case study by Bhardwaj, SP and Vasisht, AK received Best Paper Award of Rs. 5000/- at International Conference on Financial Derivatives held at Pondicherry University, Pondicherry.

Dr. VK Bhatia, Dr. Lalmohan Bhar, Dr. Hukum Chandra, Dr. Himadri Ghosh, Dr. Prajneshu and Dr. Ramasubramanian, received Best Paper Awards from the Indian Society of Agricultural Statistics for the papers published in Journal of Indian Society of Agricultural Statistics during 2009-10.

Dr. VK Bhatia and Dr. UC Sud were deputed to attend the V International Conference on Agricultural Statistics held at Kampala, Uganda. Dr. Sushila Kaul and Smt. Sangeeta Ahuja were deputed to present their papers in Turkey and Germany, respectively. Dr. Prajneshu visited University of North Carolina at Greensboro, USA as Visiting Scholar.

Five scientists of the Institute have undergone foreign training programme on Technology Forecasting, Crop Science Bioinformatics, Multimarket Modelling for Policy Analysis and Principles and Applications of Remote Sensing and GIS.

This year twenty seven training programmes were organized in which 553 participants were imparted training

- Three International training programme on (i) Agricultural Statistics System in India for the Officials of SAARC countries, (ii) Early Warning System for Food Security for the participants from Yemen and (iii) Application of Remote Sensing and GIS in Agricultural Surveys for the participants from Afro-Asian Rural Development Organization (AARDO) member countries.

- A twenty one days training programme under Centre of Advanced Faculty Training on Statistical Modeling in Agriculture.

- Winter School on Development of Expert Systems in Agriculture.

- CSO Sponsored 24 days training programme on Data Analysis with Statistical Packages for Indian Statistical Service (ISS) Probationers of XXX batch.

- A refresher training programme on Small Area Estimation for In-service ISS officers and senior officers of State Governments/Union Territories.

- Sixteen training programmes were conducted under various Research Projects

  – Twelve training programmes under NAIP Consortium on Strengthening Statistical Computing for NARS (i) SAS Platform Administration training for SAS EBI Server (ii) SAS Installation training (iii) SAS: A Comprehensive Overview (iv) SAS Genetics/ JMP Genomics (v) Data Analysis of Agroforstry Experiments using SAS (vi) Seven training programmes for researchers' on Data Analysis Using SAS

– One training programme on Statistical and Computational Genomics Data Analysis under NAIP Consortium on Bio-prospecting of Genes and Allele Mining for Abiotic Stress Tolerance

– One training programme on Technological Forecasting Methodologies under NAIP Consortium on V-PAGe

– Two training programmes on Bioinformatics Resources and Tools for Agricultural Research under National Agricultural Bioinformatics Grid

– One training programme on Research Methodology for Socio-Economic Studies at National Council of Applied Economic Research Centre for Macro Consumer Research

– Three other training programmes, one part time two days special computer training programme and two full time two days special computer training programme for the officials of ICAR Hqrs

A travel workshop on Resolvable Designs and Design Resources Server was organised and attended by 50 participants at CCSHAU, Hisar.

XVI National Conference of Agricultural Research Statisticians was organised.

Two launch workshops of (i) NAIP Consortium on Strengthening Statistical Computing for NARS and (ii) National Agricultural Bioinformatics Grid (NABG) were organised.

Institute celebrated the first World Statistics Day on 20 October 2010 and organized a symposium on Statistics in Agricultural Development.

Four sensitization cum training workshops on PIMS-ICAR for the Nodal Officers of ICAR Institute were organised at IASRI, New Delhi; NAARM, Hyderabad; DWM, Bhubneshwar and CIAE, Bhopal.

Three sensitization cum training workshops on NISAGENET for the Nodal Officers of SAU's were organised at IASRI, New Delhi and AAU, Anand.

Five Interactive meets on (i) Role of IASRI in Improving R&D Efficacy of NARS (ii) Enhancing the Role of IASRI in R&D Efficacy of ICAR Institutions of NRM Division (iii) Role of IASRI in Enhancing R&D Efficacy of NARS with Animal Science Division of ICAR (iv) Integration of IT Efforts in the ICAR (v) Information and Communication Technology in ICAR were organised.

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 10 students, {06 M.Sc. (Agricultural Statistics) and 04 M.Sc. (Computer Application)} completed their degrees. 20 new students {05 Ph.D. (Agricultural Statistics), 09 M.Sc. (Agricultural Statistics) and 06 M.Sc. (Computer Application)} were admitted.

A Senior Certificate Course in Agricultural Statistics and Computing was organised. 22 officials from India and Sri Lanka participated in this Certificate Course.

To promote Hindi, a poster presentation was organized at the Institute and awards were distributed for the outstanding performances.

2

Introduction

Indian Agricultural Statistics Research Institute (IASRI) has been and continues to be a premier Institute of the Indian Council of Agricultural Research (ICAR) with glorious tradition of carrying out research, teaching and training in the areas of *Agricultural Statistics* and *Informatics*. Recognizing the importance of research and education in Agricultural Statistics way back in 1930, the then Imperial Council of Agricultural Research established a small *Statistical Section* to assist the State Departments of Agriculture and Animal Husbandry in planning and designing their experiments, analysis of experimental data, interpretation of results, and also rendering advice on the formulation of the technical programmes and examining the progress reports of the schemes funded by the Council. The activities of the Section increased rapidly with the appointment of Dr. PV Sukhatme as Statistician to the Council in 1940 and studies were initiated for developing objective and reliable methods for collecting yield statistics of principal food crops. The efficiency and practicability of these methods was demonstrated in different States for estimating crop yield. As a result, in the course of a few years, the method was extended practically to the entire country to cover all principal food and non-food crops. Research in sampling theory and training of field staff and statistical staff were the activities initiated in this period resulting in the re-organization of the Statistical Section into a *Statistical Branch* in 1945 with appropriate expansion in its strength. The designation of Statistician was changed to Statistical Advisor. The Statistical Branch was renamed as *Statistical Wing* in

1949. The Statistical Wing soon acquired International recognition as a centre for research and training in the field of Agricultural Statistics. During 1952 on the recommendations of two FAO experts, Dr. Frank Yates and Dr. DJ Finney, who visited the Council on the invitation of the Government of India, activities of the Statistical Wing were further expanded and diversified. Subsequently, in recognition of its important role as a training and research institution, the Statistical Wing was re-designated as the *Institute of Agricultural Research Statistics* (IARS) on 02 July 1959. In April 1970, the Institute was declared as a full-fledged Institute in the ICAR system and is since then headed by a Director. On 01 January 1978 the name of the Institute was changed to *Indian Agricultural Statistics Research Institute* (IASRI) emphasizing the role of 'Agricultural Statistics' as a full-fledged discipline by itself.

The Goal of the Institute is to conduct research, education and training in Agricultural Statistics and Computer Applications in Agriculture. 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 Computer Applications so that these efforts culminate into improved quality of agricultural research and also meet 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 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 organisations 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. IASRI has conducted basic and original research on many topics of interest and has published number of papers in national and international journals of repute. IASRI has been providing and continues to provide support to the NARS by way of analyzing voluminous data using advanced and appropriate analytical techniques. IASRI has also been very actively pursuing advisory services that has enabled the Institute to enrich the quality of agricultural research in the NARS. Through its advisory, IASRI 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, 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. 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 (ISS) for livestock product estimation, fruits and vegetable 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 was 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, 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. Sampling methodology for estimation of post harvest losses has been successfully adopted in AICRP on Post Harvest Technology for assessment of post harvest losses of crops/commodities.

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 food grain production, aphid population, marine fish production, etc. The methodology developed for forecasting based on weather variables and agricultural inputs was 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 were 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, multi-dimensional data cubes developed and published in the form of on-line 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) was 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.

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
– Statistical Package for Animal Breeding (SPAB) 2.1

A total of 320 Statistical packages have been sold out since their release, which includes 157 SPAR 2.0, 46 SPAD, 49 SPFE 1.0, 28 SPAB 2.0, 36 SPBD Release 1.0 and 04 SSDA 1.0, out of which 47 Statistical packages including 31 SPAR 2.0, 01 SPBD Release 1.0, 04 SPFE 1.0, 07 SPAD, 02 SSDA 1.0 and 02 SPAB 2.0 have been sold during the period under report.

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.

Achievements in Human Resource Development

The 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. 80 participants have completed both modules, 31 have completed module-I and 21 have completed module-II since 1997.

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 an 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 176 Ph.D. and 298 M.Sc. students in Agricultural Statistics and 93 M.Sc. students in Computer Application. A new degree course M.Sc. in Agricultural Bioinformatics would begin 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 45 training programmes have been organised under the aegis of CAS/CAFT. In all a total of 805 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 Indian Council of Forestry Research, 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. One such training programme was organized for research personnel of E.I. DuPont Pvt. Ltd. The Institute has also conducted training programmes for the scientists/research personnel of CGIAR organizations such as ICARDA and Rice-Wheat Consortium for Indo-Gangetic plains. 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. had 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 created in the Institute. The laboratory was 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 with the funds received through two AP Cess Fund 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 created 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 cores 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 (DPL). 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, JMP 8.0, JMP Genomics 4.0, SAS BI Server 4.2, 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, two Units and three Cells to undertake research, training, consultancy, documentation and dissemination of scientific output.
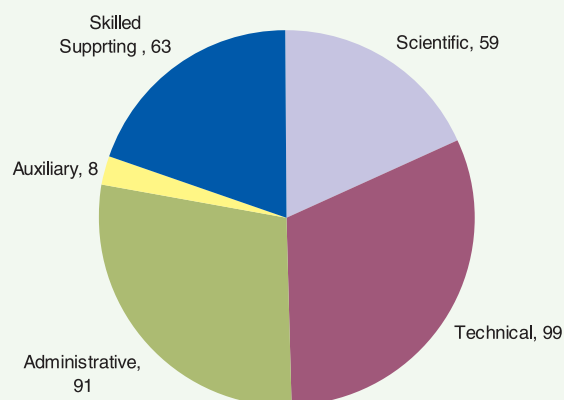
Divisions

- Design of Experiments
- Biometrics
- Forecasting Techniques
- Sample Survey
- Econometrics
- Computer Applications

The Council vide Office Order No.5(9)/2010-IA-II(AE) dated 02 August 2010 has made following changes in the Divisions at IASRI w.e.f. 02 August 2010.

- The Division of Biometrics is renamed as Division of Biometrics and Statistical Modelling.
- The mandate and activities of Division of Forecasting Techniques and Division of Econometrics are merged to form Division of Forecasting and EconometricsTechniques.
- A new centre namely Centre for Agricultural Bio-informatics [CABin] has been created with the status of a Division at IASRI, New Delhi.

Staff Position (as on 31 March 2011)

Manpower	No. of posts sanctioned	No. of posts filled
Director	1	1
Scientific	130	58
Technical	219	99
Administrative	84	91
Auxiliary	14	8
Skilled Supporting	80	63
Total	**528**	**320**

Staff Strength in Position as on 31 March 2011

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The Council has also accorded approval for re-designing the post of the Head of Division of Econometrics and filling as Head, Centre for Agricultural Bio-informatics.

Now the Six Divisions at the Institute are

1. Design of Experiments
2. Biometrics and Statistical Modelling
3. Forecasting and Econometrics Techniques
4. Sample Surveys
5. Computer Applications
6. Centre for Agricultural Bio-informatics [CABin]

Units

* Research Co-ordination and Management Unit (RCMU)
* Institute Technology Management Unit (ITMU)

Cells

* Training Administration Cell (TAC)
* Consultancy Processing Cell (CPC)
* Planning, Monitoring and Evaluation (PME) Cell

Financial Statement

The Standing Finance Committee had approved the XI Plan Budget of the Institute. The total outlay of Rs. 1200 lakhs was sanctioned under the XI Plan budget of the Institute.

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 (2010–11)

(Rupees in Lakhs)

Head of Account	Allocation		Expenditure	
	Plan	Non-Plan	Plan	Non-Plan
Pay & Allowances	0.00	1981.08	0.00	1838.69
TA	6.50	4.00	6.49	4.00
OTA	0.00	1.00	0.00	0.53
HRD/Fellowship	1.50	33.50	1.31	31.87
Contingencies	80.00	368.56	79.10	332.91
Equipments	5.00	2.00	4.99	1.86
Furniture	0.00	0.00	0.00	0.00
Works	27.00	34.71	26.93	34.58
Library	30.00	0.00	29.85	0.00
Total	**150.00**	**2424.85**	**148.67**	**2244.44**

Expert System on Seed Spices

HOME   PROJECT DETAILS   IASRI   NRCSS   CONTACT US

GENERAL INFORMATION

Helping Farmers Worldwide

Introduction
History
Medicinal Value
Export Potential
Value Addition
Current Trends
New Horizons
Site Map

Please Select Crop

--Select your crop--

Proceed

EXPSS is a web based Expert System developed on Seed Spices. It provides the complete information about Seed Spices Production Management in the country. The System covers altogether 10 Seed Spices namely Ajwain,Anise,Caraway,Cumin,Celery,Coriander,Dil,Fennel,Fenugreek, , Nigella.

It advises farmers of Seed Spice on varieties on the basis of area, cultural and climatic conditions and other characteristics of farmer's interest. It also suggests the appropriate cultural practices, like field preparation, fertilizer

Maize

Home | Introduction | Design Technique | About Us | Help | Contact Us

Partner Institute

IASRI
DMR

Maize Technology

Introduction
Production Technology
Seed Production Tech.
Value Addition in Maize
Success Story
Crop Protection
Problem Identification

Queries & Solutions

Feedback / Ask Question?
Expert Response..

The Expert System for Maize Crop emulates the interaction a user might have with a human expert to solve a problem. It is meant to enhance the efficiency of farmers or Agricultural Extension personnel for maize crop management and to increase the crop yield. It determines the best strategy for irrigating, applying fertilizer and insecticides. Presently, it has four subsystems: Variety Selection, Cultural Practices, Disease Diagnosis, Insect Identification, and Post Harvest Technology. The Variety Selection subsystem advises location specific varieties and Cultural Practices advises on the aspects of irrigating, application of fertilizers and insecticides. Disease Diagnosis and Insect Identification subsystems help the stake-holders to diagnoses the disease and to identify insects affecting the maize crop and suggest preventive and control measures. Post Harvest Technology subsystem deals with storage and processing of maize for developing value added products.

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Select State

Select District

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Ask Your Questions to Maize
Experts
Feedback

3

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 Computer Application 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

Generalized Row-Column Designs for Agricultural Experiments

For the experimental situations in which experimental units have two cross classified sources of heterogeneity and the number of treatments is substantially larger than the number of replicates, row-column designs with each cell corresponding to the intersection of row and column containing more than one treatment can usefully be employed. Generalized incomplete Trojan-type designs have been defined for this situation. Some series of generalized incomplete Trojan-type designs with equal/unequal cell sizes have been developed. These designs are balanced/ partially balanced with respect to variance of estimates of elementary treatment contrasts. There is flexibility in choosing the cell size of these designs depending on the experimental resources available. A catalogue consisting of number of treatments (v), number of rows (m), number of columns (n), cell size (k) and number of replications (r) has been prepared for $v \leq 30$. The catalogue also contains average variance pertaining to the estimation of elementary treatment contrasts and the efficiency factor of these designs in comparison to an orthogonal design having the same number of treatments and same number of replications. The experimenter can use this catalogue as a ready reference while selecting an appropriate design for a given situation. The cell contents of generalized Trojan-type designs can be used to obtain the sample crosses in mating plans, like partial diallel/ triallel cross plans. The plans obtained from such designs are uniquely determined as the cell contents are unique and non-repetitive.

Designs for Bioequivalence Trials

Bioequivalence is defined as the degree to which clinically important outcomes after receiving a new formulation (test) of a drug resemble those of a previously well established formulation called standard or control or reference. Bioequivalence trials are conducted for evaluation of veterinary medical products. Crossover balanced for residual effects are the most recommended experimental designs for these trials. However, in bioequivalence trials, the experimenters are not interested in all pairwise comparisons among direct effects and among residual effects of formulations, but are interested in test versus reference formulation comparisons of direct as well as residual effects. A class of variance balanced crossover designs with complete sequences has been developed for such experimental situations. Besides, a class of partially variance balanced crossover designs with incomplete sequences has also been obtained. These designs can be advantageously used in situations wherein the number of available periods is less than the number of formulations.

Crossover Designs Using Linear Integer Programming

Experiments with biological entities often involve application of a sequence of treatments to each experimental unit over varying periods of time are conducted using crossover designs. These designs are used advantageously in animal nutrition experiments, long term agricultural field experiments, bioequivalence trials sensory evaluation of food products, weather modification experiments, etc. The distinguishing feature of such an experiment is that any treatment applied to a unit in a certain period influences the responses of the unit not only in the period of its application but also leaves residual effects in the succeeding periods. These residual effects or carryover effects may be of different magnitudes. Balanced crossover designs are useful for these experimental situations. Linear integer programming approach has been developed for generating sequence of treatments to be assigned to the units. Using this approach, cyclic circular balanced and cyclic circular strongly balanced crossover designs for $v < 30$, $p < 5$ and $\lambda \leq 4$ $\lambda* \leq 4$, $p < v$ with $n\lambda \leq 100$ or have been generated and catalogued, where v is the number of treatments, p is the number of periods, n is number of units and $\lambda (\lambda*)$ refers to number of times each treatment is preceded by every other treatment excluding itself (including itself) depending on whether it is circular balanced or circular strongly balanced. The designs obtained are uniform over periods and universally optimal over the class of all connected designs with fixed number of treatments, number of periods and number of sequences.

Supersaturated Designs

A Supersaturated Design (SSD) is a fractional factorial plan whose run size is insufficient for estimating all the main effects represented by the design matrix. These designs are useful because of their run size economy.

A new method of constructing multi-level SSDs based on the association between the rows of the design has been developed. An algorithm has been developed for construction of such designs. The designs constructed by this method are both f_{NOD}- optimal and χ^2- optimal. A catalogue of 11 optimal multi-level supersaturated designs is also prepared. Another method of constructing optimal mixed-level SSDs by juxtaposing mixed orthogonal arrays of strength two with uniform designs has been given. Mathematical expression for $E(f_{NOD})$ and $E(\chi^2)$ criteria and their lower bound have been obtained for these designs by exploiting the combinatorial properties of mixed orthogonal arrays and uniform designs.

Supersaturated designs generated through k-cyclic generators are called k-circulant SSDs and can be constructed by cycling k elements of a generator. An algorithm to construct efficient balanced mixed-level k-circulant supersaturated designs with m factors and n runs has been developed. Using the proposed algorithm many mixed-level, balanced supersaturated designs are constructed and catalogued. A list of many optimal and near optimal, mixed-level supersaturated designs is also provided for $m \leq 60$.

Design Resources Server

For dissemination of research in Design of Experiments, Design Resources Server (www.iasri.res.in/design) has been further strengthened through adding new link on orthogonal arrays. The details for this link are:

- **Mixed Orthogonal Arrays and their Usefulness**
  Orthogonal Arrays (OAs) are useful in agricultural, biological, industrial research and also in quality control. OAs and Mixed Orthogonal Arrays (MOAs) have been used extensively in planning

experiments, particularly generating fractional factorial plans for symmetric and asymmetric factorial experiments. The rows of the array represent the experiments or tests to be performed or runs or treatment combinations in factorial experiments. The columns of the orthogonal array correspond to the different variables (factors) whose effects are being analyzed. The entries in the array specify the levels at which the variables are to be applied. Since the rows of an orthogonal array represent runs (or tests or samples) - which require money, time, and other resources - there are always practical constraints on the number of rows that can be used in an experiment. Finding the smallest possible number of rows is a problem of eminent importance. On the other hand, for a given number of runs, one may like to know the largest number of columns that can be used in an orthogonal array, since this will yield information that how many factors can be studied. It is also desired that the strength should be large, though in many real-life applications this is set at 2, 3 or 4. Another interesting application of MOAs is in variance estimation of a non-linear statistic from a large scale complex survey data. Special forms of OAs have found applications in computer experiments, computer science and cryptography.

A new link on 'Orthogonal Arrays' has been initiated on Design Resources Server and is available at http://www.iasri.res.in/design/Oarray/oa/default.htm. The link contains definitions of OAs, MOAs, resolvable OAs, resolvable MOAs, method of construction of 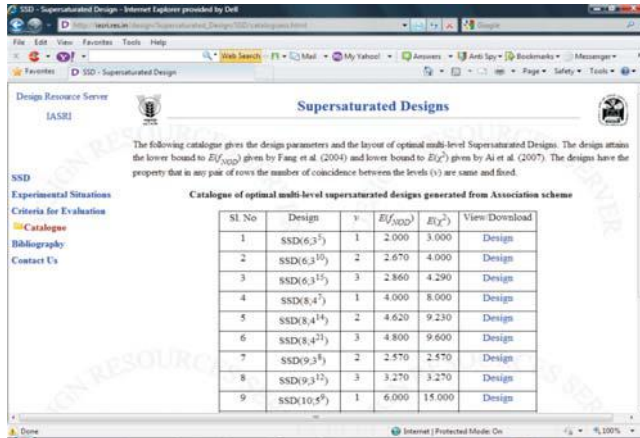orthogonal arrays, procedure of orthogonal blocking in orthogonal arrays and bibliography on orthogonal arrays. One can generate orthogonal arrays of strength two, resolvable orthogonal arrays of strength two and the orthogonal blocking of resolvable orthogonal arrays for $4 \leq n(\# \text{Runs}) \leq 144$ from this link. Some screen shots for MOAs are given below:
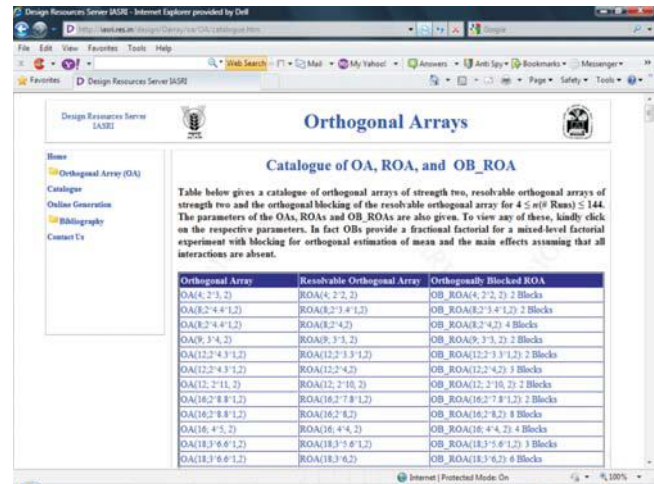
- **Updation of Catalogues**

Design Resources Server has also been strengthened by updating the catalogues of resolvable block designs with factorial treatment structure in 3-replications for number of levels for any factor at most 12 and that of χ^2-optimal multi-level supersaturated designs (SSDs) and *k*-circulant multi-level SSDs. Some screen shots are given as below:

- **Usage of the Server**

  The server has a facility of "Ask a Question" through which a lot of questions are being received and answered. The server is registered under Google Analytics on 26 May 2008. During 26 May 2008 to 31 March 2011, Google Analytics gave 19948 page views and usage through 997 cities across 107 countries in 6 continents. During 01 April 2010 to 31 March 2011, Google Analytics gave 9566 page views and usage through 471 cities across 88 countries in 6 continents.

Multiple Parallel Line and Slope Ratio Assays

Biological assays (bioassays) are a set of techniques relevant to the comparisons between the strength of alternative but similar biological stimuli (a pesticide, a fungicide, a drug, a vitamin, plant extract, etc.) based on the response produced by them on the subjects (e.g., an animal, a piece of animal tissue, a plant, a bacterial culture, subhuman primates or humans, living tissues, plants or isolated organisms, insects, etc.). In many practical bioassays, the experimenter may be interested in comparing several test preparations with a single standard preparation. In multiple parallel line assays with one standard and several tests, it is indeed possible that several tests have different importance and hence the comparisons of the tests with the standard may be made with different precision. Therefore, weighted A-optimality criterion has been developed for multiple parallel line assays. The criterion considers the weighted sum of variances of the best linear unbiased estimates of the contrasts of interest for two different situations. In the first case the weights are given to three parameters of interest according to

their relative importance without distinguishing between the several tests and in the second case the weights are given to different tests according to their relative importance assuming that all the three contrasts are equally important. Designs have been generated using this criterion. A necessary and sufficient condition has been derived for the existence of block designs for two-test preparations slope ratio assay that enable estimation of blank and intersection contrasts free from block effects. Using this condition, a general method of construction of designs has been obtained. A catalogue of designs generated has been prepared. Further, weighted A-optimality criterion has been developed to obtain optimal designs by giving different weights to contrasts corresponding to different test preparations. Some optimal designs are obtained for two test preparations slope ratio assay using this criterion and considering some specific values of the weights.

Experiments Planned On Stations under the Project Directorate for Farming Systems Research

Four types of research programmes viz. (i) development of new cropping systems; (ii) nutrient management in cropping systems; (iii) development of system based management practices and (iv) maximum yield research were planned and conducted at 37 On Station Research Centres of AICRP on Integrated Farming Systems. These experiments are conducted using Randomized Complete Block (RCB) design, Factorial RCB design, and $3^2 \times 2$ balanced confounded factorial experiments.

Data of 335 experiments conducted during the year 2008-09 have been received and analysis work for all the experiments has been completed. Results have been tabulated in the form of summary tables and have been sent to the respective scientist-in-charge of the cooperating centres. The final tables of the results of the experiments have been sent to PDFSR, Modipuram for inclusion in the project report of AICRP on IFS.

Out of 310 experiments conducted during the year 2009-10, statistical analysis of 210 experiments has been completed and for rest of the experiments work is in progress.

Testing of data entry and analysis modules of Experiment 1a (Intensification/ Diversification of cropping sequence based on high value crops) has been carried out. Some screen shots for analysis module are:

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 2009-10 at 32 ON FARM centres under the Project Directorate of Farming Systems and Research, Modipuram during 2009-10. The data of 75 experiments conducted at 1546 farmers at 17 ON FARM centres of three types were processed for statistical analysis. Distribution of percent coefficient of variation (CV) of 256 experiments conducted during 2008-09 is obtained. It is observed that 48% of the experiments have CV less than 5% and 36% of the experiments have CV in the range of 5% to 10%. Only 11% of the experiments have CV more than 15%. On-line testing of data entry and analysis modules of Experiment-1 (Response of Nutrients) has been carried out for data of 17 On Farm centres. Some screen shots for analysis module are:

Fertilizer Response Ratios for Rice-Wheat Crop Sequence

Fertilizer Response Ratios (FRR) for Rice-Wheat crop sequence at NARP zone, State and National level have been obtained from the data of the experiment "Response of Nutrients" conducted at various regions of country at farmers' field during 1999-2000 to 2008-09. Eight fertilizer response ratios for different fertilizer combinations such as N, NP, NK, NPK over control, P over N and NK, K over N and NP have been worked out using data of 1406 trials across 6 states. FRR for Rice-Wheat cropping sequence of NPK over control of rice crop varies from 19.41 kg/kg (Bihar) to 6.96 kg/kg (Maharashtra). In most of the states, FRR of NPK over control of rice crop lies above 12kg/kg except Maharashtra, Uttrakhand and Jharkhand. The fertilizer response ratios of wheat in Rice-Wheat cropping sequence is at lower level than rice in almost all states.

State-wise Fertilizer Response Ratios for Rice (Kh: Kharif) –Wheat (Rb: Rabi) Cropping System

State	Season	Recommended Fertilizer	Average Response Ratio (kg/kg)							
		N-P-K(kg/ha)	N	NP	NK	NPK	P Over		K Over	
							N	NK	N	NP
			Over Control							
Bihar	Kh	80-40-20	14.31	16.92	17.52	19.41	22.12	24.14	30.32	34.36
	Rb	120-60-40	8.81	10.06	9.39	10.86	12.57	14.79	11.12	14.46
Gujarat	Kh	100-40-45	14.03	15.36	13.34	13.06	20.36	13.03	12.08	6.06
	Rb	120-60-40	10.12	11.20	10.39	10.13	13.37	9.35	11.70	6.02
Haryana	Kh	150-60-60	22.04	17.75	16.48	14.53	7.01	7.69	2.57	3.25
	Rb	140-60-60	17.17	13.93	13.01	11.63	5.90	6.84	2.69	3.62
J&K	Kh	120-60-30	10.49	12.13	10.49	13.53	15.41	21.12	10.52	21.94
	Rb	90-45-25	8.05	8.97	8.56	9.99	10.82	13.57	10.61	16.11
M.P.	Kh	100-50-50	7.28	14.02	6.87	12.58	25.95	26.63	5.88	6.91
	Rb	120-60-40	7.23	11.03	6.64	10.35	17.51	19.22	5.30	7.86
Maharashtra	Kh	100-60-50	4.83	5.86	4.33	6.96	7.92	14.83	3.33	10.25
	Rb	100-50-50	4.38	5.89	4.42	5.58	8.92	9.08	4.50	4.67
Orissa	Kh	60-30-30	14.74	17.86	16.96	17.48	24.10	19.01	21.41	16.31
	Rb	80-50-40	7.43	7.97	8.53	7.39	8.84	4.64	10.75	5.50
Punjab	Kh	120-30-30	13.29	14.16	11.77	14.57	17.62	28.57	5.69	16.64
	Rb	120-60-30	11.04	10.75	11.12	11.30	10.15	11.75	11.43	14.63
U.P.	Kh	100-50-50	10.61	12.09	10.06	12.16	15.04	18.06	9.23	12.88
	Rb	120-60-40	8.29	9.45	8.11	9.74	11.78	14.07	7.58	11.01
Uttrakhand	Kh	150-60-40	5.97	8.30	7.37	9.38	14.13	15.75	12.62	15.05
	Rb	150-60-40	6.05	8.83	7.93	9.22	15.77	13.33	14.98	11.31
Jharkhand	Kh	100-50-25	5.40	9.08	7.79	10.92	16.77	18.98	17.23	21.88
	Rb	100-50-26	3.86	9.22	7.48	11.40	20.22	21.48	21.86	24.27
Chattisgarh	Kh	100-60-40	11.43	13.05	9.93	12.09	15.77	17.13	6.19	8.24
	Rb	90-60-40	11.20	14.23	9.55	12.64	19.28	19.83	5.44	6.25

N: Nitrogen; P: Phosphorus; K: Potassium

Planning, Designing and Analysis of Data relating to Experiments conducted under AICRP on Long Term Fertilizer Experiments

Under the AICRP on Long Term Fertilizer Experiments, experiments are being conducted to monitor the changes in soil properties and yield responses due to continuous application of plant nutrient inputs through fertilizers and organic sources. Cropping systems with special emphasis on cereals, oil seeds and as per the needs of different co-systems are being followed. Out of 17 centres, 6 are based on rice, 4 on maize, 2 on finger millet, 3 on soybean and one each on groundnut and hybrid sorghum respectively. Statistical analysis of data relating to various crop wise characters viz. (i)yield: grain and straw (ii) plant nutrients concentration/ uptake forgrain and straw separately and (iii) available soil nutrients after the completion of each crop cycle at the soil depth of 0-15 cms received from15 cooperating centres for the year 2008-09 (kharif and rabi) has been 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 Bangaluru (4 bifurcated treatments, each with 3 superimposed treatments) have been statistically analysed using the nested model to explore the possibility to utilize the build up of P and to overcome the decline in yield due to inadequate supply of K or other nutrients like Zinc (Zn) and Sulphur (S).

Agricultural Field Experiments Information System (AFEIS)

AFEIS is a Web-enabled information system (http://js.iasri.res.in/afeis or http://iasri.res.in:8080/afeis) wherein information relating to agricultural field experiments (excluding purely varietal trials) conducted in the country are stored and maintained on-line. AFEIS is an on-line digital research data repository. It aims at

bringing the results and ancillary information of Agricultural Field Experiments conducted in NARS at a central place, in compatible form through collecting experimental data from various organizations engaged in agricultural research; storing information in a centralized database providing a facility to search and access data to aid in furtherance of their research work; providing users with on-line reporting and analysis of experimental data and serving as reference material for scientists, research managers and other researchers working in the field of agricultural sciences. The home page of the information system is
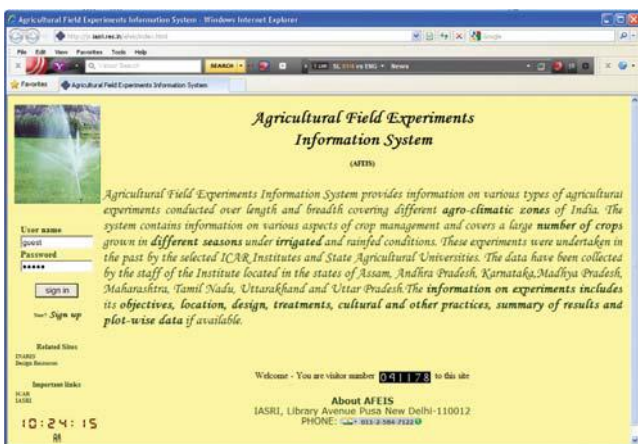
During 2010-11, data relating to 1613 experiments have been entered on-line both by regional staff and outsourcing agency. Presently the system has information relating to about 30693 experiments. Crop wise distribution of experiments depicted below reveals that maximum numbers of experiments are available for paddy crop (21%) followed by wheat (11%), sugarcane (7%), groundnut (6%) and cotton (5%) etc.
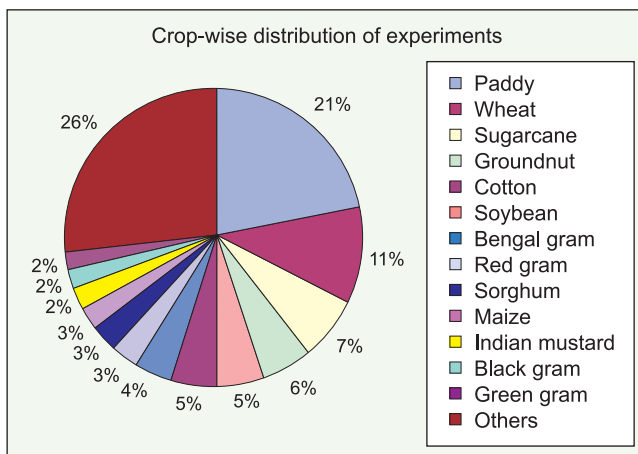
The number of replications used in an experiment effects the precision of inferences drawn from it as well as the cost of experimentation. Distribution of replications adopted in 30693 experiments is
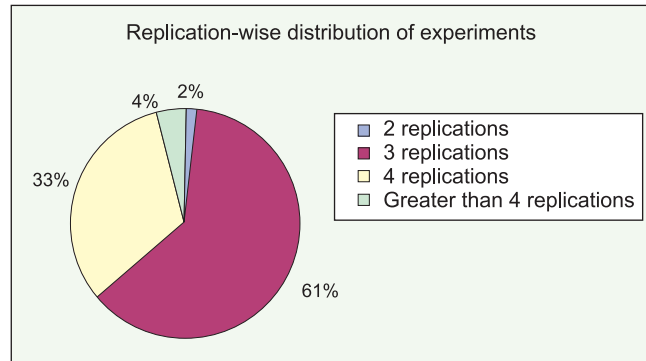
It is observed that in 61% of the experiments number of replications adopted is three.

For protecting the data rights of the user, several user authentication levels have been created for data entry of field experiments by the scientists of ICAR Institutions/SAUs etc. In this respect identification of types/levels of users are identified and accordingly modification in database tables and software development are undertaken. Updated authentication levels are Guest, Registered User, Advanced Registered User, Principal Investigator, Incharge level-I (Head of Division), Incharge level-II (Director/Associate Director of Research), Incharge level –III (Assistant Director General/Deputy Director General/ Director of Research), Administrator and Superadministrator. AFEIS site has been updated with newer version of the software so as to facilitate data entry along with the experimental technical programme.

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

Stochastic Process Modeling and Forecasting through Discrete Nonlinear Time – Series Approach

The Exponential Autoregressive Nonlinear Time-series model, denoted as EXPAR(p), is defined as

$$X_t = \left\{\varphi_1 + \pi_1 \exp\left(-\gamma X_{t-1}^2\right)\right\} X_{t-1} + \ldots + \left\{\varphi_p + \pi_p \exp\left(-\gamma X_{t-1}^2\right)\right\} X_{t-p} + \eta_t$$

This model is capable of describing those data sets which depict periodic/cyclic variation. A promising approach to deal with state/time-dependent parameters

is to use Kalman Filter (KF). In order to apply this technique, the model is put in state space form. A heartening feature of KF is that it provides the minimum mean squared prediction error estimates for unobserved state of the dynamic system. However, for the EXPAR model, the transition equation is nonlinear, so, KF is not applicable. To this end, an extension of KF, called Extended KF (EKF) technique is applied. A general nonlinear state space model can be approximated by using the Taylor series expansion about the conditional means $\alpha_{t|t}$ and $\hat{\alpha}_{t|t-1}$. Assuming higher order terms to be negligible, the model reduces to:

$$\alpha_{t+1} = F_t \alpha_t + G w_t + u_t$$
$$X_t = H'_t \alpha_t + \nu_t + y_t$$

Now the linear KF can be used for this approximate system by computing time update and state update equations along with prediction error variances using Kalman gain equations. Initialization is provided by $\hat{\alpha}_{0|-1} = E\{\alpha_0\}, \sum_{0|-1} = P_0$ After obtaining $\hat{\alpha}_{t|t-1}, X_t$, is predicted by the suboptimal predictor $\hat{X}_{t|t-1}$, where

$$\hat{X}_{t|t-1} = h_t\left(\hat{\alpha}_{t|t-1}\right)$$

The best model is chosen on the basis of minimum Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC). A code for the above task is written in MATLAB, Version 7.4. As an illustration, oil sardine landings time-series data in Kerala ('000 tonnes) from 1961 to 2005, obtained from Central Marine Fisheries Research Institute, Kochi is considered. The best model identified on the basis of minimum AIC value is EXPAR model of order 1, given by

$$X_{t+1} = \left\{0.91 + 1.55 \exp\left(-0.0023 X_t^2\right)\right\} X_t + \eta_{t+1}, \sigma_\eta^2 = 2443.92$$

For fitted EXPAR model, formulae for one-step and two-step optimal out-of-sample forecasts are also derived analytically by recursive use of conditional expectation. Using optimal forecast formulae, it is concluded that, for the data under consideration, EXPAR model is successful for modelling and forecasting purposes.

Forecasting Model for Podfly, *Melanagromyza obtusa* Malloch in Late Pigeonpea

Models are developed for forecasting mean percent pod damage due to podfly for Dholi (Bihar) and

Khargaon (M.P.) at different weeks of forecast (50th to 3rd SMW). Forecasts are obtained for the subsequent years not included in the model development. The Mean Absolute Percent Error (MAPE) for forecast are also obtained for various locations.

Weather Based Forewarning Models for Onion Thrips (*Thrips tabaci* Lindeman)

A model for forecasting weekly onion thrips population for one date of planting (15 November) has been developed assuming that the thrips population in a week is due to its natural cycle and weather fluctuations. The model has been developed in two stages. In first stage natural growth pattern is obtained by fitting proper non linear model to the data (averaged over years). In second stage forecast model has been developed by relating the deviations of thrips population counts (from natural growth pattern) with appropriate weather variables lagged by one to three weeks and previous weeks' thrips population. Weekly forecasts of thrips have been obtained for the subsequent year, not included in the model development. Forecasts of thrips population for subsequent year (2009-10) are very close to the observed thrips population in general as presented in figure.
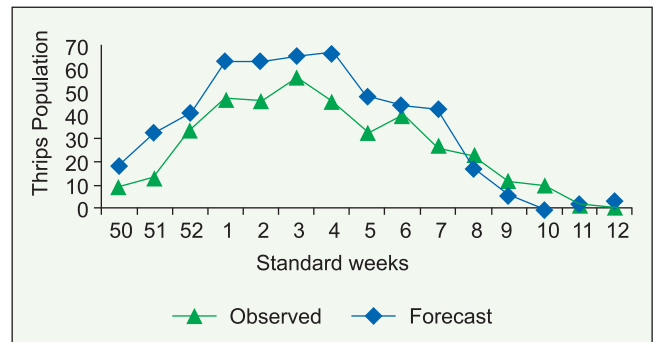
Weather Based Forewarning of Mango Pests

Models for forewarning time of first appearance of powdery mildew on second flush have been developed for Vengrule. It is reported that apart from time of flush, weather of December and January affects onset of the disease. Therefore models have been developed using weather starting from 49th standard meteorological week (smw) i.e. first week of December. Weather indices have been obtained using the data on weather variables which have been used as regressors alongwith time of second flush in the model. Stepwise regression technique has been used to select the

important variables in the model. Using these models earliest forecast can be obtained at 50th smw which can be subsequently revised. Maximum relative humidity, maximum temperature, wind speed and their interactions are found important in different models. Forecasts of different years have been obtained from the models based on data of remaining years. Observed and forecast are given in the following Table.

Forecast of time of disease appearance

Year	Time of disease appearance (week)*					
	Observed	Forecast based on model using data				
		49-50	49-51	49-52	49-53	49-54
1992-93	56	55.48	56.66	56.70	57.00	55.89
1993-94	56	55.57	55.83	55.99	56.20	54.69
1994-95	52	51.75	53.58	53.84	53.71	53.40
1995-96	56	55.26	54.99	55.54	54.59	55.57
1996-97	53	54.35	52.83	53.39	53.49	53.01
1997-98	54	53.78	52.52	53.53	54.26	54.25
1998-99	54	54.93	54.08	53.82	53.12	53.89
1999-00	54	54.30	54.56	54.92	54.04	54.23
2000-01	53	54.58	53.74	53.21	53.14	53.47
2001-02	54	54.33	54.55	53.34	53.41	53.68
2002-03	51	51.09	51.99	52.69	53.43	51.76
2003-04	54	54.00	54.10	53.26	53.39	53.96
2004-05	53	55.49	54.12	53.84	54.03	53.95
2005-06	53	51.68	51.08	52.13	53.48	53.18
2006-07	58	57.03	56.72	55.95	55.61	56.20
2007-08	57	54.32	55.57	56.45	56.72	56.90
2008-09	56	55.93	56.53	56.40	55.81	55.07

*First week of January onwards of subsequent year are denoted as 53 smw onwards.

Developing Remote Sensing based Methodology for Collection of Agricultural Statistics in North Eastern Hilly Regions

North-Eastern states lack in objective methodology for estimation of area under different crops due to the typical problems existing in this region. Total cropped area in the state is very less (only 10%) and is scattered throughout the state. Even use of remote sensing satellite data alone may not be able to provide reliable information regarding crop acreage in the region due to hilly terrain and cloud cover. Therefore, an integrated methodology based on remote sensing, GIS and ground survey for estimation of area under major crops in the North Eastern states of the country has been taken up. For conducting this study, Meghalaya is chosen as the representative state. Four districts are covered under the state and major crops of the state like paddy, maize, potato, ginger, pineapple, cashewnut
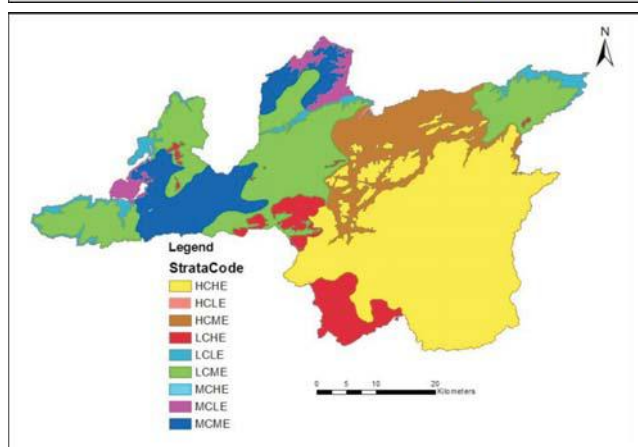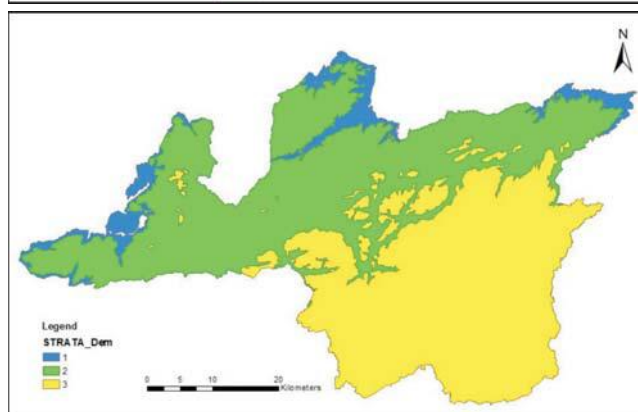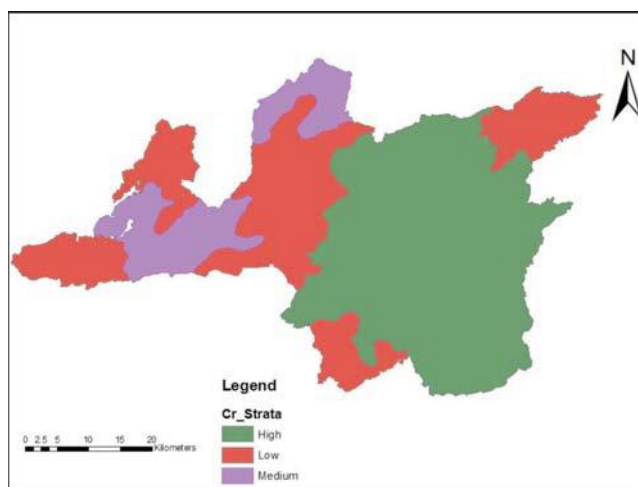
and vegetables were chosen for acreage estimation. These crops are grown in the State of Meghalaya at different elevations and elevation plays an important role in determining the area under a crop. The usual stratification criterion based on administrative boundaries fails to provide accurate/efficient strata.

Since elevation and extent of cultivation are two important factors influencing the acreage under a crop, therefore, a stratification criterion is required to take into account both the factors. Keeping this in view, a methodology for spatial stratification based on elevation and the extent of cultivation has been devised in order to cover all the crops growing at different elevations. For spatial stratification, cropped area layer and elevation layer is used. Cropped area layer is extracted from Land Use Land Cover (LULC) maps created using classified images of each district. Elevation is obtained from Digital Elevation Model (DEM) layer. Both the layers are classified into three categories as Low, Medium and High (as shown in figures). The two layers are then overlaid in GIS environment to form nine strata namely High Cultivation High Elevation (HCHE), High Cultivation Medium Elevation (HCME), High Cultivation Low Elevation (HCME), Medium Cultivation High Elevation (MCHE), Medium Cultivation Medium Elevation (MCME), Medium Cultivation Low Elevation (MCLE), Low Cultivation High Elevation (LCHE), Low Cultivation Medium Elevation (LCME), Low Cultivation Low Elevation (LCLE) (as shown in figures). After stratification, sixty villages are selected from each district from the strata in which the cropped area is relatively larger. The number of villages selected from each stratum is in proportion to the total cropped area falling under each stratum. Five farmers are selected from each of these selected villages/habitats for data collection by enquiry. Suitable estimators have been developed for estimation of acreage under various crops.

The methodology developed by IASRI, New Delhi has a potential of adoption by Department of Economics and Statistics (DES) for acreage estimation of major crops in North Eastern part of the country.

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

Distance Balanced Sampling Plans using Linear Integer Programming Approach

Balanced sampling plans excluding adjacent units {BSA(*m*) plans} are useful for sampling from populations in which nearer units provide similar observations due to natural ordering of units in time or space. BSA(*m*) plans suffers from the drawback that the unbiased estimation of variance of Horvitz-Thompson estimator of population mean is not possible.

To tackle this problem, a family of Distance Balanced Sampling Plans (DBSP) with the property that the second order inclusion probabilities are non-decreasing function of distance between the two consecutive units was introduced as a generalization of BSA(*m*) plans.

A general *w*-point DBSP ($w = 1, 2,...,\left[\frac{N}{2}\right]$, where *N* is the population sizeand [*x*] denotes largest integer contained in *x*) is introduced and a method of construction of *w*-point DBSP using linear integer programming is proposed. The method is general in nature and two-point, three-point, many other DBSPs, simple random sampling without replacement, balanced sampling plans excluding contiguous units and balanced sampling plans excluding adjacent units fall out as a particularcase. A list of $\left[\frac{N}{2}\right]$ point DBSP for sample size three is obtained for population size *N* ≤100, where *N* is odd.

Methodology for Estimation of Meat Production in Meghalaya

Meat production estimates in Meghalaya state are perceived to be underestimated. This is attributable to the fact that meat production related data in the State are collected from meat markets only and slaughtering of animals taking place in the villages are not properly captured. Accordingly, the study entitled Sampling Methodology for Estimation of Meat Production in Meghalaya was taken up with the objective of capturing meat production from villages as well as meat markets and working out a correction factor on the basis of data collected on meat production from villages and meat markets so as to use it in future for adjusting market related estimated meat production figures. The survey work was carried out in East Khasi Hill district of Meghalaya state. The collected data has been analysed as per the estimation procedure for developing species-wise estimates of meat production. The total annual meat production from sheep, goat, pig, buffalo and cattle in the East Khasi Hills district of Meghalaya state for the period November 2009 to October 2010 was estimated to be 21404.21 metric tonnes with 13.70 percent standard error. The villages contributed significantly to the total meat production i.e. 7.89% of total meat production.

Construction of Food Security Index

The method of construction of composite index based on principal component analysis is proposed for

construction of Food Security Index (FSI). Food Availability Index (FAI) has been considered one of the important sub indices of FSI. Construction of FAI has been completed for the three states namely, U.P., Bihar and Punjab. Generation of thematic maps based on constructed FAI and its sub indices for all the three states using GIS is in progress. Construction of other sub indices namely, Economic Prosperity Index, Health and Sanitation Status Index and Nutritional Status Index for Punjab State has been completed and is in progress for the other two states.

Identification of Factors for Enhancing Productivity in Rainfed Areas

Linear combination weighted scoring, multi-dimensional scaling and analytical hierarchical process methods have been used for envisioning technologies/ prioritizing factors in rainfed agriculture from around 50 filled-in questionnaires from subject matter experts. The results revealed that in contrast to yield input-use efficiency should be taken as an important performance indicator for comparing rainfed vis-à-vis irrigated agriculture. Water harvesting and water saving technologies came out to be best strategies to cope with climate change in the coming years among different technologies considered for rainfed agriculture. Stability of crops should be given highest research priority followed by early maturity, broad adoption, stress resistance and high yield potential in achieving high productivity in rainfed areas.

Impact of Global Meltdown on Indian Agriculture

Indian economy has been affected by global recession mainly through the external sector. Agriculture is, however, not perfectly integrated with the external sector so far. But still it has made inroads into the external market especially in some selected commodities. International prices for agricultural commodities are known for their high volatility, a feature which has been, and continues to be a cause for concern among governments, traders, producers and consumers. In a prolonged volatile environment, the problem of extracting the true price signal from the noise may arise, a situation that can lead to an inefficient allocation of resources. The volatility can attract significant speculative activity, which in turn can initiate a vicious cycle of destabilizing cash prices. Impact of global disturbances (Meltdown) on mentha oil, which is mainly export oriented commodity and industrial raw material has been examined. The study showed that

production of mentha oil is constantly on the rise and large surplus available for exports. This statement supports the presumption that rises in price volatility of mentha oil in the recent years may be attributed to the economic and financial disturbances in the global economy. The cultivation of mentha in India is very successful as the scenario of net importing country up to 1966 has changed to large exporting one. This is rabi season crop and mostly grown in selected parts of Uttar Pradesh (90%) followed by Punjab and parts of Rajasthan. The secondary data used in the study pertains to future trade in mentha oil at Multi Commodity Exchange (MCX), National Commodity & Derivatives Exchange (NCDEX) and Spot Market namely Chandausi. Analysis was carried out for the period of January 2006 to December 2009. The global economic and financial disturbances are covered in the period of study. The study showed that the two price series i.e future and spot, of mentha oil became stationary at first difference. The volatility clusters of high and low variance were more prominent in the year 2008 in case of both future as well as spot price series. This gave an indication that ill effect of economic turmoil was reflected through higher volatility in the year 2008 and 2009 as compared to the previous years. The spot price series showed higher level of persistent volatility as compared to future price series. A special mention can be made regarding future trading, which provides an opportunity to lower down the extent of volatility. The volatility clusters of high and low variance were more prominent in the year 2008 in case of both future as well as spot price series.

Market Efficiency in Commodity Futures

Theoretically, trading in commodity futures helps the market to discover prices based on fundamentals (i.e. strength of the supply and demand forces) while allowing the physical market participants to hedge (or lock in) their returns. The price discovered in future trading are transparent and serve the economic interest of all the stakeholders. With this hypothesis, the present study has been undertaken to investigate the bivariate relationship between spot and future markets and also to study the comparative performance of different future contracts in achieving market efficiency through price discovery mechanism. The price discovery in both spot as well as future markets occured only once in eleven contracts. However, the desirable bi-directional relation between spot and future markets was observed in three contracts. The analysis of bivariate relationship

between spot and future markets of mentha oil showed that in most of the mentha oil future contracts, secured at MCX platform, better price were discovered mostly in future market. Regarding market dominance in terms of lead lag relationship, strong dominance of future market was observed. With respect to the Granger causality, the market relationship was dominated by uni-directional, i.e., from futures to spot markets for mentha oil.

The study of future trading in guar gum showed that there is no cointegration between the spot prices and the future prices of guar gum, pepper and groundnut oil commodities. The absence of cointegration implies lack of a long-run stable relationship between the spot prices and the future prices in all the 12 contracts for all the commodities. This indicates the inability of future price to be the optimal forecaster of future spot price. The testing of the efficiency of futures market indicates that the futures markets are not efficient in predicting the future ready prices and thus, are not able to discover future prices efficiently.

The study of vertical integration of wholesale prices of different products of mustard showed that one cointegrating vector is present among mustard seed, oil and oil-cake indicating that the only seed and oil are cointegrated in Delhi and Kanpur markets. This may be due to different demand and supply functions for these products. The Vector Error Correction Model showed that even though the seed and oil are integrated in both the markets, the speed of adjustment is slower in Delhi market (–0.008) and faster in Kanpur market (–0.624).

An Econometric Analysis of Groundwater Markets in Indo-Gangetic Plain of India

In this study various aspects of groundwater markets are examined in the Indo-Gangetic plain. The study suggested that irrigation development in terms of net irrigated area showed meager growth during the last decade in Indo-Gangetic plains. However, the growth rates differed across the regions. The groundwater irrigated area recorded a moderate growth in Upper and Middle and poor growth in Trans and Lower-Gangetic plains during 1999-2000 to 2006-07. The analysis of groundwater development using volumetric statistics showed that the groundwater development was in over-exploited category (134 per cent) in Trans-Gangetic plains and in semi-critical and critical

categories in Upper-Gangetic plains in 2004. In the Middle and Lower-Gangetic plains, there is an ample scope for further development of this resource as only few blocks were in over-exploited category. The groundwater markets were prevalent in all the regions of Indo-Gangetic plains. However, in Trans-Gangetic plains, the buying and selling activities are undertaken by only 16 and 8 per cent of the farmers. On the other hand, the groundwater buying and selling have been prevalent in all categories of farms in Upper, Middle and Lower-Gangetic plains. The farmers' decision to own an electric operated tubewell are influenced by size of operational holding, education of head of family, family labour per acre, groundwater table, off farm income, selling price of water and joint ownership of tubewell in Upper-Gangetic plains. The farmers in these regions followed cereal based cropping patterns. However, the tubewell owners preferred to grow high water requiring cash crops like paddy, sugarcane, potato, wheat and vegetables on more land in comparison to purely buyers. The yields and returns were high on self user farms in comparison to purely buyer farms in wheat and paddy crops in all the regions except wheat in Middle-Gangetic plains. The accessibility to groundwater irrigation during the transplantation of paddy crop appeared to be the main reason for the variation in returns from paddy across different forms of water market. The equity analysis showed that the buyers used significantly lower irrigation hours than self-user forms of water markets. Further, irrigation applied by electric tubewell users is significantly higher than the diesel tubewell users. The economic efficiencies of farms are low and varied in different regions of Indo-Gangetic plains. Water market-wise analysis showed that purely self user and buyer farmers had highest economic efficiencies in wheat crop, whereas in paddy crop, the purely self users and self users plus sellers had highest economic efficiencies. Reliability of electric operated tubewells has been found to be low for buyers in comparison to self-users. The demand of groundwater in these regions is significantly and positively influenced by the electricity as cheap source of energy for groundwater extraction, cropping intensity, area under high water requiring crops and water selling along with self use.

The findings of the study give some clear indications regarding some policy options for more efficient, equitable and sustainable groundwater use in this

region. The special attention is needed to monitor further development of the groundwater in Trans-Gangetic and north-west and south-west sub-regions of Upper-Gangetic plains and faster development of groundwater in Middle and Lower-Gangetic plains. The inequity in the accessibility to groundwater and cost of irrigation may be reduced through a system for licensing new electric operated tubewell in diesel command areas giving greater emphasis for joint ownership and efficient water markets, and by subsidising the groundwater extraction through diesel operated tube wells. The reliability of electric operated tubewells can be improved through revamp of electric connection policy and regular, uninterrupted, timely and adequate power supply. Further, the demand of water under electric operated tubewells can be reduced through rational electricity tariff to agriculture. The farmers may be educated for better utilization of inputs to improve the farm level efficiencies and a flexible cropping pattern incorporating remunerative but less water consuming crops for sustainable groundwater development.

Econometric Study of Long-run Effect of Public Investment in Irrigation on Foodgrains Productivity

The long term effect of public investment in irrigation projects on foodgrain productivity indicated that there has been a time varying impact across the states. The plan-wise compound growth rates of per hectare real expenditure on major and medium irrigation show that in a number of states the growth of public expenditure was erratic especially during sixth, seventh, eighth and ninth plan periods. The disparity among the states on the basis of expenditure on per hectare of gross cropped area in each state was marginally increased over plan periods. The long-term effect of public expenditure in major and medium irrigation on foodgrain productivity has been examined by Polynomial Distributed Lag (PDL) model. Four states namely, Haryana, Madhya Pradesh, Tamil Nadu and Uttar Pradesh have no lag structure relationship; therefore, PDL model is not applied in such cases. In Andhra Pradesh, Karnataka and Orissa, a lag of six years is observed in attaining the 100 percent effect of public expenditure (in major and medium irrigation) on foodgrain productivity. Bihar indicated a lag of four years, while Gujarat indicated a lag of 9 year years. In Kerala, a lag of 11 years is observed, while in Maharashtra and Rajasthan a lag of 7 years has been

observed. In Punjab, West Bengal and Assam a lag of twelve year has been observed for realizing the 100 percent effect of public expenditure on food grain productivity.

Risk Assessment and Insurance Products for Agriculture

For characterization and mapping of all the districts based on various socio-economic parameters, four indices viz. Infrastructural index, Health and sanitation index, Nutritional index, Economic status index are developed for all 500 districts of the country. All these indices have been integrated using data driven weights to formulate a livelihood index. Bio-physical index has been developed in collaboration with CRIDA, Hyderabad 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 order to assess the income risk at household level, logistic regression model has been developed after incorporating survey weights. 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. Software module for calculation of Poverty indices at district level based on NSSO data for measuring the poverty ratio, squared poverty gap ratio, Foster Green Thorbecke (FGT) Index and Contribution Towards Poverty (CTP) have been developed as depicted below.

On-line data extraction and estimation of poverty indices module

Farmers window of on-line prototype of Decision Support System for risk assessment and insurance products in agriculture

A functional prototype of the Decision Support System for risk assessment and insurance products in agriculture has been developed.

### Programme 4: MODELING AND SIMULATION TECHNIQUES IN BIOLOGICAL SYSTEMS

Establishment of National Agricultural Bioinformatics Grid (NABG) in ICAR

Genetic engineering and genomic approaches have opened new vistas for increasing the productivity and quality attributes of biosystems. During the last decade, genomics has witnessed an information explosion. A genomic database contains huge amounts of information that are not amenable to traditional analytical approaches. Therefore, bioinformatics has emerged as an inter-disciplinary programme, which links computational and mathematical sciences with life sciences. The present project aims to bring the biologists, statisticians and computer scientists together from the point of view of system biology approach and effective problem solving. The establishment of this grid will bridge the gap between genomic information and knowledge, utilizing statistical and computational sciences. It will also open up new vistas for downstream research in bioinformatics ranging from modelling of cellular function, genetic networks, metabolic pathways, validation of drug targets to understand gene function and culminating in the development of improved varieties and breeds for enhancing agricultural productivity.

In order to keep pace with the research and developments in agricultural bioinformatics at global level, country needs expertise and exposure in this area

of research. Therefore, establishing National Agricultural Bioinformatics Grid (NABG) will help in developing databases, data warehouse, software and tools, algorithms, genome browsers and high-end computational facilities through systematic and integrated approach in the field of agricultural bioinformatics. This will be national facility which will provide computational framework to support biotechnological research in the country. NABG is also aimed for capacity building for research and development in agricultural bioinformatics and in turn agricultural biotechnology. Further, it is also going to provide platform for inter-disciplinary research in cross-species genomics. One of the main purposes of this project is to integrate number of other institutions/ organizations in order to provide computational framework and support to carry out biotechnological research. It is expected that, in due course of time, information and knowledge generated through research on bioinformatics from the genomic knowledge base will start flowing downward and experimentations in different sectors of agriculture will be able to evolve internationally superior competitive varieties/breeds and commodities in agriculture.

The process of developing supercomputing facilities for undertaking research in the field of agricultural bioinformatics is being initiated at IASRI along with High Performance Computing (HPC) infrastructural facilities at five Bureaus related to crop science, animal science, fisheries, agriculturally important microbes and insects namely NBPGR, New Delhi; NBAGR, Karnal; NBFGR, Lucknow; NBAIM, Mau and NBAII, Bengaluru. Also, process has been initiated for interlinking these
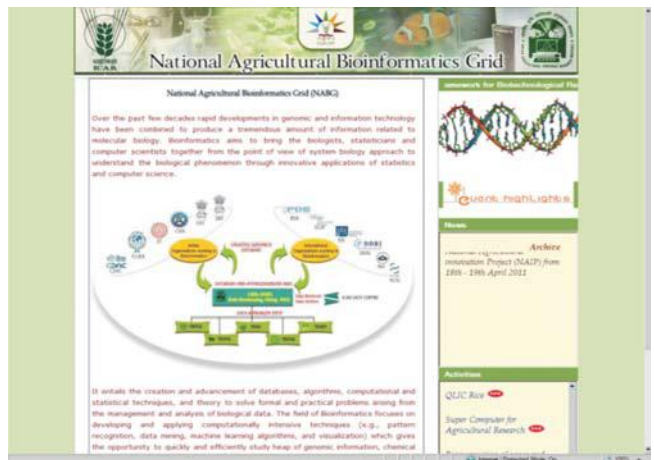

Website of the NABG

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institutions with high speed connectivity. Further, work on designing and implementation of number of biological databases and work on important problems of high throughput data analysis has been undertaken in collaboration with different ICAR institutions.

All international genomic data bases i.e. Gene Bank, EMBL and DDBJ have been studied with respect to their coding structure, input and output formats. A comprehensive logical database model has been designed to cover all features of these database structures. This database will be used for storage of Nucleotide, Genes, Genome, EST, GSS, SNP, RNA etc. sequences. Web base front end for genomic data submission by the user has been developed.
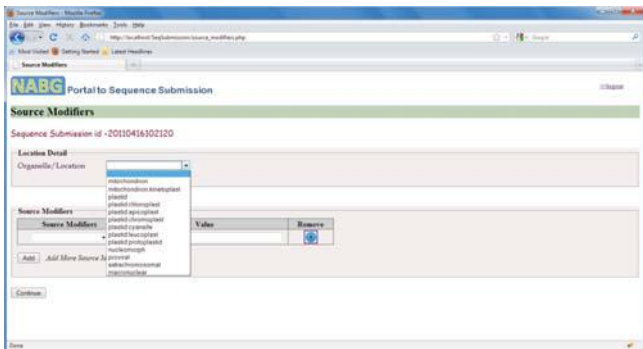
Database Web portal for submission of genomic data

Also, web based SNP database of animal diseases such as foot and mouth disease and growth related characters has been developed. Further, attempts are made to develop databases related to salt stress related genes of the cereal crops, salt tolerance bacteria Phytophthora infestans genome, and Late Blight disease susceptible genes (available) in potato.

Database related to salt stress in crops

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
- Study of synonymous codon usage and its relation with gene expressivity in genomes of halophilic bacteria
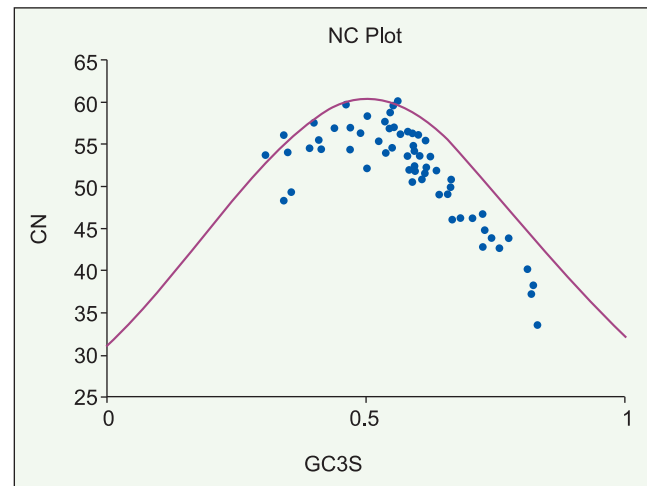
Codon usage analysis to study expression levels of genes

- Analysis/Assessment of synonymous codon usage of Cytochrome P450 mono-oxygenase in agriculturally important insects
- In-Silico identification of genes responsible for late blight dsease in potato

Bioprospecting of Genes and Allele Mining for Abiotic Stress Tolerance

A database on rice germplasms is designed and is being populated. A mini core is being identified from the collected germplasms under study. Genome prediction techniques are identified for associating the phenotype information of the mini-core collection with the whole genome genotypic information. Key residues responsible for reduced oxygen tolerance across species are identified using bioinformatics approaches. A Genome library is created for genes in different species responsible for various abiotic stresses under study. A centralized Statistical and Computational Genomics Lab (SCGL) Facility is created under the project. The SCGL Facility is well equipped with 18-nodes (144 core) computational cluster, 10TB

storage, thin client solution, Open source and commercial software for genomics data analysis.

Programme 5: DEVELOPMENT OF INFORMATICS IN AGRICULTURAL RESEARCH

Strengthening Statistical Computing for NARS

Statistical analysis is an important tool to extract as much information as possible from the given data. Statistical computing methods enable to answer quantitative biological questions from research data and help plan new experiments in a way that the amount of information generated from each experiment is maximized. Widespread use of computers and specialized high end statistical software packages have helped and greatly improved the ability of researchers to analyze and interpret voluminous data. Developments in computerized statistical analysis have enhanced the ability of researchers to come up with better conclusions. This has helped in improving their statistical, computer-related and networking skills of the researchers. For exploiting and sustaining these developed skills, availability of proper computing and infrastructure facilities to agricultural research in National Agricultural Research System (NARS) is of utmost importance for improving skills. The statistical computing support would be useful in improving the quality of agricultural research and make it globally competitive and acceptable by way of publications in International refereed Journals.

Therefore, a NAIP Consortium on Strengthening Statistical Computing for NARS (www.iasri.res.in/sscnars) has been initiated that targets at providing research guidance in statistical computing and computational statistics and creating sound and healthy statistical computing environment for the benefit of researchers of NARS by way of providing advanced, versatile, and innovative and state-of the art high end statistical packages and enable them to draw meaningful and valid inferences from their research. The efforts would not merely be focused on an interface of statistics, computer science and numerical analysis, but would also involve designing of intelligent algorithms for implementing statistical techniques particularly for analyzing massive data sets, simulation, bootstrap, etc.

A General purpose high end Statistical Software Package has been procured with 151 licenses including one Enterprise Business Intelligence Server for perpetual use with three years updates and upgrades to provide enabling statistical computing facilities to the researchers of NARS. The package can be installed on multiple official machines both in standalone as well as intranet mode. The availability of this high end statistical computing package would enable the researchers to undertake probing, in-depth, appropriate, intractable analysis of data generated from agricultural research including those in advanced research areas like biotechnology, genomics, microarrays, forecasting, agricultural field experiments, surveys, microarrays, and massive data sets such as climate change, biodiversity, market intelligence, etc. It would also facilitate data sharing over web and creation of analytics for All-India Co-ordinated Research Projects and other Network Projects of NARS.

- **Installation and Configuration**
- 180 researchers/nodal officers from all 151 NARS organizations have been trained in Software installation. SAS Depot and Installation manual have been handed over to all 151 Nodal officers. SAS software has been installed at more than 970 computers in 151 NARS organizations, i.e. on an average 6 computers in each NARS organizations.
- SAS EBI Server has been configured at IASRI, New Delhi.

- **Capacity Building**
- 209 trainers have been trained through 30 working days training programmes on SAS: A Comprehensive Overview and SAS Genetics/JMP Genomics and 6 days training programme on Data Analysis Using SAS across 83 NARS organizations.
- 892 researchers of NARS (496 from ICAR Institutes and 396 from SAUs) have been trained through 43 training programmes of one week duration each. Out of these 43 training programmes 07 training programmes were organized at IASRI, New Delhi and rest 36 training programmes were organized by consortium partners. Some of these training programmes were organized at doorsteps of users such at MPKV, Rahuri; BSKV, Dapoli; AAU, Anand; BAU, Ranchi; JNKVV, Jabalpur; CTCRI, Thiruvananthapuram; CIRB, Hisar; CIFRI, Barrackpore and CARI, Port Blair. One of these training programme was organized for researchers for AICRP on Agroforestry on Data Analysis of Agro-forestry Experiments Using SAS.

– NAARM, Hyderabad has included Data Analysis Using SAS in the course curriculum for Foundation Course for Agricultural Research Services (FOCARS) training from 90th batch onwards. 158 ARS Scientists have been sensitized through FOCARS training at NAARM, Hyderabad conducted in 5 forenoon sessions of 3 hours duration each.

– WebEx sessions on SAS Bridge to ESRI, Cluster Analysis, Statistical Analysis using SAS EG, and Enterprise Guide-Statistical Analysis and Time Series Forecasting: using Graphical User Interface were being organized. These sessions were attended by 35, 50, 20 and 50 researchers respectively.

– Nodal officer from Tamil Nadu Agricultural University, Coimbatore has trained 90 researchers through 3 training programmes of 5 days duration each. Nodal Officer from NRC AF, Jhansi organized a 5 days training programme at Jhansi in which researchers from NRCAF, Jhansi; IGFRI, Jhansi and CSWCRTI, Dehradun participated.

- **Service Oriented Computing Modules**

– Service-oriented computing consists of the computing techniques that operate on software-as-a-service. For providing a service oriented computing to Indian NARS users, a Portal has been established under NAIP Consortium on Strengthening Statistical Computing for NARS which is available to NARS users through IP Authentication at http://stat.iasri.res.in:8080/sscnarsportal. First page of portal appears as:

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) and split plot design is available on this portal. Some Screen Shots are given:
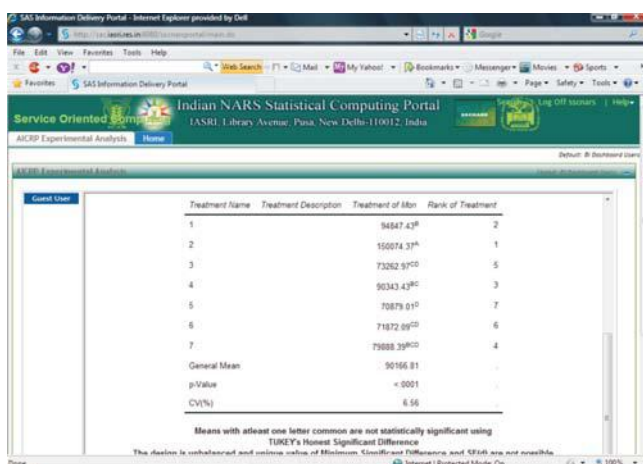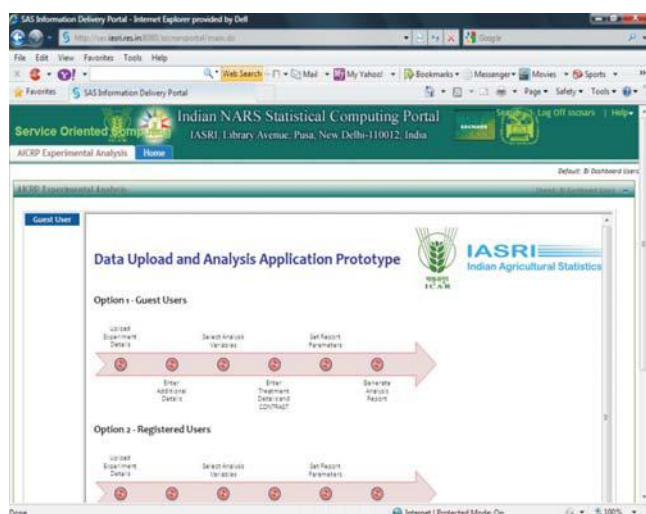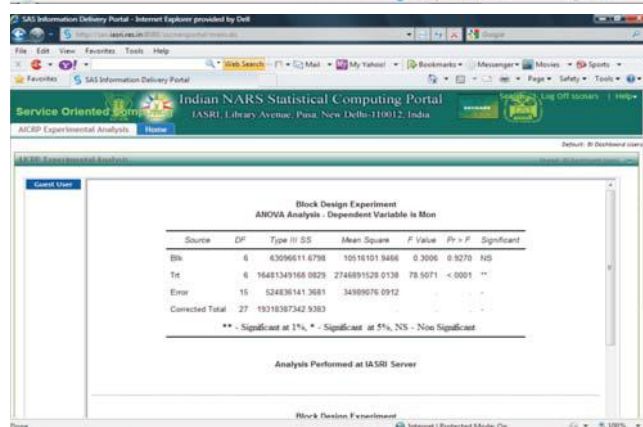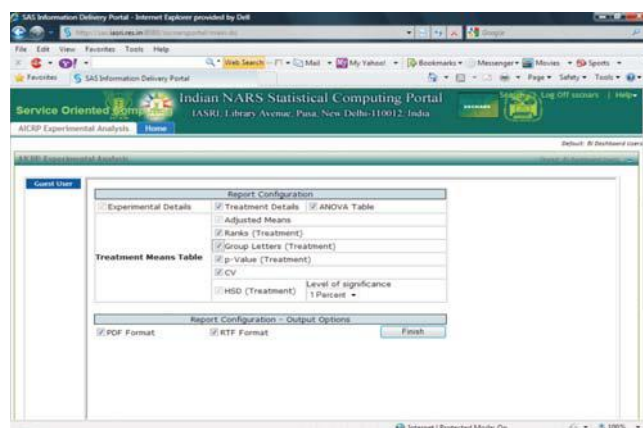
- **Sensitization of Researchers**
  - Website of the project is being maintained and updated regularly. 5954 views on Website www.iasri.res.in/sscnars during June 2010-31 March 2011. Website was registered under google analytics on 15 November 2010. Till 31 March 2011, there were 1939 page views across 92 cities of 22 countries.
  - A presentation on Strengthening Statistical Computing for NARS was also made in the Director's Conference held at New Delhi during 15-16 July 2010.
  - E-mails were sent to all NARS research personnel whose E-mails were available at websites of their respective NARS organizations. More than 1000 E-mails were sent.
  - Presentations were made in 14 training programmes/conferences/workshops organized at different NARS organizations.
  - Nodal Officer of CTCRI, Thiruvananthapuram has delivered half a day seminars at his organization.
  - CMFRI, Kochi has included this as a part of training programmes being conducted.

- **Usage**

  Researchers have started making effective use of the software. Based on partial feedback received from 110 NARS organizations 26 research reports, 30 research papers have been published/ accepted for publication by analyzing the data using high end statistical computing facility. 50 research papers have been communicated. This high end statistical computing facility has also been used in data analysis of 16 dissertations. There are 1200 users of this high end statistical computing facility and 947 data sets have been analyzed.

Web Solutions for Partially Balanced Incomplete Block (PBIB) Designs

PBIB designs are found to be scattered all over literature and are not easily accessible. These designs are not widely used by the practicing scientists, probably due to the difficulties in understanding their method of construction. To overcome these difficulties an e-learning material on these designs is also prepared that can be used as reference material by researchers and students working in this area. A web based solution for cataloguing, generation and analysis of PBIB

designs has been developed using client server architecture.
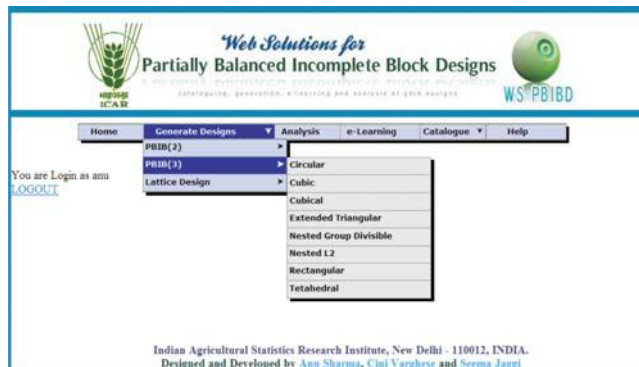
Screen displaying various schemes for generation of PBIB designs

The web based software is designed for multipurpose use, to meet the needs of students and teachers for demonstrating PBIB designs and also to meet the requirements of agronomists and breeders engaged in research in agricultural and allied sciences.

Home page of e-learning contents on PBIB Designs

An eLearning Solution for Agricultural Education

Internet-enabled learning or eLearning is the education methodology that takes advantage of modern Information and Communication Technologies (ICT) to

eLearnAgriculture Home Page

address the continuing educational needs of students. Being online, this methodology provides an opportunity to learn independently, comfortably and at the desired pace from any part of the world at anytime. It has been fostered with the development in the ICT sector.

In many sectors of education and training, eLearning has found its place. In agricultural education also its need has been felt with the development of Agricultural Science and Technology all over the world. To fulfill the increasing demand of online interactive PG courses in this sector, an eLearning platform "eLearnAgriculture" has been designed, developed and implemented for the post graduate courses in Agriculture Sciences and is available at (http://www.elearnagri.iasri. res.in/home).

The system has been developed in a way that the teaching, learning, evaluation and administration of the courses and users can be accomplished online. Presently it has been enriched with the fundamental courses under the disciplines of Agricultural Statistics and Computer Application like Elementary Statistical Methods; Computer Fundamentals and Programming and Data Structures and Algorithms.

Each course has been distributed into well defined topics with each topic having the online features of glossary, interactive lessons, multimedia enabled presentations, quiz and assignments.

The open source Learning Management System, MOODLE has been used for creating the eLearning documents, management of contents and users. The modular nature of MOODLE has been used in this system to add the new features such as an equation editor, frequently required mathematical symbols and a new user interface. The system provides following facilities to the learners:

- Online courses
- Free e-mail based registration
- Enrollment key based entry in a course
- Course search facility
- Online help
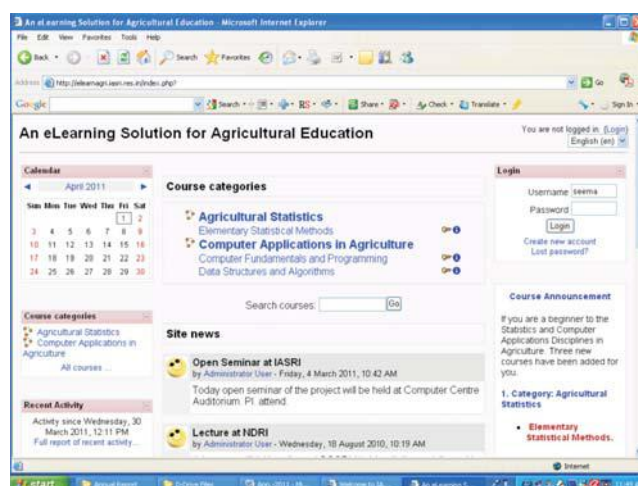
The system provides an opportunity to the agricultural educationists to create and link their course contents online. In near future the system will be enriched with more courses and will be useful to the students, teachers, researchers and other learners of these courses.

Decision Support System for Manpower Planning-PERMISnet

PERMISnet-II system has been implemented and enriched with new modules for different types of identified users. Major enhancement includes passport information, auto generation of username and password for individual, updating rights to individuals, strengthening of manpower planning reports and monitoring reports. Passport information contains basic

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information like Name, Designation, Date of Birth, Date of Joining ICAR, Date of Joining Present Institute, Discipline/Functional Group, and Address along with Qualification, Number of Publications and Specialization.

RMP Module

Passport Information report has been added to RMP module. Using search form, managers can look for passport information of any person of the council. Passport report can be generated for different service categories (Scientist/Technical/Administrative & Supporting).

Council reports section was further strengthened for manpower planning with new reports on discipline wise list of personnel, visits abroad, publications of scientist, qualifications of scientist (Ph.D./M.Sc.) and distribution of personnel under different service categories in age groups.

Individual User Module

Updating rights have also been extended to Individuals in which individuals could update passport information along with other parameters of image, qualification, specialization, publication, training, professional society affiliation and teaching.

Passport Information Report for Scientific Service

Updating mechanism is devised in a manner that information which needs authentication (subset of personal information) is checked before submission to database and for other information (training, image, publication etc.) individual is made responsible for updating of its parameters.

Updating Parameters for Individuals

Nodal Officer Module

In the data management section for nodal officers functionality for auto updating of cadre strength for different plan and years has been strengthened. Functionality for auto generation of username and password and sending the same through email to individuals is developed. Functionality also includes Adding/ Updating passport information for personnel. Monitoring reports section is added to the Nodal officer module. Quality checks of data are carried out in database using SQL commands.

Nodal Officer Module

Management System for Post Graduate Education

PG School, IARI Management System has been developed under project "Management System for Post Graduate Education". The system automates the working of PG School, IARI and provides online access to various resources. The system is available at http://pgs.iasri.res.in to all its users. The system has user

categories such as students, non-faculty scientists, faculty members, guides, professors, Head of Divisions, PG School administration, registrar, dean and system administrator. At present, the system has modules like Student Management, Faculty Management, Courses Management, e-Learning and Administration. The system has workflows for student admission, faculty registration, inducting guide from faculty, designation of professor from guide, adding /modifying/deleting courses under different disciplines, offering courses in trimesters, allocating faculty to courses, allotting guide to students, advisory committee of students, PPW of students, student trimester registration, progress report, ORW of students, fees, class schedule, topic wise e-Learning resources and grade allotment. The system has discipline wise reports for getting information about students, faculty, professor, and courses offered in each trimester.

Student Registration Status

Expert System for Maize Crop

Maize AgriDaksh provides ICT based advisories on Maize Crop and allows interaction with experts using Internet. Maize AgriDaksh is available online at http://expert.iasri.res.in/agridaksh.

Status of PPW Submitted by Students

Maize AgriDaksh

Knowledge Model Creation

First step for building an expert system of a crop through AgriDaksh is to build its knowledge model. Knowledge model can be build by selecting the desired attributes from the Attributes List and moving them to Selected Attribute List. Once, the desired attributes are chosen, domain experts can enter the values of these attributes for each and every variety of the crop.

Knowledge Acquisition

Knowledge Acquisition module is used for entering knowledge about various entities such as crop varieties,

The system also has administrative reports like PPW or ORW submission status report, trimester registration status report, roaster report etc. The system has been implemented from the academic year 2009-10 and successfully running since then. The system has been strengthened with Pending Work Status that appears on the home page of the user, auto email facility. At present the system has 522 registered students and 503 faculty members. The system has 1126 courses listed in 23 disciplines. The online capability of the system allows the students, faculty members and administrators to publish and retrieve the information from their respective disciplines and desktops.

diseases, insect-pests, weeds, nematodes, physiological disorders and post harvest technology. The system contains information on varieties for Distinctive, Uniformity and Stability (DUS) features. It provides location specific and characteristics based varieties search facility. It displays production technology for Specialty Corn: such as Baby Corn Quality Protein Maize, Sweet Corn, Pop Corn and High Oil Corn. It also includes the methods for producing various products on Specialty Corn. It also has Single Cross Hybrid Seed Production Technology.

Problem Identification

This module has two sub modules viz., Rule based problem identification and Ontology based problem identification. First sub module allows the domain experts to define the problem and develop decision tree to solve the problem. Once the tree is developed, farmers can get the solution about the problem. The second sub module allows the farmers to identify the diseases and insects affecting their crops as well as select varieties according to their location and conditions.

Disease Diagnosis based on Farmer Answers to System Queries

Knowledge Retrieval

Knowledge Retrieval module is the most important module as far as farmers are concerned. Through this module, a farmer can get information about each and every thing that domain experts have entered e.g. plant protection sub module allows farmers to retrieve knowledge about diseases, insects, weeds, nematodes and physiological disorders.

Ask Questions to Experts

Using this module a farmer can ask question directly to domain experts. The system transfers the question to relevant domain experts and sends answer to the farmer thorough email. The same is displayed in the system for the benefit of other farmers.
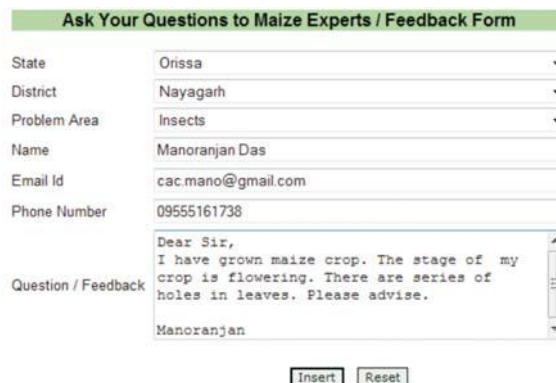
A Farmer Asking the Maize Disease Related Problem

Administration

This module is for the administrator for controlling the overall functionality of the system. Using this module administrator can create different type of users such as end users, domain experts, domain expert validators, and crop administrator. One can add a new crop and assign a crop administrator for that crop.

The system has been developed using JAVA, OWL Ontology and Semantic Web technology. It has used the published sources of DMR and applied the heuristics of maize experts. The user interfaces for General Information, Knowledge Acquisition and Retrieval for Disease and Insect-pests are designed and implemented using JSP. To enter the information in database multiple authentication levels for maize experts are incorporated in the system. It has a Farmer Feed Back/Ask question window, which allows a farmer to ask their problems and to get the answer from concerned maize experts. The knowledge about maize disease diagnosis, variety and insect/pest identification is added in the ontology based knowledgebase of the system. The system will help in dissemination of the latest information to the users.

Machine Learning Approach for Data Mining in Agricultural Dataset

To explore the overlaps between machine learning and

statistical analysis of data, classification task of data mining has been carried out on several datasets using following Machine Learning and Statistical Methods.

Machine Learning Methods

1. Artificial Neural Network
2. Decision Tree
3. Support Vector Machines
4. Discretization based Support Vector Machine (D-SVM)

Statistical Methods

5. Naïve Baye's Classifier
6. Discriminant Analysis

Hybrid Model

7. Rough Set based Decision Tree (DT)

The evaluation parameter considered for the performance is Classification Accuracy. The measure for evaluation of performance used in the study is 10 x 10 Cross-validation.

All the datasets are explored and pre-processed as per the requirement of the technique. For DT and D-SVM, datasets are discretized and then only the classifiers are applied on them. For D-SVM, the datasets are discretized using three discretization algorithm: Entropy, Boolean reasoning and equal-frequency. It is observed that in general, the performance of ML classification techniques achieve better classification accuracy as compared to the statistical techniques. It is also visible that the best performer is the hybrid classification model D-SVM. It is surprising that the ANN model has a much lower classification accuracy as compared to other ML techniques and also it has a lower accuracy as compared to the statistical classifiers. It is concluded that:

- The techniques of machine learning have been developed in response to the current pressing need to automate the information discovery process.
- By providing the mechanisms to automate the information discovery process ML algorithms augment statistical analysis.
- The two approaches of data analysis are complementary, rather than contradictory.
- Machine learning algorithms have a sound mathematical basis, and directly incorporate statistics into their algorithms.

- ML algorithms also tend to be more accessible to end-users and domain experts. The two analysis methods are converging, and these fields have much to offer each other.
- Identifying the right technique also plays an important role in achieving the better accuracy.

The data although in the vector format displays the spatial aspects in the form of latitudes and longitudes and the results of SVM are encouraging for the vector data format of spatial data.

Project Information and Management System of ICAR

Project Information and Management System of ICAR (PIMS-ICAR) has been designed and developed as a web enabled system to help in taking decisions to check duplication in research projects both at divisional as well as inter divisional level of ICAR. The system is being strengthened for modules on Data Management; Duplicate Detection to check duplication in research projects; Projects On-line Monitoring; Reports & Queries; and User Management and Administration. The system has been hosted at http://pimsicar.iasri.res.in/ on the server of IASRI, New Delhi.
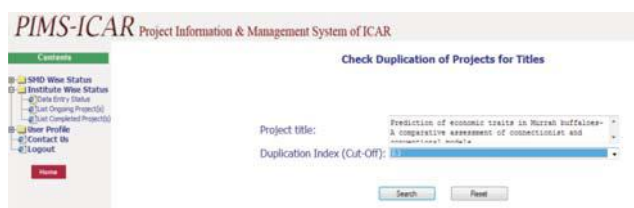
Duplication Detection Module of PIMS-ICAR

Auto extracted keyword based search approach has been used for the development of the Duplicate Detection Module capable to assist in identification of duplication of research activities at divisional and inter divisional level of ICAR.

The procedures for search of Project Title, Objectives, Activities, Keywords and Expected Outcome have been implemented. The procedures for ontologies based search is under development and testing.

The module for projects data management has user interfaces for on-line data entry, data updating, and modification with respect to ongoing projects data as per RPF-I and as well as for the completed projects wherein

facility has also been provided to upload RPF-III document in Doc/PDF/Scanned file format into the system.

Four zonal workshops were organized in which Nodal Officers from 77 ICAR institutes participated. In the zonal workshops a brief introduction on PIMS-ICAR along with the objectives and the role and responsibilities of Nodal Officers at their respective Institute were discussed. The procedural flows as well as the working of the system including access rights of the Nodal Officer were demonstrated. Live demonstration cum practical session on the data management module for Ongoing Projects Data Entry as per RPF-I and for Completed Projects Data Entry Process including the process for upload of digital copy (Scanned/PDF/Doc file) of RPF-III into PIMS-ICAR were given. Reference guide for data management has been prepared and made accessible on PIMS-ICAR site for the Nodal Officers/ PIs of the projects. The problems faced by the Nodal Officers in initiating data entry task from their respective institutes and their suggestions for achieving the targets and improvement in the system have also been deliberated. As an outcome of the zonal workshops, the Nodal Officers have been sensitized and trained to initiate the research projects data entry process. As per the data entry status available in PIMS-ICAR on 31 March 2011, so far 91 institutes have initiated project data entry process for more than 3700 ongoing and 2650 completed projects into PIMS-ICAR from their respective institutes.

4

Library and Documentation

The Library of IASRI is one of the Regional Libraries of NARS (National Agricultural Research System) of the country. The Library has an excellent print and electronic resource base in the fields of Agricultural Statistics, Computer Applications, Agricultural Economics, Agricultural Bioinformatics and allied sciences to support teaching, research and consultancy in the relevant areas. This is a sole referral library in Agricultural Statistics and Computer Applications in India. It caters to the information needs of students, faculty, researchers, scientists and trainees etc. not only of IASRI but also from different Institutes of ICAR and State Agricultural Universities under NARS both in conventional as well as electronic format.

The Library Advisory Committee plays an important role in management of the Library and it clears proposals relating to enrichment of resources of the library such as books, journals, on-line bibliographical, statistical, abstract and CD-ROM databases as well as infrastructural development etc. The Library Advisory Committee for the year 2010-11 was as under:

Dr. VK Bhatia	Chairman
Dr. VK Gupta	Member
Dr. Prajneshu	Member
Dr. Ranjana Agrawal	Member
Dr. PK Malhotra	Member
Dr. Rajender Parsad	Member
Dr. UC Sud	Member
Dr. Anil Rai	Member

Sr. Administrative Officer	Member
Finance & Account Officer	Member
Sh. Shrikant	Student Representative
Dr. (Mrs.) P Visakhi	Member Secretary

The internal administration and organization of the Library & Information System was supervised by Dr. (Mrs.) P Visakhi, Librarian till 14 February 2011 under the guidance of Dr. PK Malhotra as Scientist-in-Charge, Library.

Library has updated its well featured website http://lib.iasri.res.in which is available to the users at IASRI on the Intranet.

Physical Verification of Library Holdings

Stock of library documents have been verified by the Committee specially constituted for the purpose by Competent authority and preliminary report has been received in library for further necessary action.

During the year, the library provided following services to its users.

Library and Documentation

(i) All resources added during the year in the library have been classified, catalogued and bar-coded and updated in the Library Bibliographical Database using "Alice for Windows" Library Management software.

(ii) Full text of M.Sc. and Ph.D. Theses added during the period have been digitized and added in online digital format.

(iii) Library users were given hands-on training whenever necessary on the use of library computerized services/resources.

(iv) All trainees of the short term training programmes held in the Institute were given lectures and hands-on training on "On-line Library Information Services".

Collection Development

The library continues to maintain its excellent collection of scientific literature in the form of Books, Journals, Reports, Theses, CD-ROM/on-line bibliographical databases etc.

During the period under report Library subscribed/ renewed the following Bibliographical, Statistical and Abstracting on-line portals

– Indiastat.com (http://www.indiastat.com)
– Indian Harvest (http://lib.iasri.res.in/cmie.asp)
– Developing Library Network (http://delnet.nic.in)

Periodicals

i.   Indian Journals - 30 (Print)
ii. Foreign Journals - 49 (Print)

Computerized Services

– On-line Catalogue - OPAC
– Archival Database (Digitized Theses is and Old & Fragile Journals) - 2
– On-line Journals - 38

– On-line Bibliographical Database - 6
– CD-ROM Database (On-line and Off-line) - 25
– Internet Search
– On-line Enquiry (OPAC)
– Current Awareness Service (New Arrivals)
– On-line Reservation of Documents
– On-line User Profile Service

Statistics Relating to the Library

Item	Number
Number of text books added (English)	3
Number of reference books added (English)	184
Number of books added (Hindi)	36
Number of grey literature added	109
Number of Indian journals subscribed	30
Number of Foreign journals subscribed	49
Number of on-line journals subscribed (Indian and Foreign)	38
Number of electronic and printed theses added	11
Number of publications issued from the library	15,000
Number of users visited library website	32,000
Number of articles (Electronic+Print) received from DELNET	46
Number of books received on inter-library loan through DELNET	20
Number of outside users accessed e-services in library premises (NARS)	650
Number of publications lent out on inter-library loan	46
Number of readers visited and consulted the library	16,500
Number of scientific and technical papers reprographed (pages)	11,800
Number of CD-ROM added	23
Number of articles provided under CeRA document delivery	275
Services including digital format internet/databases access searches	70,000

Technology Assessed and Transferred

Launch of AgriDaksh and Expert System on Seed Spices

Secretary, DARE and DG, ICAR launched AgriDakh and Expert System on Seed Spices on 24 February 2011 during Director's Meeting held at NASC Complex, New Delhi.

AgriDaksh

AgriDaksh, a tool for building online expert system, has been developed at the Division of Computer Applications, Indian Agricultural Statistics Research Institute, New Delhi. AgriDaksh has modules on Knowledge Model Creation, Knowledge Acquisition, Problem Identification, Knowledge Retrieval, Ask Questions to Experts and Administration. AgriDaksh enables domain experts to build online expert system in their crops with minimal intervention of knowledge engineers and programmers. With its use, it is possible to build online expert system for each and every crop in shorter time and resources. Online expert systems have the capability to transfer location specific technology and advice to the farmers efficiently and effectively. This in turn will reduce losses due to diseases and pests infestation, improve productivity with proper variety selection and increase in income of the farmer. **Maize AgriDaksh** is the first system developed by IASRI in collaboration with Directorate of Maize Research, New Delhi using AgriDaksh. Maize AgriDaksh provides ICT based advisories on Maize Crop and allows interaction with experts using

Internet. Maize AgriDaksh is available online at http://expert.iasri.res.in/agridaksh.
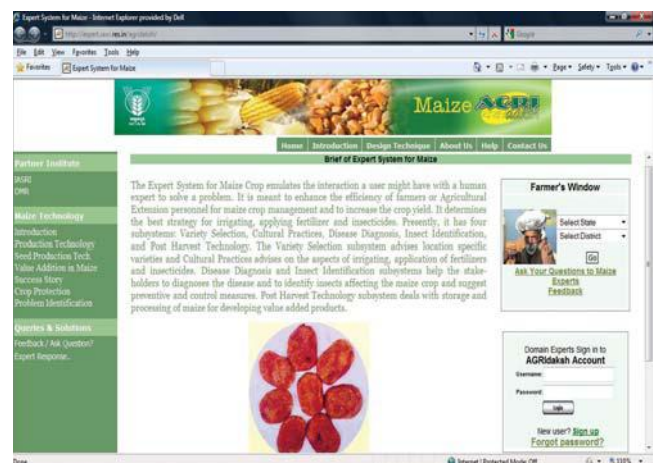
Expert System on Seed Spices

Expert System on Seed Spices (EXPSS) has been developed in collaboration with National Reserach Centre on Seed Spices (NRCSS), Ajmer. This expert system extends large amount of research work done by the NRCSS and SAU's pertaining to crop management on 4 major and 6 minor seed spices to the farmers in a scientific way. It provides expert advice to farmers on variety selection, field preparation, fertilizer application, schedule of irrigation, plant protection from pests/diseases/nematodes. It also

provides solution to the problems faced by the farmers through online queries. It helps in identifying insect/pest attack and suggests remedial measures.This system will help in transfer of technology for the enhancement of production level of seed spices. It is an integrated system which addresses all aspects of seed spices crop management in India. EXPSS is available online at http://iasri.res.in/expss. Some screen shots of EXPSS are:

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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 has M.Sc. and Ph.D. programmes in Agricultural Statistics since 1964 and M.Sc. in Computer Application since 1985-86. A brief description of human resource development during the year through degree courses, certificate courses, ad-hoc training programmes, customised national and international training programmes 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)

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, New Delhi. The course-curriculum was revised and implemented from the academic year 2010-11. The revised course-curriculum is available at http://www.iasri.res.in/iasriwebsite/degree_course.htm.

The eligibility qualifications for admission to Master's degree in Agricultural Statistics is Bachelor of Science degree in Agriculture / Horticulture / Forestry / Agroforestry /Sericulture / Agricultural Marketing/ B.Sc. (10+2+3 System) with at least 60% marks or its equivalent Overall grade point average (OGPA) for general category, and at least 55% marks or its equivalent OGPA for SC/ST/PH candidates.

For admission to Master's degree in Computer Application, the eligibility qualification is Bachelor of Science degree in Agriculture/Computer Science/ Agricultural Engineering/B.Sc. (Horticulture), Veterinary Science, Home Science, B.Sc.(Forestry)/ B.Sc. with Maths/Statistics/Physics/Biology/B.Sc.(10+2+3 System) with at least 60% marks or its equivalent Overall grade point average (OGPA) for general category, and at least 55% marks or its equivalent OGPA for SC/ST/PH candidates.

Further, only those candidates who had their Bachelor's Degree Programme under 10+2+4 or 10+2+3 or 10+1+4 system (or awarded B.Sc. degree under 10+2+2 system prior to 1985) are eligible for admission to Doctor of Philosophy degree in Agricultural Statistics who have Master's degree in Agricultural Statistics / Statistics / Mathematical Statistics / Biostatistics of IVRI / Professional Statisticians' Certificate Course (PSCC) from IASRI with at least 60% marks or an its equivalent overall grade point average (OGPA).

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

(a) **Ph.D. (Agricultural Statistics)**
Admitted   :   5
Completed   :   -

(b) **M.Sc. (Agricultural Statistics)**
Admitted   :   9
Completed   :   6

(c) **M.Sc. (Computer Application)**
Admitted   :   6
Completed   :   4

Brief of research work carried out by students who completed various courses during 2010-11 is as follows:

M.Sc. (Agricultural Statistics)

i) Sandip Kumar Sadhu

A study on tree-based modeling for classification in agriculture

Classification and prediction in agricultural systems are quite useful for planning purposes. In this study, Classification and Regression Tree (CART) models have been employed in agricultural ergonomics for ascertaining whether the farm labourers have eventually experienced discomfort in operating farm machineries under various modes and loads of operation using a large dataset simulated from a real dataset. An alternative classification tree model has also been proposed within the CART framework to overcome some of its inherent drawbacks. In this, the variable selection and split point selection has been done separately by employing sound statistical testing and an optimal stratification procedure respectively to circumvent the selection bias which arise in the usual CART methodology due to simultaneous selection of split variable and the split points. Thereafter, an independent test set has been used for pruning of the resulting maximal tree. The final fitted tree has been validated upon the same dataset employed earlier for classification using the usual CART models fitted. When the classificatory performances of the CART models fitted using both the usual and proposed approaches are compared, the results came out to be at par under the two approaches. Moreover, classifications using the fitted CART models were found to be better when compared to those obtained for corresponding logistic regression and discriminant function analysis methods.

Guide: Dr. Ramasubramanian

ii) Sandipan Samanta

A study of SETARMA nonlinear time-series models

To assess the presence of nonlinearity for given data, the directed scatter diagram, time irreversible plot and Tukey's one-degree-of freedom tests are carried out. Using the Naive approach and Monte Carlo simulation technique, comparative study of different non-linear models like Self-Exciting Threshold Autoregressive Moving Average (SETARMA) two-regime, Smooth Transition Autoregressive (SETAR) two-regime and Autoregressive Integrated Moving Average (ARIMA) models is carried out on the basis of Mean Square Forecast Error (MSFE). The theoretical development of optimal out-of-sample forecasts for SETARMA two-regime model is described. Application of Real-Coded Genetic Algorithm (RCGA) for fitting of SETARMA two-regime model is discussed and applied for forecasting of annual mackerel catch time-series data of Karnataka. Various RCGA operators, viz. Tournament Selection operator, Simulated Binary Crossover (SBX) operator and Polynomial Mutation operator are also studied. Finally, it is concluded that SETARMA model has performed satisfactorily for modelling and forecasting for annual Mackerel catch time-series data of Karnataka.

Guide: Dr. Prajneshu

iii) Rupam Kumar Sarkar

An empirical study on mixture of qualitative and quantitative traits

Crop genotypes possess a great deal of similarity in respect of qualitative characters, quantitative characters or a mixture of both. Furthermore, quantitative characters' based distinction may not be very accurate because of the influence of environment on expression of these characters. Whereas qualitative characters like the molecular markers reveal this distinction among genotypes, which are not influenced by environments. Many a time, clustering techniques are applied for qualitative data and quantitative data separately in order to classify the genotypes into homogeneous groups. There is a problem when the degree of correspondence between the clusters groups formed based on qualitative traits and quantitative traits do not agree with each other. Five procedures PCAMIX, INDOMIX, PRINQUAL, Expectation-maximization (EM) and Artificial Neural Network (ANN) meant for classification of mixed data of qualitative and quantitative traits are studied and compared for performance based on weighted average probability of misclassification. Two

methods, namely, INDOMIX and PCAMIX along with k-means clustering are identified suitable procedures as they show lowest weighted average probability of misclassification.

Occurrence of missing observations in a multivariate genotype data is a common feature in breeding experiments due to non-germination, pests and disease attack etc. Therefore, the performance of combined analysis procedures assessed against 1%, 5% and 10% missing observations along with different methods of imputation techniques. The results reveal that all the five classification methods are robust up to 5% of imputed missing observations. INDOMIX and PRINQUAL methods along with k-means clustering perform better over other methods to the extent of 10% imputed missing observations.

Guide: Dr. A.R. Rao

iv) Sudhir Srivastava

Some investigations on augmented partial diallel cross designs

A major objective of plant and animal breeding programmes is to improve the genetic potential of plants and animals, respectively. Plant breeders generally require information regarding the methods to evaluate the general combining ability (gca) effects of the individual parental lines. In experimental situations where several new lines (called the test lines) are developed in the initial stage of an experiment and are compared with one (or more) control lines to screen out the new lines for further investigation. Block designs involving complete/ partial diallel crosses for comparing test lines with control line(s) are suitable when the experimenters are interested to estimate test versus control comparisons with respect to their gca effects with a minimum variance. Some families of small and efficient block designs for diallel cross experiments for test versus control comparisons have been constructed for such situations. For experimental situations where resources are limited so that a complete diallel is not feasible, but some lines are believed to be superior and are, therefore, of prime interest, augmented partial diallel cross (APDC) plans are suitable. It is desirable to have these primary lines represent a high proportion of the crosses and hence they are crossed with every other line but a partial diallel system is used for lines of secondary interest. Some classes of APDC plans have been obtained using various association schemes of

partially balanced incomplete block designs. Variances pertaining to different groups of interline comparisons have been computed in both the situations and lists consisting of parameters of the plans for useful range have been prepared. It was observed that variance of interline comparisons of interest have been estimated with maximum precision in all the classes.

Guide: Dr. Cini Varghese

v) Hiranmoy Das

Study on additivity of effects and independence of errors in experimental data

The procedure for testing the assumption of additivity in data generated from a block design has been developed and illustrated with an example of experimental data generated using Balanced Incomplete Block Design. From the Agricultural Field Experiments Information System database, plot-wise data relating 6287 experiments conducted using Randomized Complete Block Design were retrieved for (i) testing of assumption of additivity of effects (Tukey's one degree of freedom test) and (ii) testing of assumption of independence of errors (Run test). It is observed that the assumption of additivity does not hold in 10.85% of experiments whereas in 11.07% experiments, assumption of independence of errors fails.

Guide: Dr. P.K. Batra

vi) Rohan Kumar Raman

A study on performance of linear discriminant function under multivariate non-normal situations

Fisher's linear discriminant function (LDF) is commonly used procedure for classification problems using multivariate data. It is based on the assumption of multivariate normality and equality of dispersion matrices between two groups. The performance of linear discriminant function under normal and non-normal situations has been compared using two sets of live data on three distinct populations of rice and maize consisting of nine and ten morphological characters, respectively. The data of different dimensions viz. four, six and nine characters and for different sample sizes 50, 100 and 150 are simulated by using different mean vectors and pooled covariance matrix of different populations of both rice and maize. Different samples of data are simulated by using multivariate beta distribution popularly known as Dirichilet distribution as well as multivariate normal

distribution by RANDIRICHLET and RANDNORMAL functions in SAS package.

Probabilities of misclassification under normal and non-normal data have been obtained. These probabilities decrease with increase in sample size and number of characters taken in the D^2 statistics in both rice and maize. The empirical probabilities of misclassification are higher in case of non-normal data as compared to normal data. Hence, it may be concluded that the violation of multivariate normality assumption in LDF results in higher probability of misclassification as compared to normal. It was also found that for the very large samples both the values are almost equal.

Guide: Dr. A.K. Paul

M.Sc. (Computer Application)

i) Sazia Siddique
Software for multivariate analysis of variance for general block design

Experiments in which data on several responses are measured from an experimental unit corresponding to the application of a treatment are known as multi-response experiments. There is a tendency to analyze data from these experiments as a single response experiment in the sense that each response variable is analyzed separately as if the responses were independent. The response variables are generally correlated. In analyzing data from each response variable separately, the advantage of the correlation structure is lost. Therefore, to take advantage of correlation structure between several response variables in multi-response experiments, the data must be analyzed using multivariate analysis of variance. For

such experimental situations a web enabled Software for Multivariate Analysis of Variance for General Block Design has been developed using ASP.NET and C# language, which is more flexible and user-friendly. There is no restriction on the number of variables and observations. The module provides the facility to upload comma separated value (csv) or excel data files. It provides MANOVA under the General Block Design setup. It also provides estimated genotypic and phenotypic variance-covariance matrices, heritability coefficient and genetic correlations under an incomplete block design set up. It has been provided with an extensive Help document, regarding statistical concepts involved, how to use the software, example data file, example of input files and output files.

Guide: Dr. PK Malhotra

ii) Manoranjan Das

Building and querying soil ontology for agriculture

With the outburst of knowledge, it has become necessary to convert unstructured knowledge into structured one. Traditional Knowledge Organization Systems must be re-engineered so that they contain domain concepts linked through a rich network of well-defined relationships and a rich set of terms identifying these concepts in order to convert unstructured knowledge to structured one. These systems must also be converted to machine-processable formats based on Web technologies like XML, which tag the vocabularies in a standardized way. Ontology is the latest way of knowledge representation, in any domain as it defines concepts and relationships between them and acts in synergy with agents and Semantic Web Architecture. Building ontologies in different domains of agriculture are helpful to convert unstructured knowledge into structured one that can be shared across applications. Soil ontology has been designed and created for USDA soil taxonomy through Protégé OWL editor from Order to Subgroup level. Using this soil ontology, a web based application, *Soil Taxonomy Ontology* has been developed. This application has N-tier architecture, application development environment as NetBeans 6.9 editor, Protégé, Web development technology as Java Server Pages (JSP) and SPARQL. Semantic Web Framework layer is implemented using JENA. The search facility provides USDA Soil Taxonomy in details up to Subgroup level of seven orders available in India. Domain experts can see and edit the *Soil Ontology* or can suggest anything related
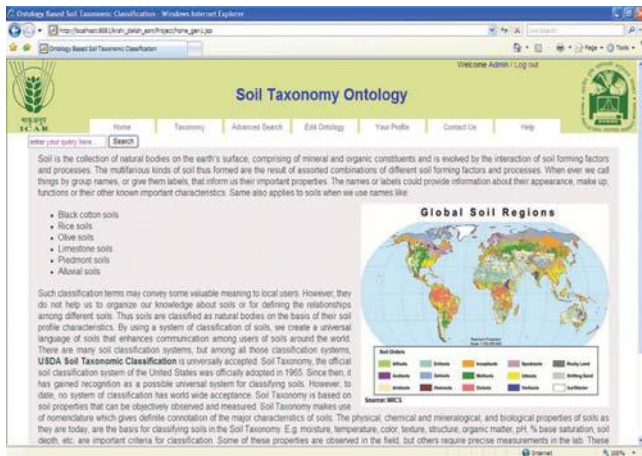
to the creation of Soil Taxonomy Ontology through Web Protégé. By using *Advance Search* navigation key, one can easily classify a newly found soil up to Subgroup level. This software also facilitates name based search for all soil taxonomic terms.

Guide: Dr. P.K. Malhotra

iii) Debasis Dutta

Design and development of data mart for consumption expenditure survey data

Integrated National Agricultural Resources Information System (INARIS), is an endeavour in developing a central information repository of major agricultural resources like Forestry, Horticulture, Agronomy, Social Science etc. To fulfil the requirement of data on consumption expenditure (for planners, researchers, development agencies and Government of India) which is required for further studies and evolving realistic strategies for improvement of the standard of living of the people of the country, the Consumption Expenditure

Survey Data are collected all over the country by NSSO. These data have been analyzed to identify possible data marts and the dimensions that can be associated with these data marts. To find out the associated dimensions with the data marts and conformed dimensions, the top-down planning approach called as Data Warehouse Bus Architecture Matrix was used and it was found that a single mart is sufficient enough in order to integrate all the information into a single place. The dimensional models have been designed and the data mart for consumption expenditure survey data has also been created. The data storage has been converted into a form of multidimensional model, known as cube. These cubes have been designed by using fact and dimension tables and deployed on Internet for on-line analysis, which is called as On-Line Analytical Processing (OLAP). The cubes have been integrated with previously developed INARIS. The information in this data warehouse is available to the end-users in the form of DSS in which all the flexibility of the presentation of the information, such as its online analysis is inbuilt into the system. The data in the developed cubes can be viewed in cross tab view as well as in graphical views. Drill downs and roll ups can be performed on the data available in the cubes. Another important functionality incorporated in these cubes is Drill Through in which user can find interesting trends or anomalies while analysing data. The advantage of this approach is that the often query intensive work of ad hoc data analysis is performed using summarized data in the cube. Users can also import the results of their query in Excel sheets as well as in pdf files.

Guide: Dr. V.K. Mahajan

iv) Nishikant Pareshwar Taksande

Development of web based software for generation and analysis of partial diallel crosses

A web based software WebPDC has been developed for generation and analysis of PDC. *webPDC* provide PDC crossing plans, and analysis of PDC crossing plan is also carried out. With this different association schemes are also developed and web services are created for all these module which are platform independent and easy to consume. This software can upload the data from MS-Excel files and analysis of variance table with mean table is presented to users and results can be saved in MS-Excel files on users

Inaugural Function of Training Programme on
Statistical Modelling in Agriculture

Modelling, Nonlinear Time Series Modelling and (v) Soft Computing, Fuzzy Linear Regression, Artificial Neural Network, Data Mining.

Four guest faculty Dr. Prem Narain, Former Director, IASRI, Dr. S Ravichandran, DRR, Hyderabad, Dr. SR Singh, BHU, Varanasi and Dr. TV Sathianandan, CMFRI, Kochi have delivered lectures in this training programme on VARIMA, Structural and Fuzzy Time Series Modelling, Modelling in Genetic Statistics along with one faculty Dr. Manju Nath from Indian Statistical Institute, New Delhi who delivered lecture on R Software.

The training was inaugurated by Dr. MM Pandey, DDG (Engg.), ICAR, New Delhi and Valedictory Address was delivered by Dr. C Devakumar, ADG (HRD), ICAR, New Delhi. Dr. Himadri Ghosh and Sh. Amrender Kumar were the Course Director and Course Co-Director, respectively.

Summer/Winter School Organized: (21 Participants)

A winter school on **Development of Expert Systems in Agriculture** was organised during 02-22 December 2010. The winter school was sponsored by the Education Division of ICAR. The objective of the programme was to inculcate among participants the online expert systems development skills using AgriDaksh and other related web technology and also to familiarize the participants with the knowledge dissemination systems developed at IASRI. This course was attended by 21 participants. This training programme covered sufficient practical exercises to design, develop and hosting an online expert system for a specific crop. The focus of the training programme was to familiarize the participants with recent advances in Artificial Intelligence and impart skills to develop online expert systems. Dr. Sudeep was the Course Director for the winter school.

International Training Programmes

Resource Generation: 3 (30 Participants)

- An International training programme on **Agricultural Statistics System in India** for the Officials of SAARC countries was organized during 31 May–11 June 2010. 20 participants attended the training programme. This training programme was funded by CSO, MOS&PI, Government of India (GOI).

The broad objective of the training programme was to provide exposure to the participants about the agricultural statistics system prevailing in our country. Dr. UC Sud was the Course Director and Dr. KK Tyagi was the Co-Course Director of the training programme. The lecture manual was brought out in two volumes and softcopy of lecture manual was prepared in CD. Dr. Pronab Sen, Chief Statistician and Secretary, MOS&PI, GOI was the Chief Guest of the Inaugural Function and Prof. MM Pandey, DDG (Engineering), ICAR was the Chief Guest at the Valedictory Function.

A participant receiving certificate during Valedictory Function on International Training Programme on Agricultural Statistical System in India

- An International training course on **Early Warning System for Food Security** was organized during 31 May-18 June 2010 for the five participants from Yemen. The course aimed at educating the participants about techniques for estimation / forecasting of agricultural production and issues involved in food security and imbalance between demand and supply of food. The course was conducted with Dr. Ranjana Agrawal as course Director, Dr. Chandrahas and Sh. SC Mehta as Co-Directors. The programme was inaugurated by

Dr. Pronab Sen, Chief Statistician and Secretary, MoS&PI, Government of India. The topics covered spread over four modules consisting of Introduction to computers, Statistical methods, Sampling techniques and Forecasting techniques and Food security analysis.

The faculty consisted of the scientists of the Institute and some were invited from IARI, NCAP, IMD and Ministry of Agriculture, etc. Field visits were arranged for carrying out crop cutting experiments at a village in Agra district and also to National Agricultural Science Museum to acquaint the participants with historical background and latest developments in agriculture. Also, visits were made to interact with the officials at IMD, NCMRWF, CSO and NASA to acquaint the trainees for the work done at the respective organizations. For Valedictory Function, Sh. SK Das, DG, CSO was the Chief Guest.

A participant receiving certificate during Valedictory Function of International Training Programme on Early Warning System for Food Security

- An international training programme on **Application of Remote Sensing and GIS in Agricultural Surveys** was organized during 13 October-02 November 2010 for the participants from AARDO member countries. Five participants one each from Syria, Jordan, Egypt, Taiwan, and Bangladesh attended this programme. Dr. Anil Rai and Dr. Prachi Misra Sahoo have acted as Course Director and Course Co-Director respectively. The course aimed at i) familiarizing the participants with the basic concepts of remote sensing and GIS, ii) acquainting the participants with use of GIS and Remote Sensing Software Packages and iii) exposure to application of remote sensing and GIS in agricultural surveys.

National Training Programmes

Resource Generation: 2 (22 Participants)

- A training programme on **Data Analysis with Statistical Packages** for 07 XXX batch ISS Probationers was organized during 17 March –09 April 2010. Dr. Rajender Parsad was the Course Director and Dr. Krishan Lal and Dr. Cini Varghese were the Course Co-Directors for this training programme sponsored by CSO, MoS&PI, Government of India. This training programme was inaugurated by Dr. Bikas K. Sinha, Ex-Member, National Statistical Commission. The training programme aimed at familiarizing the participants with the advances in data analytical techniques for drawing statistically valid inferences from data and to acquaint the participants with the use of statistical packages for data analysis and provide hands on experience. Entire course contents was structured in seven modules: Statistical Software Packages; Basic Statistical Techniques; Diagnostics and Remedial Measures; Multivariate Analytical Techniques; Sampling Techniques; Statistical Modelling and Forecasting and Other Useful Statistical Techniques such as Spatial Statistical Analysis, Remote Sensing and GIS, Data Mining, Artificial Neural Networks, etc. The course material was distributed to the participants in the beginning of the training programme in the form of reference manual in two volumes that consisted of 69 lectures and 760 pages. Dr. Pronab Sen, Chief Statistician and Secretary, MOS&PI, Government of India was the Chief Guest in the Valedictory Function. He distributed the certificates to the participants along with a copy of E-manual.

A view of Valedictory Function of Training Programme on Data Analysis with Statistical Packages

- A refresher training programme on **Small Area Estimation** for 15 in-service ISS officers and senior officers of State Governments/Union Territories was organized during 23-28 August 2010. This training programme was funded by CSO, MOS&PI, Government of India. The broad objective of the training programme was to provide exposure to the participants about the small area estimation techniques. Dr. UC Sud was the Course Director and Dr. Tauqueer Ahmad was the Course Co-Director of the programme. The reference manual was brought out and softcopy of manual was prepared in CD. The training programme was inaugurated by Prof. TCA Anant, Chief Statistician and Secretary, MOS&PI, GOI. Dr. Padam Singh, Head, Research & Evaluation, EPOS Health Consultants (India) Pvt. Ltd. delivered the Valedictory Address.

Inauguration of Refresher Training Programme on Small Area Estimation

Training Programme Conducted under various Research Projects: 16 (359 Participants)

Training Programmes under NAIP Consortium on Strengthening Statistical Computing for NARS: 12 (276 Participants)

- **SAS Platform Administration training for SAS EBI Server** was organized during 02-05 June 2010. The training programme was inaugurated by Dr. VK Gupta, ICAR National Professor. The training was imparted by SAS Resource Persons and 20 Scientific/ technical personnel from the Institute participated in the training programme.

A view of SAS Installation Training under NAIP Consortium on SSCNARS

- **SAS Installation training** was organized during 07-08 June 2010. Dr. MM Pandey, Deputy Director General (Engineering) inaugurated the Installation training of Nodal Officers from 24 NARS organizations of NAIP Consortium on "Strengthening Statistical Computing for NARS" on 07 June 2010 in presence of Dr. VK Gupta, ICAR National Professor and Dr. VK Bhatia, Director, IASRI, New Delhi and many other dignitaries. Dr. Bhatia underlined the importance of this project and emphasized that the outcome of this project would be in terms of trained manpower in the usage of statistical package. Dr. Rajender Parsad, Consortium Principal Investigator described briefly the genesis, importance and goal of the project and also presented an implementation plan. This initiative aims at creating a sound and healthy statistical computing environment for the benefit of scientists of NARS. The goal of the project is to provide research guidance in statistical computing and computational statistics, providing thereby enabling statistical computing facilities to the researchers of NARS. It would not merely be an interface of statistics, computer science and numerical analysis; it would also involve development of intelligent algorithms using statistical techniques for analyzing massive data sets. Dr. VK Gupta felt that the initiation of this project is a historical event, which would go in the Annals of the ICAR as a red letter day. It would give a new look to the research of agricultural scientists and through statistical computing environment the agricultural research would become globally competitive, visible and

acceptable. Dr. Gupta also felt that the process of procurement and installation has been successfully initiated but the bigger challenge that lies ahead is in the implementation and capacity building of scientists and this would become a major component of the success of this project. Dr. MM Pandey congratulated IASRI for its efforts in spearheading this initiative which would provide desired impetus to agricultural research. Dr. Pandey expressed his feelings by saying that this effort would further enhance the visibility of IASRI and the disciplines of Agricultural Statistics and Computer Applications in NARS. He also expressed a sense of fulfillment over the fact that not only this project aims at creating infrastructure but also targets at training 1500 researchers in the NARS in the usage of high-end statistical package. These trainers would in turn train their fellow scientists and thus it would have a multiplier effect. Further, he loudly expressed the feeling that sensitization of the research managers and the research scientists is very important for the success of this project. IASRI has to prove its leadership in this aspect also. The training programme was attended by 35 participants (22 nodal officers from the NARS organizations linked to IASRI as Statistical Computing Hub and 13 from IASRI, New Delhi).

A class room view during SAS Training under SSCNARS

- A trainers training programme on **SAS: A Comprehensive Overview (Part I)** was organized during 23 June-09 July 2010. The training programme was inaugurated by Dr. VK Gupta, ICAR National Professor. The training

programme was attended by 26 research personnel of NARS from Indian Agricultural Research Institute, New Delhi; National Centre for Agricultural Economics and Policy Research, New Delhi; National Research Centre for Agroforestry, Jhansi; Indian Grassland and Fodder Research Institute, Jhansi; Indian Institute of Soil Science, Bhopal; Central Institute of Agricultural Engineering, Bhopal; Directorate of Soybean Research, Indore and Indian Agricultural Statistics Research Institute, New Delhi. Dr. Rajender Parsad and Sh. N Sivaramane co-ordinated the training programme. Dr. VK Gupta, ICAR National Professor was the Chief Guest during Valedictory Function and it was chaired by Dr. VK Bhatia, Director, IASRI, New Delhi.

A class room view of Training Programme on SAS: A Comprehensive Overview

- A trainers training programme on **SAS: A Comprehensive Overview (Part II)** was organized during 13 September–01 October 2010 under NAIP Consortium Strengthening Statistical Computing for NARS. The training was given by SAS Resource Persons. It was attended by 26 Scientific/ technical personnel from NRC for Agro-Forestry, Jhansi; IGFRI, Jhansi; NBFGR, Lucknow; CIAE, Bhopal; Directorate of Soybean Research, Indore; IARI, New Delhi and IASRI, New Delhi.

- Trainers training programme on **SAS Genetics/ JMP Genomics** was organized during 04–08 October 2010 under NAIP Consortium Strengthening Statistical Computing for NARS. 29 participants from 16 different NARS organizations

NBPGR, New Delhi; NBAGR, Karnal; NBFGR, Lucknow; NRCPB, New Delhi; NDRI, Karnal; IVRI, Izatnagar; NRC for Agro-Forestry, Jhansi; Directorate of Soybean Research, Indore; DWM, Bhubaneshwar; ICAR RC NEHR, Barapani; NAARM, Hyderabad; CIFE, Mumbai; Institute of Biotechnology, ANGRAU, Hyderabad; DRMR, Bharatpur; CTCRI, Thuruvananthapuram; CIFA, Bhubaneshwar; CIRB, Hissar and IASRI, New Delhi were trained in this training programme. Topics covered in this training programme are microarray analysis for gene expression, basic marker association genetics, estimates of allele, genotype, and haplotype frequencies; tests for Hardy-Weinberg equilibrium (HWE) and measures of linkage disequilibrium (LD) between pairs of markers, exploring marker-trait relationships, stability analysis, QTL analysis, whole genome SNP analysis, genetic diversity analysis were covered. JSL script was also covered as part of the training programme. Professor David Burnham, UK and Professor Dough Robinson, USA were the resource persons in this training programme. Dr. TR Shrama, NRCPB, New Delhi was the Guest of Honour during the Inaugural Function of the training programme and Dr. NK Singh, ICAR National Professor, NRCPB delivered the Valedictory Address.

A view of Trainers Training Programme on
SAS Genetics/JMP Genomics

- Trainers training programme on **Data Analysis using SAS** was organized at IASRI, New Delhi during 09–15 October 2010 under NAIP Consortium Strengthening Statistical Computing for NARS. It was attended by 17 participants from NDRI, Karnal; ICAR RC NEHR, Barapani; NAARM, Hyderabad; CSWCRTI, Deharadun; SKUAT-Jammu; SV Agricultural College, Tirupati; Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli; IVRI, Izatnagar; DWM, Bhubaneshwar; DRMR, Bharatpur; MPUA&T, Udaipur and IASRI, New Delhi. In this training programme various topics covered were SAS EBI Server, SAS Macro Development, SAS IML Studio, R-integration, Webex on SAS Enterprise Guide, Analysis of Repeated Measures Data, SAS Enterprise Guide, JMP Statistical Discovery Software, Diagnostics and Remedial Measures, ANN using JMP, running of SAS Macros and Design Resources Server. Dr. Rajender Parsad was the Course Director and Dr. AK Paul and Dr. N Sivaramane were the Course Co-ordinators.

A view of Trainers Training Programme on
Data Analysis using SAS

- A trainers training programme on **Data Analysis of Agroforestry Experiments using SAS** was organized for the research personnel of AICRP on Agroforestry during 17-22 January 2011. The training programme was inaugurated by Dr. SK Dhyani, Director, National Research Centre of Agroforestry, New Delhi. This training programme was attended by 23 participants from NRCAF, Jhansi; OUAT, Bhubaneshwar; TNAU, Coimbatore; BSKKV, Dapoli; UAS, Dharwad; NDUA&T, Faizabad; RAU, Fatehpur; CCS HAU, Hisar; ANGRAU, Hyderabad; JNKVV, Jabalpur; TNV&ASU, Kattaupakkam; PAU, Ludhiana; AAU, Kahikuchi; GBPUA&T, Pantnagar; RAU,

Samastipur; MPKV, Rahuri; IGKV, Raipur; GAU, SK Nagar; SKUAST, Srinagar; KAU, Thrissur; BCKV, Kalyani and UAS, Bangalore. The Valedictory Address was delivered by Dr. Arvind Kumar, DDG (Education), ICAR, New Delhi.

A view of Trainers Training Programme on Data Analysis of Agroforestry Experiments using SAS

- **Six training programmes for researchers'** were organised on **Data Analysis Using SAS** under Consortium Strengthening Statistical Computing for NARS. Dr. Rajener Parsad was the Course Director for these training programmes.

A participant receiving certificate during Valedictory Function of a Training programme on Data Analysis using SAS

The topics covered were on SAS: An Overview; SAS Data Sets; Learning Simple SAS Macros; Regression Diagnostics and Remedial Measures; Time-series Analysis Modelling and Forecasting using SAS Software; SAS Enterprise Guide: An

Overview; E-Miner: An Overview; JMP Statistical Discovery Software: An Overview; Fitting of Nonlinear Statistical Models Using SAS and Design Resources Server. The details of these training programmes are given in the Table on next page.

NAIP Consortium on Bio-prospecting of Genes and Allele Mining for Abiotic Stress Tolerance: 2 (46 Participants)

- One-day training programme on Thin Client Solution / High Performance Cluster Computing by Locuz Enterprize Solution for NAIP-BAM Project was organised on 07 July 2010 in Centralized Statistical and Computational Genomics Lab-Facility 20 participants attended the training programme.

- Dr. AR Rao conducted a training programme on Statistical and Computational Genomics Data Analysis during 11-21 January 2011 at Statistical and Computational Genomics Lab Facility of CABin. This training programme was attended by 26 participants from National Research Centre for Groundnut, Junagarh,Gujarat; Central Inland Fisheries Research Institute, Barrackpore; Central Rice Research Institute, Cuttack; Directorate of Coldwater Fisheries Research, Bhimtal; ICAR Research Complex for NEH Region, Meghalaya; Central Institute of Fisheries Technology, Cochin; Central Marine Fisheries Research Institute, Cochin; Central Institute for Research on Goats, Mathura; National Bureau of Animal Genetic Resources, Karnal; National Research Centre on Plant Biotechnology, New Delhi and Indian Agricultural Research Institute, New Delhi.

NAIP Consortium on V-PAGe: 1 (17 Participants)

- A training programme on Technological Forecasting Methodologies under the aegis of Sub-programme on Technology Forecasting of NAIP Project V-PAGe was organised during 13-17 July 2010. 17 participants (Scientists / Assistant Professors) from various ICAR institutes/ State Agricultural Universities attended the programme. The methods on Technological Forecasting (TF) covered in this training programme were : Intuitive methods, Extrapolation methods, Normative methods, Time series modelling, Scenario building, Multivariate methods, Analytical Hierarchical process, Fuzzy Analytical Hierarchical process, Interpretive Structural models, Simulation modelling,

Details of training programme on Data Analysis using SAS

S. No.	Training Dates	No. of Participants	Participants belongs to NARS Organizations	Inaugural Address	Valedictory Address
1.	17-22 August 2010	20	IARI, New Delhi; NBPGR, New Delhi; DMR, New Delhi; NCAP, New Delhi; PDFSR, Modipuram; NRCAF, Jhansi IGFRI, Jhansi; NBFGR, Lucknow; DSR, Indore; PDMAS, Bangalore; RVSKVV, Gwalior; SVPUAT, Meerut and IASRI, New Delhi	Dr. NT Yaduraju, National Co-ordinator, NAIP Component-I	Dr. VK Bhatia, Director, IASRI, New Delhi
2.	25-30 October 2010	19	NBPGR, New Delhi; DRMR, New Delhi; NCIPM, New Delhi; NCAP, New Delhi; PDC, Meerut; IISR, Lucknow; CISH, Lucknow; IAS, BHU, Varanasi; ICAR RCER, Patna and IASRI, New Delhi	Dr. VK Gupta, ICAR National Professor	Dr. R Sai Kumar, Director, DMR, New Delhi
3.	22-27 November 2010	22	NBFGR, Lucknow; PDFSR, Modipuram; NRCPB, New Delhi; NCAP, New Delhi; NRC Citrus, Nagpur; NDUAT, Faizabad; RVSKVV, Gwalior; IAS, BHU, Varansi; IARI, New Delhi; NCAP, New Delhi and NBPGR, New Delhi	Dr. KC Bansal, Director, NBPGR, New Delhi	Dr. HS Gaur, Dean and Joint Director Education, IARI, New Delhi
4.	10-15 January 2011	22	NRCPB, New Delhi; IAS, BHU, Varansi; IARI, New Delhi; DMR, New Delhi; NBPGR, New Delhi; IISR, Lucknow; IGFRI, Jhansi and PDKV, Akola	Dr. RC Agrawal, National Coordinator, NAIP, New Delhi	Dr. AK Singh, DDG (NRM), ICAR, New Delhi
5.	31 January - 05 February 2011	20	IARI, New Delhi; IAS, BHU, Varanasi; DMR, New Delhi; DSR, Indore; IGFRI, Jhansi; NRC AF, Jhansi; NBPGR, New Delhi; RVSKV, Gwalior; IISR, Lucknow; IISS, Bhopal and IASRI, New Delhi	Dr. OM Bambawale, Director, NCIPM, New Delhi	Dr. RC Agrawal, National Co-ordinator, NAIP, ICAR, New Delhi
6.	21-26 February 2011	23	BHU, Varanasi; IIVR, Varansi; Directorate of Mushroom Research, Solan; IGFRI, Jhansi; NRC Litchi, Muzzafarpur; Agricultural College, Nanded; TNAU (Forest College and RI); Tamil Nadu IARI, New Delhi; NBPGR, New Delhi; Directorate of Floricultural Research, New Delhi; NCAP, New Delhi and PDC, Meerut	Dr. Madhuban Gopal, National Fellow, IARI, New Delhi	Dr. Raj K Gupta, South Asia Co-ordinator, CIMMYT

A view of Valedictory Function of Training Programme on Technology Forecasting Methodologies under VPage Project of NAIP

A participant receiving certificate during Training Programme on Bioinformatics Research and Tools for Agricultural Research

Bibliometrics, Patent analysis with case study of nanotechnology, TIFAC organisation and its role in national TF exercise, Technology forecasting through combination of models, TF initiatives at IASRI viz., ICT for Accelerated growth in agriculture, Implications of RS & GIS on agriculture and Multi-Dimensional scaling for prioritizing factors in agriculture. The faculty included all the scientists associated in the project and also guest speakers from NAARM, Hyderabad; TIFAC, New Delhi; NISTADS, New Delhi and RIS, Delhi. The training programme ended with the Valedictory Function in which the Chief Guest was Dr. Ramesh Chand, Director, NCAP, New Delhi who is also the Consortium leader of the project V-PAGe. Dr. Ramasubramanian was the Course Director for the training programme.

National Agricultural Bio-informatics Grid: (17 Participants)

- Sh. SB Lal conducted sensitization training programme on **Bioinformatics Resources and Tools for Agricultural Research** during 24-29 January 2011. 17 participants including scientists, technical officers and research associates from National Bureau of Agriculturally Important Insects, Bangalore; Central Potato Research Institute, Shimla; National Research Centre on Equines, Hissar; National Academy of Agricultural Research Management, Hyderabad; Central Institute of Fisheries Education, Mumbai and Indian Agricultural Research Institute, New Delhi attended the training programme.

Other Training Programmes

- A part time two days special computer training programme was conducted for the officials of ICAR Hqrs. during 18-19 May 2010. The training programme was attended by 30 participants. Sh. VH Gupta and Ms. Shashi Dahiya took classes in the training programme with the assistance of technical officers of Division of Computer Application.

- Two full time two days special computer training programme were conducted for the officials of ICAR Hqrs. during 17-18 June 2010 and 24-25 June 2010. The training programs were attended by 50 participants. Sh. VH Gupta and Ms. Shashi Dahiya took classes in the training programme with the assistance of technical officers in the Division.

- Conducted a training programme on On-line Data Entry of Experimental Information and its corresponding technical programme in AFEIS at Acharya NG Ranga Agricultural University, Rajendranagar, Hyderabad during 27–28 September 2010.

- A one day visit was organized on 22 October 2010 at IASRI on functions and activities of IASRI for 23 participants of six weeks training programme on Official Statistics and Related Methodology of International Statistical Education Centre (ISEC), Kolkata conducted by National Academy of Statistical Administration (NASA) from 04 October to 12 November 2010. The participants were from seven countries.

- A training programme on Research Methodology for Socio-Economic Studies was organised at National Council of Applied Economic Research Centre for Macro Consumer Research (NCAER_CMCR) from 19 October to 4 November 2010. This training was organized under a consultancy project with NCAER on Survey Methodologies, Data Analysis and Capacity Building. The training programme was attended by 20 participants. This training programme was specially designed for research personnel of NCAER undertaking research in socio-economic aspect to equip them with the art of collection, analysis of data and drawing valid interpretation of their results. All the topics useful for socio-economic research starting with basics to some advanced topics covering Statistical Methods, Sample Surveys, Statistical Modelling, Forecasting, GIS and Remote Sensing were covered. The practicals were done using statistical software, mainly SPSS. Course material in the form of Reference Manual was provided to all the participants. Dr. Seema Jaggi was the Course Director for this training programme.

Research Fellowship

During 2010-11, 15 Ph.D. and 37 M.Sc. students received Research Fellowship. 14 Ph.D. students received IARI Scholarship @ Rs.10,500/- p.m. in addition to Rs.10,000/- per annum as the contingent grant and one Ph.D. students received ICAR SRF Fellowship @ Rs.12,000/- p.m. in addition to Rs. 10,000/- per annum as the contingent grant. 13 M.Sc. students received ICAR Junior Research Fellowship @ Rs. 8640/- p.m. besides Rs. 6000/- per annum as the contingent grant and 24 M.Sc. students received IARI Scholarship @ Rs. 7560/- p.m. besides Rs. 6000/- per annum as the contingent grant.

BOARD OF STUDIES FOR ACADEMIC YEAR 2010-11

Agricultural Statistics

1.	Dr. VK Bhatia, Director & Prof. (Ag. Stat.)	Chairman
2.	Dr. PK Batra, Principal Scientist	Member
3.	Dr. Anil Rai, Principal Scientist	Member
4.	Dr. Ramasubramanian V, Senior Scientist	Member
5.	Dr. Tauqueer Ahmad, Senior Scientist	Member Secretary
6.	Dr. Sukant Dash (Student Representative)	Member

Computer Application

1.	Dr. PK Malhotra, Prof. (C.A.)	Chairman
2.	Dr. VK Bhatia, Director & Prof. (Ag. Stat.)	Member
3.	Dr. RC Goyal, Principal Scientist	Member
4.	Dr. Alka Arora, Senior Scientist	Member
5.	Sh. Samir Farooqi, Scientist (SS)	Member Secretary
6.	Sh. Rakesh Kumar Ranjan (Student Representative)	Member

CENTRAL EXAMINATION COMMITTEE FOR ACADEMIC YEAR 2010-11

Agricultural Statistics

1. Dr. VK Bhatia, Director & Prof. (Ag. Stat.)
2. Dr. Vinod Kumar Gupta, National Professor, ICAR
3. Dr. Prajneshu, Head, Division of Biometrics and Statistical Modellng
4. Dr. Ranjana Agrawal, Head, Division of Forecasting and Econometric Techniques
5. Dr. UC Sud, Head, Divison of Sample Surveys
6. Dr. Rajender Parsad, Head, Division of Design of Experiments

Computer Application

1. Dr. VK Bhatia, Director & Prof. (Ag. Stat.)
2. Dr. PK Malhotra, Principal Scientist & Prof. (C.A.)
3. Dr. RC Goyal, Principal Scientist
4. Dr. Anil Rai, Principal Scientist
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 and Professor (Agricultural Statistics)	1987
2.	Dr. VK Gupta, National Professor	1984
3.	Dr. Prajneshu, Head, Division of Biometrics and Statistical Modellng	1984
4.	Sh. SD Wahi, Principal Scientist	1987
5.	Dr. Ranjana Agrawal, Head, Division of Forecasting and Econometric Techniques	1988
6.	Dr. UC Sud, Head, Divison of Sample Surveys	1995
7.	Dr. KK Tyagi, Principal Scientist	1995
8.	Dr. Rajender Parsad, Head, Division of Design of Experiments	1995
9.	Dr. Anil Rai, Principal Scientist	1995
10.	Dr. Seema Jaggi, Senior Scientist	1995
11.	Dr. Chandrahas, Principal Scientist	1996
12.	Dr. PK Batra, Principal Scientist	1996
13.	Dr. Amit Kumar Vasisht, Principal Scientist	1998
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. Prachi Misra Sahoo, Scientist	2002
22.	Dr. RL Sapra, Principal Scientist (at IARI)	2002
23.	Dr. Krishan Lal, Principal Scientist	2003
24.	Dr. Hukum Chandra, Scientist	2003
25.	Sh. Amrender Kumar, Scientist	2003
26.	Md. Wasi Alam, Scientist	2003
27.	Dr. Prawin Arya, Senior Scientist	2003
28.	Dr. Himadri Ghosh, Senior Scientist	2004
29.	Dr. Anil Kumar, Senior Scientist	2010

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

S. No.	Name	Year of induction
1.	Dr. PK Malhotra, Professor (Computer Application)	1991
2.	Dr. RC Goyal, Principal Scientist	1995
3.	Dr. VK Mahajan, Principal Scientist	1996
4.	Sh. Harnam Singh Sikarwar, Scientist (SG)	1997
5.	Md. Samir Farooqi, Scientist	2001
6.	Dr.(Smt.) Alka Arora, Scientist	2001
7.	Smt. Shashi Dahiya, Scientist	2001
8.	Smt. Sangeeta Ahuja, Scientist	2002
9.	Dr. Sudeep Kumar, Senior Scientist	2002
10.	Sh. KK Chaturvedi, Scientist	2002
11.	Sh. SN Islam, Scientist	2004
12.	Sh. SB Lal, Scientist	2004
13.	Smt. Anshu Bharadwaj, Scientist	2004
14.	Smt. Anu Sharma, Scientist	2004
15.	Smt. Rajni Jain, Sr. Scientist (at NCAP)	2007
16.	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 (Agricultural Statistics)	2010
2.	Dr. Prajneshu (Agricultural Statistics)	2010
3.	Dr. Rajender Parsad (Agricultural Statistics)	2010
4.	Dr. Anil Rai (Agricultural Statistics)	2010
5.	Dr. Seema Jaggi (Agricultural Statistics)	2010
6.	Dr. AR Rao (Agricultural Statistics)	2010
7.	Dr. Sudeep (Computer Application)	2010
8.	Sh. SB Lal (Computer Application)	2010
9.	Sh Md. Samir Farooqi (Computer Application)	2010
10.	Smt. Anu Sharma (Computer Application)	2010
11.	Dr. TR Sharma (MBB)	2010
12.	Dr. T Mahapatra (MBB)	2010
13.	Dr. Kishore Gaikwad (MBB)	2010
14.	Dr. RL Sapra (Agricultural Statistics)	2010
15.	Dr. T Napolean (Genetics)	2010
16.	Dr. PK Singh (Genetics)	2010
17.	Dr. PS Pandey (Bioinformatics)	2010
18.	Dr. KC Bansal (MBB)	2010
19.	Dr. KV Bhat (PGR)	2010
20.	Dr. SS Marla (PGR)	2010
21.	Dr. Sunil Arechak (PGR)	2010

COURSES TAUGHT DURING THE ACADEMIC YEAR 2009–10

Code	Title	Course Instructors
	AGRICULTURAL STATISTICS	
	Trimester – III	
AS-103	Elementary Sampling & Non- Parametric Methods (2+1)	KK Tyagi & GK Jha
AS-163	Statistical Inference (4+1)	Rajender Parsad, Hukum Chandra & LM Bhar
AS-164	Design of Experiments – I (3+1)	Seema Jaggi & VK Gupta
AS-166	Statistical Genetics – I (3+1)	SD Wahi, AR Rao & Amrit Kumar Paul
AS-302	Advanced Design of Experiments – II (2+1)	Krishan Lal, PK Batra & Rajender Parsad
AS-304	Advanced Sample Survey – II (2+1)	UC Sud & Hukum Chandra
AS-307	Forecasting Techniques (1+1)	Chandrahas & Amrender Kumar
AS-370	Recent Advances in the Field of Specialisation (1+0)	VK Bhatia, VK Gupta, Prajneshu & UC Sud
AS-299	Seminar (1+0)	Anil Kumar
	COMPUTER APPLICATION	
	Trimester – III	
CA-131	Data Base Management System (2+2)	RC Goyal, Anu Sharma & OP Khanduri
CA-132	Data Structures and Algorithms (2+1)	Shashi Dahiya & KK Chaturvedi
CA-134	Modeling and Simulation (2+1)	PK Malthotra & Md. Samir Farooqi
CA-135	Computer Networks (2+1)	SN Islam & Alka Arora
CA-299	Seminar (1+0)	Md. Samir Farooqi

COURSES TAUGHT DURING THE ACADEMIC YEAR 2010–11

Code	Title	Course Instructors
	AGRICULTURAL STATISTICS	
	Trimester – I	
AS-101/ AS-501	Elementary Statistical Methods (2+1)	KK Tyagi & AK Gupta
AS-150/ AS-550	Mathematical Methods – I (4+0)	Himadri Ghosh & Cini Varghese
AS-560	Probability Theory (2+0)	PK Batra & Anil Kumar
AS-561	Statistical Methods – I (2+1)	Ramasubramanian V & Seema Jaggi
AS-167	Applied Multivariate Analysis (2+1)	Ranjana Agrawal & AR Rao
As-168	Econometrics (2+1)	Prawin Arya & GK Jha
AS-169	Planning of Surveys / Experiments (2+1)	VK Mahajan & DK Sehgal
AS-200/ AS-600	Design of Experiments – II (1+1) / Advanced Design of Experiments(1+1)	Rajender Parsad & Cini Varghese
AS-201/ AS-601	Sampling Techniques – II/ Advanced Sampling Techniques (1+1)	Tauqueer Ahmad & Prachi Misra Sahoo
AS-202/ AS-602	Statistical Genetics – II (1+1)/ Advanced Statistical Genetics (1+1)	SD Wahi & AK Paul
AS-203/ AS-603	Regression Analysis (1+1)	LM Bhar & Ramasubramanian V
AS-204	Linear Models (2+0)	Krishan Lal & VK Gupta
AS-606	Optimization Techniques (1+1)	UC Sud & Prajneshu
AS-299/ AS-691	Seminar (1+0)	Anil Kumar
	Trimester – II	
AS-102/ AS-502	Elementary Design of Experiments (2+1)/ Basic Design of Experiments (2+1)	DK Sehgal & Anil Kumar
AS-551	Mathematical Methods in Statistics – II (4+0)	NK Sharma, Cini Varghese & Prawin Arya
AS-562	Statistical Methods – II (2+1)	Seema Jaggi & Ramasubramanian V
AS-565	Sampling Techniques – I (3+1)	Tauqueer Ahmad & Prachi Mishra Sahoo
AS-570	Statistical Modeling (2+1)	Prajneshu
AS-571	Bioinformatics – I (3+1)	AR Rao & KV Bhatt
AS-205	Advanced Statistical Inference (1+1)	Krishan Lal & UC Sud
AS-607	Stochastic Processes (3+0)	Himadri Ghosh
AS-661	Advanced Design for Single Factor Experiments (2+1)	LM Bhar & VK Gupta
AS-663	Advanced Theory of Sample Survey (2+1)	UC Sud & Anil Rai
AS-299/ AS-691	Seminar (1+0)	Anil Kumar
PGS-504	Basic Statistical Methods in Agriculture (2+1)	KK Tyagi & AK Gupta
	COMPUTER APPLICATION	
	Trimester – I	
CA-100/ CA-502	Introduction to Computer Application (1+1)	SN Islam & Md. Samir Farooqi
CA-551	Mathematical Foundations in Computer Application (4+0)	PK Batra, NK Sharma & Prawin Arya
CA-111/ CA-560	Computer Organization and Architecture (3+0)	Shashi Dahiya, HO Agarwal & Sudeep Kumar
CA-112/ CA-561	Principles of Computer Programming in C (2+1)	Sangeeta Ahuja & KK Chaturvedi
CA-211	Compiler Construction (2+1)	SB Lal
CA-212	Computer Graphics (2+1)	Pal Singh
CA-213	Artificial Intelligence (2+1)	Sudeep Kumar & Rajni Jain
CA-214	Internet Technologies & Applications (2+1)	Alka Arora
CA-215	Software Engineering (2+0)	Anu Sharma
CA-299/ CA-691	Seminar (1+0)	Pal Singh
	Trimester – II	
CA-501	Computer Fundamentals & Programming (3+1)	Pal Singh & SN Islam
CA-562	Object Oriented Programming & Design (2+1)	Sudeep Kumar, Sangeeta Ahuja & SB Lal
CA-564	Data Structure and Algrithms (2+1)	Shashi Dahiya & Soumen Pal
CA-566/ CA-131	Data Base Management System (2+2)	RC Goyal, Anu Sharma & OP Khanduri
CA-568	Software Engineering (2+0)	Rajni Jain & Sangeeta Ahuja
CA-221	Data Warehousing and Data Mining (2+1)	Anil Rai, Anshu Bharadwaj & Md. Samir Farooqi
CA-225	Data Analysis in Agriculture (1+2)	Amrit Kumar Paul & VK Mahajan
CA-299/ CA-691	Seminar (1+0)	Pal Singh

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

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Awards and Recognitions

AWARDS

- **Sankhyiki Bhushan Conferred upon Dr. VK Gupta**
  Indian Society of Agricultural Statistics in 2010 conferred the prestigious title of Sankhyiki Bhushan on Dr. Vinod Kumar Gupta, ICAR National Professor, 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 the National Agricultural Research System.

Dr. VK Gupta receiving Prestigious Sankhiyiki Bhushan Award

- **Prof. PV Sukhatme Gold Medal Award**
  Dr. Rajender Parsad, Head, Division of Design of Experiments was awarded Prof. PV Sukhatme Gold Medal Award for the year 2009-10 by Indian Society of Agricultural Statistics for his important and useful research contributions to both theoretical and applied aspects of Agricultural Statistics in general and Design of Experiments in particular.

Dr. Rajender Parsad receiving Prof. PV Sukhatme Gold Medal Award

His efforts have led to the use of modern efficient designs and sophisticated analytical procedures by the researchers in the National Agricultural Research System, which is important for improving the quality of agricultural research.

- डॉ. रंजना अग्रवाल को वैज्ञानिक लेख 'मौसम चरों पर आधारित फ़सलों का पूर्वानुमान' के लिये केन्द्रीय सचिवालय हिन्दी परिषद् द्वारा अखिल भारतीय महिला विशेष पुरस्कार (2008–09) से पुरस्कृत किया गया ।

- Dr. Anil Kumar, Scientist was conferred for Young Scientist Award 2010 by Hi-Tech Horticultural Society

on the occasion of National Symposium on Emerging Trends in Agricultural Research held at PDFSR, Modipuram.

- Following received Best Paper Awards by the Indian Society of Agricultural Statistics for the papers published in Journal of Indian Society of Agricultural Statistics during 2009-10.

  – Raju, BMK, **Bhatia, VK** and **Bhar, LM** (2010). Assessing stability of crop varieties with incomplete data. *J. Ind. Soc. Agril. Statist.*, **63(2)**, 139-149 in the field of **Statistical Genetics and Genomics**.

  – **Chandra, Hukum** (2010). Estimation of small area proportions under unit level spatial models. *J. Ind. Soc. Agril. Statist.*, **63(3)**, 267-276 in the field of **Sample Surveys**.

  – Singh, Rama Krishna, **Ghosh, Himadri** and **Prajneshu** (2010). Possibility and necessity measures for fuzzy linear regression analysis: An application. *J. Ind. Soc. Agril. Statist.*, **63(1)**, 19-25 in the field of **Applied Statistics**.

  – Jain, Rajni, Minz, Sonajharia and **Ramasubramanian V** (2010). Machine learning for forewarning crop diesease. *J. Ind. Soc. Agril. Statist.*, **63(1)**, 97-107 in the field of **Informatics**.

- Research paper entitled Market efficiency in commodity futures - A case study by **Bhardwaj, SP** and Vasisht, AK received Best Paper Award of Rs. 5000/- at International Conference on Financial Derivatives held at Department of Commerce, Pondicherry University, Pondicherry.

RECOGNITION

Dr. VK Bhatia

- Elected as Fellow of National Academy of Agricultural Sciences from 01 January 2011.

- Delivered PV Sukhatme Memorial Lecture during International Conference on Development and Applications of Statistics in Emerging Areas of Science & Technology during 08-10 December 2010 at Department of Statistics, University of Jammu, Jammu.

- Served as an Expert for revising the course contents of Masters and Doctoral Programs in Central Institute of Fisheries, Mumbai on 16 April 2010.

Dr. VK Gupta

- Delivered the Keynote Address on Some Random Thoughts for Agricultural Research Statisticians Conference during the 16th National Conference of the Agricultural Research Statisticians held at IASRI, New Delhi during 23 -24 December 2010.

- Delivered the Keynote Address during National Seminar on Interface between Statistics, Mathematics and Allied Sciences at Department of Statistics, Kumaun University, S.S.J. Campus, Almora during 20-22 November 2010.

- Acted as Chairman, Component – I of the Review Meeting on Performance of MS Consortia (NAIP) held at GBPUAT, Pantnagar during 18-19 February 2011.

- Member of the Committee to do the second-tier screening of the candidates for considering towards 2009 review as cleared by the Divisional Committee in the area of Statistics and Mathematics at the Indian Statistical Institute, Kolkata held on 03 April 2010.

- Nominated by NAAS as a Member of the Sectional Committee on Social Sciences for selecting suitable candidates for Academy's Fellowship/Associateship.

- Nominated by NAAS as a Member of the Judging Committee for screening nominations for Recognition Award of the Academy for Social Sciences Group for the biennium 2009-2010 and selecting suitable candidate for the award.

Dr. Rajender Parsad

- Elected as Fellow of National Academy of Agricultural Sciences from 01 January 2011.

Dr. Sushila Kaul

- Acted as Chairperson on a session on Agricultural Issues at the 10th Conference of EcoMod held at Istanbul, Turkey, during 7-10 July, 2010.

Dr. Anil Kumar

- Nominated as a member, Editorial Board of Journal: Progressive Research in the Society for Scientific Development in Agriculture and Technology, Jhansi, India.

- Acted as the Member of Judging Panel in the 9th Kisan Mela evam Pashu Vigyan Pradarshani held at IVRI, Izatnagar, Bareilly during 01-03 November 2010.

Offices in Professional Societies/Research Journals

Aligarh Journal of Statistics

Dr. Tauqueer Ahmad	Member, Editorial Board

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

Computer Society of India

Dr. PK Malhotra	Member Managing Committee
Dr. Alka Arora	Member Managing Committee

Department of Educational Measurement and Evaluation of National Council of Educational Research and Training

Dr. Rajender Parsad	Nominated Member of Advisory Board

Farming Systems Research and Development Association

Dr. Anil Kumar	Joint Secretary Member, Editorial Board

Forum for Interdisciplinary Mathematics

Dr. VK Gupta	Vice-President (till December 2010)
Dr. Rajender Parsad	Joint Secretary (till December 2010) Member Executive Council

Indian Journal of Applied Statistics

Dr. Prajneshu	Member, Editorial Board

Indian Society of Agricultural Marketing

Dr. SP Bharadwaj	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. Prajneshu	Associate Editor, JISAS Sessional President, 2011
Dr. PK Malhotra	Joint Secretary Coordinating Editor, JISAS
Dr. UC Sud	Member, Executive Council Associate Editor, JISAS
Dr. VK Mahajan	Member, Executive Council (till 31 December 2010)
Dr. Hukum Chandra	Member, Executive Council
Dr. Sudeep	Member, Executive Council

Institute of Applied Statistics and Development Studies

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

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

Dr. VK Bhatia	President

International Statistical Institute, Netherlands

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

International Journal of Agricultural and Statistical Science

Dr. Anil Kumar	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

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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 & Application
Dr. Aloke Lahiri	Joint Secretary
Dr. LM Bhar	Joint Secretary
Dr. V Ramasubramanian	Member, Executive Council
Dr. Alka Arora	Member, Executive Council

University of Kumaun, Nainital

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

Swadeshi Science Movement of Delhi

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

Indian Society of Agricultural Economics, Mumbai

Dr. Sushila Kaul	Member, Executive Council

Animal Science Reporter

Dr. Ranjana Agrawal	Research Editor (Bio-statistics)

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Linkages and Collaboration in India and Abroad including Outside Funded Projects

S. No.	Title	Collaborative/ Funding Agency	Date of Start	Date of Completion
1.	Planning, designing and analysis of experiments relating to AICRP on Soil Test Crop Response (STCR) correlation	AICRP on STCR, IISS, Bhopal	01 March 2007	28 May 2010
2.	Planning, designing and analysis of experiments planned ON-STATION under PDFSR	PDFSR, Modipuram	01 April 2007	31 March 2012
3.	Planning, designing and analysis of ON-FARM experiments under PDFSR	PDFSR, Modipuram	01 April 2007	31 March 2012
4.	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
5.	Developing remote sensing based methodology for collecting agricultural statistics in Meghalaya	SAC, Ahmedabad and NESAC, Shillong	01 October 2007	30 September 2010
6.	Development of forecasting module for podfly, *Melanagromyza obtusa* Malloch in late pigeonpea	IIPR, Kanpur	01 July 2007	30 June 2012
7.	Strengthening, refining and implementation of expert system on wheat crop management	DWR, Karnal and IARI, New Delhi	25 August 2007	24 August 2010
8.	Development of Expert system on seed spices	NRCSS, Ajmer	01 February 2009	15 March 2011
9.	Expert system for maize crop	DMR, New Delhi	01 April 2009	31 March 2011
10.	Visioning, Policy Analysis and Gender (V-PAGe) - Sub-Programme II : Technology forecasting	NCAP, New Delhi (NAIP Component-I)	01 June 2007	31 March 2012
11.	Visioning, Policy Analysis and Gender (V-PAGe) Sub-Programme III : Policy analysis and market intelligence	NCAP, New Delhi; IARI, New Delhi (NAIP Component-I)	01 June 2007	31 March 2012
12.	Risk assessment and insurance products for agriculture	NCAP, New Delhi (NAIP Component-I)	01 October 2008	31 March 2012
13.	Bioprospecting of genes and allele frequency for abiotic stress tolerance	NRCPB, New Delhi (NAIP Component-IV)	04 May 2009	31 March 2012

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 Funded)	20 April 2009	31 March 2012
15.	Stochastic process modelling and forecasting through discrete non-linear time series approach	DST, New Delhi	01 March 2008	28 February 2011
16.	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
17.	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
18.	Evaluation of rationalization of minor irrigation statistics (RMIS) scheme	Ministry of Water Resources, New Delhi	25 July 2009	23 December 2010
19.	Prioritization of rainfed area in the country	CRIDA, Hyderabad and National Agricultural Rainfed Authority, Ministry of Agriculture, New Delhi	01 January 2010	31 October 2010
20.	Weather based forewarning models for Onion Thrips (*Thrips tabaci Lindeman*)	DOGR, Pune	01 April 2010	30 September 2012
21.	Weather based forewarning of mango pests	CISH, Lucknow; RFRS, Vengurle; BCKV, Mohanpur; BAC, Sabour; FRS, Sangareddy	01 April 2010	31 March 2013
22.	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
23.	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
24.	Weed assessment and management in the crops and cropping system	IARI, New Delhi	24 October 2009	31 March 2014
25.	Development of innovative convenience food as protein supplement	IARI, New Delhi	24 October 2009	31 March 2014
26.	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 2012

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List of Publications

Research Papers

1. Ahmad, T and Kathuria, OP (2010). Estimation of crop yield at block level. *Adv. Appl. Res.,* **2(2)**, 164-172.

2. Ahmad, T, Rai, A and Singh, R (2010). Statistical evaluation of development of village's potential for agro forestry using GIS. *Adv. Appl. Res.,* **2(2)**, 157-163.

3. Alam, W and Chaturvedi, A (2010). Discriminating among overlapping parametric models and estimating survivorship function of insects mortality. *Int. J. Comp. Sci. Math.*, **2(1)**, 1-10.

4. Bhardwaj, SP (2010). Impact of global meltdown on agriculture – An exploratory study. *Ind. J. Agric. Eco.,* **65(3)**, 497-507.

5. Chandra, Hukum (2010). Small area estimation with binary variables. *J. Ind. Soc. Agril. Statist.,* **64(3)**, 367-374.

6. Gandhi, RS, Kumar, Amit, Singh, Avtar and Paul, AK (2009). Genetic analysis of stayability in dairy cattle: A review. *Ind. J. Dairy Sci.,* **62**, 79-89.

7. Gangopadhyay, KK, Mahajan, RK, Parsad, Rajender, Kumar, Gunjeet, Meena, BL, Kar, Ranjan, Gambhir, Rajeev, Mishra, SK (2010). Relative efficiency of experimental designs in evaluation of plant genetic resources. *Ind. J. Plant Gene. Reso.,* **23(2)**, 164-167.

8. Ghosh, H, Paul, RK, and Prajneshu (2010). GARCH and EGARCH nonlinear time-series models for volatile data: An application. *J. Statist. Appl.*, **5**, 177-193.

9. Gupta, VK, Singh, Poonam, Kole, Basudev and Parsad, Rajender (2009). Construction of optimal mixed-level supersaturated designs *J. Ind. Soc. Agril. Statist.,* **63(3)**, 311-319.

10. Gupta, VK, Singh, Poonam, Kole, Basudev and Parsad, Rajender (2010). Addition of runs to a two-level supersaturated design. *J. Statist. Plann. Inf.,* **140(9)**, 2531-2535.

11. Gupta, VK, Singh, Poonam, Kole, Basudev and Parsad, Rajender (2010). Construction of efficient balanced and nearly balanced two-level supersaturated designs. *J. Statist. Appl.*, **5(2)**, 179-194.

12. Gupta,VK, Singh, Poonam, Kole, Basudev and Parsad, Rajender (2010). Computer aided construction of efficient multi-level supersaturated designs. *J. Statist. Theo. Prac.*, **4(2)**, 221-231.

13. Iquebal, MA, Ghosh, H and Prajneshu (2010). Application of genetic algorithm for fitting self-exciting threshold autoregressive nonlinear time-series model. *J. Ind. Soc. Agril. Statist.,* **64(3)**, 391-398.

14. Jaggi, Seema, Sarika and Sharma, VK (2010). Response surface analysis incorporating neighbour effects from adjacent units. *Ind. J. Agril. Sci.,* **80(8)**, 719-723.

15. Jaggi, Seema, Gill, AS, Varghese, Cini, Sharma,

VK and Singh, NP (2011). Statistical evaluation of fodder trees under an agroforestry system. *The Ind. Forester,* **137(1)**, 113-120.

16. Jaggi, Seema, Varghese, Cini, Varghese, Eldho and Sharma, VK (2010). Generalized incomplete trojan-type designs. *Statist. Probab. Lett.,* **80**, 706-710.

17. Kaul, Sushila and Ram, Ghasi (2009). Impact of global warming on production of Jowar in India. *Agril. Situation Ind.,* **66(5)**, 253-256.

18. Kole, Basudev, Gangwani, Jyoti, Gupta, VK and Parsad, Rajender (2010). Two-level supersaturated designs: A review. *J. Statist. Theo. Prac.,* **4(4)**, 589-608.

19. Kumar, Jitendra, Nisar, Keyath, Shakil, N.A., Walia, Suresh and Parsad, Rajender (2010). Controlled release formulations of metribuzin: Release kinetics in water and soil. *J. Env. Sci. Health, Part B: Pesticides, Food Contaminants, and Agricultural Wastes,* **45(4)**, 330-335.

20. Kundu, MG and Paul, AK (2010). Phenotypic and genetic variability of estimated growth curve parameters in pigs. *J. Ind. Soc. Agril. Statist.,* **64(3)**, 349-358.

21. Madke, PK, Lathwal, SS, Singh, Yajuvendra, Kumar, Anil and Kaushik, Vinay (2010). Study of behavioural and physiological changes of crossbred cows under different shelter management practices. *Ind. J. Anim. Sci.,* **80(8)**, 771-774.

22. Mandal, BN, Parsad, Rajender and Gupta, VK (2010). Linear integer programming approach to construct distance balanced sampling plans. *J. Ind. Soc. Agril. Statist.,* **64(2)**, 303-312.

23. Mandal, BN, Gupta, VK and Parsad, Rajender (2010). Inclusion probability inversely proportional to size sampling. *J. Statist. Appl.,* **5(1)**, 15-26.

24. Mandal, BN, Gupta, VK and Parsad, Rajender (2011). Construction of polygonal designs using linear integer programming. *Comm. Statist.-Theory Methods,* **40**, 1787-1794.

25. Mathur, DC and Sethi, SC (2010). Estimation of productivity of coconut crop for different holding categories at blocks / districts level in Kerala state. *Hry. Eco. J.,* **27(1-2)**, 101-102.

26. Meher, PK, Rao, AR, Wahi, SD and Jaggi, N (2010). Detection of multivariate outliers in breeding data. *Intt. J. Statist Sys.,* **5(4)**, 527-535.

27. Parsad, Rajender, Rathore, Abhishek and Gupta,VK (2009). Computer aided construction of efficient designs for making treatment-treatment and treatment-control comparisons. *Amer. J. Math. Manag. Sci.,* **29(1&2)**, 201-228. (Special Issue in memory of special volume on Bechhofer-Gupta-Sobel).

28. Pateria, Dinesh Kumar, Jaggi, Seema and Varghese, Cini (2009). Self-neighboured strongly balanced block designs. *J. Ind. Statist. Assoc.,* **47(1)**, 1-14.

29. Paul, RK, Ghosh, H and Prajneshu (2010). Wavelet frequency domain approach for statistical modelling of Indian monsoon rainfall time-series data. *J. Statist. Theo. Prac.,* **4**, 813-825.

30. Rao, AR, Choudhary, SK, Wahi, SD and Prabhakaran, VT (2010). An index for simultaneous selection of genotypes for high yield and stability under incomplete genotype × environment data. *Ind. J. Genet.,* **70(1)**, 80-84.

31. Salvati, N, Chandra, Hukum, Giovanna, R and Chambers, R (2010). Small area estimation using a nonparametric model based direct estimator. *Comput. Statist. Data Anal.,* **54(9),** 2159-2171.

32. Sarkar, Ananta, Parsad, Rajender, Gupta, VK, Chatterjee, Kashinath and Rathore, Abhishek (2010). Efficient row-column designs for microarray experiments. *J. Ind. Soc. Agril. Statist.,* **64(1)**, 89-117.

33. Sarkar, Basudeb, Verma, RPS, Parsad., Rajender and Shoran, Jag (2010). Diversity among barley germplasm collection in India. *Ind. J. Genet. Plant Breed.,* **70(3)**, 234-239.

34. Sethi, SC, Pandey, PS and Mathur, DC (2009-2010). Productivity analysis of rice in India. *Hry. Eco. J.,* **27(1-2)**, 149-151.

35. Sharma, VK, Gharde, Yogita and Varghese, Cini (2010). Minimal strongly balanced changeover designs with first residuals. *African J. Math. Comp. Sci. Res.,* **3(9)**, 195-198.

36. Sharma, VK, Varghese, Cini and Jaggi, Seema (2010). Tetrahedral and cubical association schemes with related PBIB(3) designs. *Model Assist. Statist. Appl.,* **5(2),** 93-99.

37. Shukla, Rajesh, Rai, Anil and Monga, Nitasha (2010). India protection index: An objective measurement of the economic and social well-being

of the Indian population. *J. Appl. Eco. Res.*, **4(3)**, 339–367.

38. Singh, Anupma, Sarkar, Dhurba Jyoti, Parmar, Balraj S, Singh, AK, Parsad, Rajender and Kumar, Anil (2011). Studies on novel nanosuper absorbent components: Swelling behaviour in different environments and effect on water absorption and retention properties of sandy loam soil and soil less medium. *J. Appl. Polymer Sci.*, **120**, 1448-1458.

39. Singh, DR and Kaviarasan, K (2010). Growth and instability analysis of flower production in Tamil Nadu. *Agril. Situation Ind.*, **66(12)**, 709-713.

40. Singh, S, Singh, S, Singh, OP, Adlakha, SK, Sikarwar, H and Ahmad, T (2008). Reclamation and management of alkali soils – A decision support system. *J. Soil Water Conser.,* **7(1)**, 25-32.

41. Singh, Surendra, Vasisht, AK, Paul, AK, Sharma,SC and Bhar, LM (2010). The effect of farms on growth pattern of crossbred cattle. *Ind. J. Anim. Sci.*, **80(4)**, 373-375.

42. Srinath, K, Nair, RV, Unnithan, GR, Gopal, N. Bathla, HVL and Ahmad, T (2008). Post harvest losses in marine fisheries. *Fish. Technol.*, **45(1)**, 109-112.

43. Srivastava, SK, Sivaramane, N and Mathur VC (2010). Diagnosis of pulses performance of India. *Agric. Eco. Res. Rev.*, **23(1)**, 137-148.

44. Sud, UC, Chandra, H and Chhikara, RS (2010). Domain estimation in the presence of non-response. *J. Ind. Soc. Agril. Statist.,* **64(3)**, 343-348.

45. Tyagi, KK, Singh, Jagbir, Kher, KK, Jain, VK and Singh, Surendra (2010). Status and projection estimates of agricultural implements and machinery. *Ind. Agril. Engg. Today*, **34(4)**, 5-14.

46. Varghese, Cini, Sonawane, MN, Jaggi, Seema and Sharma, VK (2010). Repeated measurements designs for bioequivalence trials. *J. Statist. Appl.*, **5(1)**, 47-59.

47. Vasisht, AK and Singh, DR (2009). An analysis of capital formation in fisheries sector in India. *Asian Fish. Sci.,* **22(2)**, 823-837.

48. Yadav, DK, Singh, G, Jain, A, Paul, AK and Singh, S (2010). A comparison of nonlinear models for describing growth in Muzaffarnagar lambs under field conditions. *Ind. J. Anim. Sci.,* **80(6)**, 581-583.

Popular Articles

सांख्यिकी–विमर्श 2010–11, अंक–6 में प्रकाशित लेख

● कृष्ण कान्त त्यागी, अशोक कुमार एवं विजय बिन्दल । संस्थान के कीर्तिस्तम्भ : प्रोफ़ेसर मनीन्द्र नाथ दास, 1–2

● विजय कुमार भाटिया । कृषि अनुसंधान सांख्यिकीविदों के राष्ट्रीय सम्मेलन – एक अवलोकन, 18–20

● कृष्ण कान्त त्यागी, जगबीर सिंह, केवल कृष्ण खेर, विनय कुमार जैन एवं सुरेन्द्र सिंह । कृषि उपकरण एवं यंत्रों के स्तर तथा प्रक्षेपण आकलन पर अध्ययन, 21–32

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● आत्मकूरि रामाकृष्ण राव, उदय प्रताप सिंह, संत दास वाही एवं शिव कुमार चौधरी । अपूर्ण जीनोटाईप **x** पर्यावरण आँकड़ों पर आधारित अधिक पैदावार एवं स्थिरता वाले जीनोटाईप के युगपत चयन हेतु एक सूचक, 39–43

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● अमृत कुमार पॉल, सुब्रत केसरी बेहरा, सन्त दास वाही एवं अनिल गर्ग । प्रसरण विश्लेषण विधि द्वारा मासटाईटिस रोग की अनुवांशिकता का अनुमान, 47–49

● सुरेन्द्र सिंह, अशोक कुमार, अमृत कुमार पॉल तथा राम नरेश। विभिन्न फार्मों पर रखने से संकरित गायों के विकास का अध्ययन एवं मूल्यांकन, 50–53

● जगबीर सिंह, कृष्ण कान्त त्यागी, केवल कृष्ण खेर, अशोक कुमार एवं विनय कुमार जैन । ऊर्जा उपयोग से खेती प्रथाओं, संसाधनों एवं गतिविधियों के विस्तार का आकलन, 54–58

Book Chapters

1. Bhardwaj, SP (2010). Managing supply chain in agriculture sector, e-published in the proceeding of Second Annual Conference of the Indian Society of Agri-Business management held at IIM, Lucknow, 1-19.

2. Bhatnagar, Vasudha and Ahuja, Sangeeta (2010). Robust clustering using discriminant analysis. Advances in Data Mining: Applications and Theoretical Aspects, Lecture Notes in Computer Science. *Springer-Verlag Berlin*, Heidelberg, **6171**, 143-157.

Project Reports

1. Alam, W, Rao, AR, Singh,P, Wahi, SD and Prabhakaran, VT (2010). Some investigations on robust clustering procedures, IASRI, New Delhi.

2. Bhatia ,VK, Vasisht, AK, Singh, DR, Bhardwaj, SP, Kumar, Ashok , Arya, Prawin, Sivaramane N and Kaul, Sushila (2010). An Analysis of Market integration of major agricultural commodities in India. A report of Sub-programme III: Policy Analysis and Market Intelligence of Visioning, Policy Analysis and Gender (V-PAGe) project under NAIP, IASRI, New Delhi.

3. Singh, Jagbir, Tyagi, KK, Kher, KK, Gupta, AK and Jain, VK (2010). Estimation of extent of farming practices, resources and activities with energy use. IASRI/PR-05/2010, IASRI, New Delhi.

4. Kumar, Amrender, Ramasubramanian V and Agrawal, Ranjana (2010). Neural network based forecast modeling in crops. IASRI/PR-07/2010, IASRI, New Delhi.

5. Lahiri, Aloke, Gupta, VK, Rao, A Subba, Muralidharan, Y, Parsad, Rajender and Rathore, Abhishek (2010). Planning, designing and analysis of experiments relating to AICRP on STCR. IASRI/PR-08/2010, IASRI, New Delhi.

6. Chandrahas, Agrawal, Ranjana and Walia, SS (2010). Use of discriminant function and principal component techniques for weather based crop yield forecast. IASRI/PR-09/2010, IASRI, New Delhi.

7. Kumar, Ashok and Bhardwaj, SP (2010). Econometric study of long-run effect of public investment in irrigation on food grains productivity. IASRI/PR-10/2010, IASRI, New Delhi.

8. Tyagi, KK, Singh, Jagbir, Kher, KK, Jain, VK and Singh, Surendra (2010). Study on status and projection estimates of agricultural implements and machinery. IASRI/PR-11/2010, IASRI, New Delhi.

9. Dahiya, Shashi, Goyal, RC, Chaturvedi, KK, Bharadwaj, Anshu, Jaggi, Seema, Varghese, Cini (2010). An eLearning system for agricultural education. Technical Project Report. IASRI/PR-12/2010, IASRI, New Delhi.

10. Sharma, Anu, Varghese, Cini and Jaggi, Seema (2010). Web based solution for partially balanced incomplete block designs. IASRI/PR-13/2010, IASRI, New Delhi.

11. Rai, Anil, Malhotra, PK, Jaggi, S, Chaturvedi KK, Farooqi, S and Sahoo, PM (2010). Knowledge data warehouse for agricultural research. IASRI/PR-14/2010, IASRI, New Delhi.

12. Islam, SN, Farooqi, Samir, Chaturvedi, KK, Agarwal, Hari Om, Sikarwar, Harnam Singh (2010). Strengthening, refining and implementation of expert system on wheat crop management. IASRI/PR-15/2010, IASRI, New Delhi.

13. Singh, DR, Arya, Prawin, Kumar, Ashok and Sivaramane, N (2010). An econometric analysis of groundwater markets in Indo-Gangetic plains of India. IASRI/PR-16/2010, IASRI, New Delhi.

14. Kumar, Anil, Kaur, Rajinder and Sharma, VK (2010). A Statistical investigation on production, economic and potential of crop sequences in different agro ecosystems. IASRI/PR-17/2010, IASRI, New Delhi.

15. Arora, Alka, Farooqi, Samir, Dahiya, Shashi, Singh, Balbir and Rai, Anil (2011). Decision support system for manpower planning-PERMISnet. IASRI/PR-01/2011, IASRI, New Delhi.

16. Varghese, Cini and Jaggi, Seema (2011). Generalised row-column designs for agricultural experiments. IASRI/PR-02/2011, IASRI, New Delhi.

Technical Bulletin

1. Sharma, NK, Batra, PK, Gangwar, B, Parsad, Rajender (2010). Fertilizer response ratios for different crops. IASRI/TB-01/2010. Joint publication of IASRI, New Delhi and PDFSR, Modipuram.

Reference Manuals

1. Early Warning System for Food Security. IASRI, New Delhi. (2010, Eds. Ranjana Agrawal).

2. Goyal, RC, Malhotra, PK, Sudeep, Arora, Alka and Singh, Pal (2010). Data management in PIMS-ICAR. IASRI, New Delhi.

3. Goyal, RC, Malhotra, PK, Sudeep, Arora, Alka and Singh, Pal, Gupta, PL, Grover, Rajni, Saini, RK and Chand, Subhash (2010). Data Management in NISAGENET Project. IASRI, New Delhi.

4. Development of Expert Systems in Agriculture: IASRI, New Delhi (2010, Eds. Sudeep, RC Goyal, Alka Arora, Pal Singh, HO Agarwal and Pratap Singh).

5. Research Methodology for Socio-Economic Surveys. Training programme for NCAER Research Personnel from 19 October to 4 November 2010 (2010, Eds. Seema Jaggi, Anil Rai and AR Rao).

6. RC Goyal, PK Malhotra, Soumen Pal, Alka Arora, Pal Singh, PL Gupta, Rajni Grover, RK Saini and Subhash Chand (2011). Schedules for Primary Data Collection for NISAGENET. IASRI, New Delhi.

7. Data Analysis Using SAS, E-manual also prepared and available at http://web.iasri.res.in/nars/sas_manual/CONTENTS.html. (2011, Eds. Rajender Parsad).

8. Data Analysis of Agroforestry Experiments Using SAS. E-manual also prepared and available at http://web.iasri.res.in/nars/Agro/agroforestry_ex.htm. (2011, Eds. Rajender Parsad)

Macros Developed

1. Parsad, Rajender, Dhandapani, A and Khandelwal, Manoj Kumar (2011). SAS Macro for Analysis of Data from Augmented Block Designs. http://web.iasri.res.in/nars/Augmented_Macro/micro_sas.htm.

Other Periodical Publications

- Annual Report of the Institute, 2009-10
- IASRI News (published quarterly)

Strengthening Statistical Computing for National Agricultural Research System

New Delhi, 8 June 2010. Dr S. Ayyappan, Secretary (DARE) and Director-General (ICAR), inaugurated the Launch Workshop on 'Strengthening Statistical Computing for National Agricultural Research System' under NAIP Consortium. This project is a realization of the visualization of research managers, research facilitators, researchers and trainers to create a sound and healthy statistical computing environment for the benefit of scientists of National Agricultural Research System (NARS). The goal of the project is to provide research guidance in statistical computing and computational statistics so as to provide enabling statistical computing facilities to the researchers of NARS. The efforts would not merely be focused on an interface of statistics, computer science and numerical analysis, but it would also involve designing of intelligent algorithms for implementing statistical techniques particularly for analyzing massive data sets, simulation, bootstrap, etc.

The availability of healthy statistical computing environment would enable the researchers in National Agricultural Research System to undertake probing, in-depth, appropriate, intractable analysis of data generated from agricultural research including those in advanced research areas like biotechnology, genomics, micro-arrays, forecasting, agricultural field experiments, surveys, microarrays, massive data sets such as climate change, biodiversity, market intelligence, etc. 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 National Agricultural Research System.

Dr Ayyappan, emphasized the need to sensitize the researcher managers about the capabilities of this project in making the agricultural research globally competitive, visible and acceptable. To this end Indian Agricultural Statistical Research Institute has

to play a proactive role by describing success stories, capabilities and features of the statistical computing environment through presentations in Director's Conferences, State Agricultural Universities Vice-Chancellor's Conferences, Dean's meetings and other important fora. The launch of this timely initiative to reinvigorate the agricultural research system with advanced computing facilities and development of computing skills would provide enhanced visibility to Indian Agricultural Statistical Research Institute and agricultural statistics discipline in National Agricultural Research System. This project has brought all 151 NARS organizations in a closed network. The training component of the project is also very exhaustive and targets at training 1,500 agricultural research scientists in the country in the usage of high-end statistical package. These would then become trainers and in turn train other agricultural research scientists. Such an effort would have a multiplier effect.

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skills and technologies developed by institutions Council of Agricultural Research and the State ersities over the years have significantly enhanced oductivity, quality and production. However, alisation of agricultural research coupled with ains of proprietary rights over innovations in hanging not only the nature of agricultural research

ural diversification and value addition of agricultural y providing real equity and livelihood security. This d essentially require an innovation system centric

be on creation of new knowledge with both social erspectives. It is not just the new invention or a important, but the recognition of the potential of for developing new products, services or systems to bring about significant changes in the society. ective innovation system would essentially require e institutions in the public and private sectors, the farmer organisations, so that all these stakeholders come partners in the production, diffusion and use nomically useful knowledge; and that alone would the innovation process.

ues relating to IP management, the ICAR formulated nes on "Intellectual Property Management and fer Commercialization" that provide the required k to develop research partnerships. The ICAR has tralized three-tier institutional mechanism; wherein nology Management Unit (ITMU) and a Committee blished in each institute that are empowered to

From the DG's Desk

Dear Readers,

Information Communication Technology (ICT) has facilitated the much needed community empowerment and development by meeting their information needs. ICT is also an important enabler in research activities to accomplish tasks faster, more efficiently and effectively. It holds as much potential for development of agriculture sector as for any other sector in India.

ICAR has initiated various ICT programmes for agriculture sector in the country. Major ICT initiatives are e-connectivity of 200 Krishi Vigyan Kendras spread across the country, Video-Conferencing and IP Telephony for agricultural scientists, Agricultural Research Portal, Centralized and Secure Data Centre, National Agricultural Bioinformatics Grid, Digital Repositories of Research Information, e-Learning courseware for UG/ PG programs in Agriculture, E-Publishing and Open Access of research journals, MIS for e-Governance.

The Consortium for e-Resources in Agriculture (CeRA) established at Indian Agricultural provides access to a collection of about 2,000 international journals in more than 120 libraries in National Agricultural Research System (NARS). Till October 2010, the number of visitors to CeRA website is more than 2 million and the total download of full text articles is more than 1.5 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.

More recent initiatives inch

(callout)

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.

10

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

- **Dr. Madhuban Gopal, National Fellow, Division of Agricultural Chemicals, IARI, New Delhi**
  Advised on the analysis of data pertaining to the experiment conducted to test the effect of 20 chemicals each with 6 different concentrations on the root length and shoot length of plants. In this experiment, each of the treatment combinations were replicated twice. Best treatment combination were identified through one way classified ANOVA followed by Tukey's Honest Significant Difference test for making all possible pairwise treatment comparisons.

- **Board of Revenue for Rajasthan, Ajmer, Rajasthan**
  Provided technical guidance regarding the problems faced in estimation of number of fruits for Rajasthan State. Data analysis of the data obtained from Board of Revenue for Rajasthan, Ajmer was done for one tehsil of Shriganganagar district of Rajasthan and estimate of number of fruits along with percentage standard error was obtained by adopting two different estimation procedures.

- **Assistant Director, National Sample Survey Organisation (Field Operation Division), Ministry of Statistics and Programme Implementation, Faridabad**
  A document on Methodology on estimation of area and production of fruits and vegetables was prepared and sent to Commissioner, Land Records & Settlements, Gwalior, Madhya Pradesh.

- **Priya Shekhawat, Ph.D. student from Rajasthan Agricultural University, Bikaner**
  Advised on the analysis of data pertaining to an experiment on Genetic Characterization and Diversity Study of Rathi and Tharparkar Cattle Breeds of Rajasthan conducted to select a suitable set of microsatellite markers for determining genetic diversity in two indigenous cattle breeds viz. Rathi and Tharparkar and to characterize the breeds on the basis of microsatellite markers. She was advised on computation of heterozygosity and polymorphism information content using allele frequency data.

- **Ministry of Health & Family Welfare for pooling Annual Health Survey (AHS)**
  Advised on pooling of District Level Health Survey data for arriving the estimate at the national level.

- **Scientist from NBPGR, New Delhi**

  Advised on the procedure of estimation of heritability when the experiment was laid out using Augmented design. For this variance components estimation procedure developed by Parsad *et al*. (2003, Project Report, IASRI) was used.

- **Dr. Subhadra Singh, Senior Scientist, Department of Genetics, CCS HAU, Hisar**

  Advised on the analysis of data pertaining to an experiment conducted using α-design with parameters v = 105, b = 30, r = 2, k = 7 for evaluating 105 RILs of wheat crop.

- **Dr. Ravinder Kaur, National Fellow, Division of Agricultural Sciences, IARI, New Delhi**

  Advised on the analysis of data for one way and two-way analysis of variance followed by multiple comparison procedure using Tukey's Honest Significant Difference test.

Projects undertaken in Consultancy Mode

- Consultancy study on Prioritization of rainfed area in the country in collaboration with CRIDA, Hyderabad funded by National Rainfed Area Authority (NRAA), Ministry of Agriculture, Government of India. The aim of the study is to develop integrated index based on resource availability, agriculture and livestock production systems, socio-economic parameters with livelihood perspective which is to be used for prioritization of rainfed area. IASRI was engaged in development of socio economic and livelihood indices.

11

RAC, Management Committee and IRC

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:

1. Professor Prem Narain   Chairman
   Former Director, IASRI
   27 A, Pocket B-3, Lawrence Road
   Delhi – 110 035

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

3. Dr. SC Gulati   Member
   Professor
   Population Research Centre
   Institute of Economic Growth
   University Enclave
   Delhi – 110 007

4. Dr. Sridhar Sivasubbu   Member
   Institute of Genomics and
   Integrative Biology
   IGIB Extension Center at Naraina
   IA 93-94, Naraina Indl. Area
   Phase 1, Naraina
   New Delhi – 110 028

5. Dr. M Vidyasagar Rao   Member
   Executive Vice President   (till 21.02.2011)
   Tata Consultancy Services
   No.1, Software Units Layout
   Madhapur, Hyderabad – 500081

6. Dr. Vijay Kumar Bhatia   Member
   Director, IASRI
   Library Avenue, Pusa
   New Delhi – 110 012

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

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

9. Dr. Madhusudan Sathe   Member
   Yashodhan, 2071, Vijay Nagar Colony
   Near SP College, Pune – 411 030

10. Dr. SD Sharma   Member
    Former Director, IASRI   (Since 22.02.2011)
    D-15/02, SF (Second Floor)
    Presidency Floor, ARDEE City
    Sector 52, Gurgaon – 122 011
    (Haryana)

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

The 12th meeting of the Research Advisory Committee of IASRI was held on 30 December 2010 under the Chairmanship of Dr. Prem Narain, Former Director, IASRI, New Delhi. The meeting was attended by all the members except Dr. M Vidyasagar Rao, Dr. SC Gulati and Dr. Madhusudan Sathe. Dr. AK Vasisht, ADG (PIM & ESM), ICAR, Dr. VK Gupta, National Professor, ICAR and Heads of Divisions, IASRI also attended the meeting as special invitees.

Dr. VK Bhatia made a presentation about the achievements, functions, and future research programmes of IASRI. The details of the training and teaching activities of IASRI were also presented by him. After presentation, Chairman made opening remarks. Chairman invited the suggestions from all the members on presentation made on the research achievements and future programmes of the Institute and after discussions, the following action points emerged:

1. The Institute should be pro active in having interactions with the researchers in NARS for identification of statistical researchable issues and lay emphasis on problem solving approach. The modus operandi for identification of statistical researchable issues for Individual Scientist/ Institute level should be based on the motivation and having real life applications.

2. The Institute has its base in statistics and statistical methodologies. The statistical base of the Institute needs to be strengthened. The Institute should concentrate its efforts on development and dissemination of efficient design of experiments, statistical analytical techniques for innovative applications in agricultural sciences, new and efficient algorithms for bioinformatics and knowledge management of NARS.

3. For handling massive data sets, appropriate statistical and computational methodologies may be developed and an environment based on the concept of cloud computing may be created.

4. Efforts may be made to harness the benefits of high end statistical computing environment created in NARS. Prototypes may be developed for analysis that is commonly being used by the researchers across NARS. The efforts may be made to get these analysis performed so that the NARS users may not have any statistical computational difficulty at their end.

5. Strengthening of web resources on design of experiments should be continued. For strengthening this useful resource, efficient designs and analytical techniques may be developed through basic research and innovative applications in agricultural sciences.

6. The research efforts in small area estimation may further be strengthened and the results obtained may be cross validated in real situations.

7. Development of model assisted survey sampling techniques for precise estimation of crop yield and other parameters of interest including micro level parameters in agricultural surveys may be taken up. Statistical issues in applications of Remote Sensing technology and GIS tools for precise estimation of crop acreage/crop yield may be studied.

8. 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.

9. Development of models for forecasting and forewarning of crop yields and diseases should be taken up.

10. The possibility of having public-private partnerships, registering Ph.D. students for 4-5 years dedication, making provision of visiting faculty, adjunct faculty, post doctoral fellows etc. may also be explored. The research efforts may be reorganized in such a fashion that human resource efficiency is maximized.

11. 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.

12. Depleting scientific manpower was one major concern. It was recommended to have provision of visiting/adjunct faculty and post doctoral fellows to enhance the research output.

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:

1. Prof. VK Bhatia   Chairman
   Director, IASRI (ICAR), Pusa
   New Delhi-110 012
2. Dr. DK Thakur   Member
   Director (Agriculture)
   Government of Delhi, ITO
   New Delhi-110 001
3. Dr. VK Singh   Member
   Director, Agricultural Statistics and
   Crop Insurance
   Government of Uttar Pradesh
   Lucknow, Uttar Pradesh
4. Dr. Hari Shankar Gupta   Member
   Director, IARI, New Delhi–110 012
5. Prof. Devi Prasad Tripathi   Non-Official Member
   General Secretary &
   Chief Spokesman
   National Congress Party
   C-9/9782, Vasant Kunj
   New Delhi-110 070
6. Sh. Madhusudan Sathe   Non-Official Member
   Yashodhan, 2071
   Vijay Nagar Colony
   Near SP College
   Pune-411 030
7. Finance and Accounts Officer   Member
   IARI, Pusa, New Delhi-110 012
8. Dr. PK Agarwal   Member
   National Professor, ICAR
   IARI, Pusa, New Delhi-110 012
9. Dr. Madhuban Gopal   Member
   National Fellow
   Department of Agricultural Chemicals
   IARI, New Delhi-110 012

10. Dr. RK Mahajan   Member
    Principal Scientist (Agril. Stat.)
    Division of Germplasm Evaluation
    NBPGR, Pusa
    New Delhi-110 012
11. Dr. RL Sapra   Member
    Principal Scientist (Agril. Stat.)
    Division of Genetics
    IARI, Pusa, New Delhi-110 012
12. Dr. NP Sirohi   Member
    Assistant Director General (Engg.)
    KAB-II, ICAR, Pusa
    New Delhi-110 012
13. Sh. PS Syal   Member Secretary
    Head of Office, IASRI (ICAR)
    New Delhi-110 012

Institute Research Committee

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

Institute Research Committee Meeting is in progress

(RAC) in respect of technical programmes of the Institute. Dr. VK Bhatia, Director, IASRI is the Chairman and Dr. Rajender Parsad, In-charge (RCMU) is the Member Secretary of the IRC.

Two meetings of the Institute Research Committee (IRC) were held during 20, 23 & 26 August 2010 and 18–19 February 2011. In the first meeting 08 new research projects were approved and progress of 34 (16 Institute funded, 09 in collaboration with other Institutes and 09 outside funded) ongoing research projects were discussed and 05 research projects were declared as completed. In the second meeting 04 new research projects were approved and progress of 36 (21 Institute funded, 06 in collaboration with other Institutes and 09 outside funded) ongoing research projects were reviewed and 06 research projects were declared completed. As on 31 March 2011, 35 research projects are running at the Institute out of which 15 are Institute funded, 10 funded by outside agencies and 10 in collaboration with other institutions. Two special IRC meetings were also organised on 03 July 2010 and during 03-04 January 2011 to discuss the six monthly targets and achievements of the scientists of the Institute.

12

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

RESEARCH PAPERS PRESENTED

- **2nd Annual Conference of Indian Society of Agri-Business Management on "Managing Agri-Food Supply Chain" at IIM, Lucknow during 09-11 April 2010**
  - Bhardwaj, SP. Managing supply chain in agricultural sector.

- **National Seminar on the "Survey Results of NSS 63rd Round" held at New Delhi during 02-03 June 2010**
  - Chandra, H, Bhatia, VK and Sud, UC. Small area level estimates for proportion of poor households in the state of Uttar Pradesh in India.

- **Workshop on "Knowledge Discovery for Rural Systems" in the 14th Pacific-Asia Conference on Knowledge Discovery and Data Mining organized at Hyderabad during 21-24 June 2010 using e-conference**
  - Jain, Rajni, Arora, Alka and Ahuja, Usha. Clustering approach to diagnose determinants of ICT empowerment to women farmers.

- **10th International Conference of "Economic Modelling" held at Istanbul, Turkey during 07-10 July 2010**
  - Kaul, Sushila. Agricultural credit cooperatives of India.

- **10th International Industrial Conference on "Data Mining" held during 12-14 July 2010 at Berlin, Germany**
  - Ahuja, Sangeeta. Robust clustering using discriminant analysis.

- **Second Meeting for "Setting up Horticulture Information System (HIS)" under the Chairmanship of Dr. HP Singh, DDG (Horticulture), ICAR on 21 July 2010 held at Krishi Bhawan, New Delhi**
  - Ahmad, Tauqueer. Methodological issues relating to horticulture surveys in India.

- **National Workshop on "Improvement of Agricultural Statistics" organized by Department of Economics and Statistics, Ministry of Agriculture at NASC Complex, New Delhi during 07-08 September 2010**
  - Ahmad, Tauqueer. Variation between official and trade estimates of cotton production: Causes and remedies.

- **17th Annual Group Meeting of "All India Co-ordinated Research Project on Rapeseed and Mustard" organized at Rajmata Vijayaraje Scindia Krishi Vishwa Vidhyalaya, Gwalior during 01-03 September 2010**

  Invited Talk
  - Parsad, Rajender and Gupta, VK. Efficient design and analysis of rapeseed-mustard trials.

- **5th International Conference on "Agricultural Statistics" held at Kampala, Uganda during 13-15 October 2010**
  - Bhatia, VK. Teaching and training in agricultural statistics.
  - Chandra, Hukum, Sud, UC and Salvati, Nicola. Estimation of district level poor households in the state of UP in India by combining NSSO survey and census data.

- **20th Swadeshi Science Congress (SSC) held during 06-08 November 2010 at CMFRI, Kochi**
  - Srinivasan, K, Ashokan, PK, Varghese, Eldho and Ajayghosh, V. Influence of intercropping multipurpose trees and water harvesting structures on the performance of coconut trees in coconut based gardens, Kerala

- **4th Indian Horticultural Congress held during November 18-21, 2010 in New Delhi**
  - Chakraborti, Kalyan, Paul, Amrit Kumar, Ray, Sujit Kumar and Samanta, Arunava. Evaluation of different planting systems in mango under gangetic alluvial zone of West Bengal

- **Technical Session III of the National Seminar on "Interface between Statistics, Mathematics and Allied Sciences" at Department of Statistics, Kumaun University, S.S.J. Campus, Almora during 20-22 November, 2010**
  Plenary Talk
  - Sud, UC. Calibration estimators

- **Workshop on "Geostatistics and Softcomputing Techniques for Spatial Data Management" held at Sri Venkateshwara University, Tirupati during 22-24 November 2010**
  - Sahoo, Prachi Misra. Spatial statistics in geoinformatics for agricultural research and development.

- **24th National Conference on Agricultural Marketing during 23-25 November 2010 at Navsari Agricultural University, Navsari, Gujarat**
  - Bhardwaj, SP and Kumar, Ashok. Econometric study of asymmetry in transmission of market information.
  - Kumar, Ashok and Bhardwaj, SP. A study of institutional linkages for enhancing rural credit flow.

- **70th Annual Conference of Indian Society of Agricultural Engineering at Jammu University, Jammu & Kashmir during 29 November-01 December 2010**
  Invited Talk
  - Kaul, Sushila, Singh, DR, Singh, Rajender and Kumar, Arbind. Rearing of migratory sheep as a livelihood and food security in hill economy: A case study of Kangra district of Himachal Pradesh.

- **National Symposium on "GIS and Remote Sensing in Infrastructure Development" during 01-03 December 2010 held at Lonavala**
  - Sahoo, Prachi Misra. Crop acreage estimation in north-eastern hilly region using remote sensing, GIS and survey data.

- **64th Annual Conference of the Indian Society of Agricultural Statistics on "Statistics and Informatics for Massive Data Sets" held at Bidhan Chandra Krishi Viswavidyalaya, Kalyani during 03-05 December 2010**
  Invited Talk
  - Arora, Alka, Jain, Rajni and Upadhyaya, Shuchita. Blending rough sets and clustering methods for discovery of patterns.
  - Agrawal, Ranjana and Chandrahas. Use of data reduction techniques in crop yield forecasts.
  - Parsad, Rajender. Strengthening statistical computing for NARS.

  Contributed Papers
  - Dash, Sukanta, Parsad, Rajender and Gupta VK. Efficient designs for single factor microarray experiments.
  - Dutta, Debasis, Mahajan, VK and Rai, Anil. Design and development of data mart for consumption expenditure survey data.
  - Ghosh, Himadri and Prajneshu. Statistical learning theory for fitting multimodel distribution to rainfall data: An application.
  - Gupta, VK, Kole, Basudev, Chatterjee, Kashinath and Parsad, Rajender. Construction of optimal multi-level supersaturated designs by association scheme.
  - Kumar, Amrender and Lakshmi, Ratna Raj. Application of soft computing techniques in

identifying relationship for multi-dimensional data sets.

– Laxmi, Ratna Raj and Kumar, Amrender. Weather based forecasting model for crops yield using neural network approach.

– Varghese, Eldho and Jaggi, Seema. Response surface model with neighbour effects.

- **International Conference on "Development and Applications of Statistics in Emerging Areas of Science & Technology" held during 08-10 December 2010 hosted by Department of Statistics, Jammu**

– Alka, Sahu, TK, Kumar, CP, Bansal, D, Behera, BK and Rao, AR. In silico analysis of vitellogenin gene for abiotic stress tolerance – anoxia.

– Chaturvedi, A and Alam, Wasi. Maximum likelihood and uniformly minimum variance unbiased estimators for reliability estimation of a family of lifetime distribution.

– Sagar, P, Alka, Vashisht, S and Rao, AR Characterization of 5' splice sites of bovine genome.

– Sarkar, RK, Rao, AR, Wahi, SD and Bhat, KV. Clustering of crop genotypes based on mixture of qualitative and quantitative data.

– Srivastava, Sudhir, Varghese, Cini, Jaggi, Seema and Varghese, Eldho. Diallel cross designs for comparing test versus control line(s).

– Varghese, Eldho and Jaggi, Seema. Response surface methodology with differential neighbour effects.

- **XXIX Biennial Workshop of the "AICRP on Integrated Farming Systems" held at ANGRAU, Hyderabad during 10-13 December 2010**

  Invited Talk

– Parsad, Rajender. Design and analysis of crop sequence experiments: Some experiences

– Sharma, NK. Some observations which are restricting the comprehensive analysis of data.

– Khanduri, OP. On-line demonstration of information system for on-farm experiments.

- **International Conference on "Financial Derivatives" during 17-19 December 2010 at Department of Commerce, Pondicherry University, Pondicherry**

– Bhardwaj, SP and Vasisht. Market efficiency in commodity futures - A case study of mentha oil.

– Bhardwaj, SP. Price volatility in agricultural commodities.

- **19th International Conference of the Forum for Interdisciplinary Mathematics (FIM) on "Interdisciplinary Mathematical and Statistical Techniques" organised by the Department of Statistics, Patna University, Bihar during 18-20 December 2010**

– Ahmad, Tauqueer, Rai, Anil, Bathla, HVL and Sharma, SD. Methodological issues relating to horticulture surveys in India.

– Biswas, Ankur Ahmad, Tauqueer and Rai, Anil. Variance estimation using Jackknife method in ranked set sampling under finite population framework.

– Sud, UC. Estimation of district level poor households in the state of Uttar Pradesh in India by combining NSSO survey and census data.

- **16th National Conference of "Agricultural Research Statisticians" held at IASRI, New Delhi during 23-24 December 2010**

– Ahmad, Tauqueer. Agricultural statistics research with special emphasis on sample survey: Status and challenges.

– Arora, Alka. Priorities for human resource development in computer applications.

– Dahiya, Shashi. An eLearning system for agricultural education.

– Jaggi, Seema. Priorities for human resource development in agricultural statistics.

– Prajneshu and Ghosh, Himadri. Priorities for research in statistical modelling: Current status and future challenges.

– Rai, Anil. Priorities of research in agricultural bioinformatics.

– Sudeep. Knowledgebase systems in agriculture: Opportunities and challenges.

- **98th Session of "Indian Science Congress" at SRM University, Chennai on 4 January 2011**

– Islam, SN. Expert system on seed spices: An ICT initiative for knowledge management in agriculture.

- **International Conference on "Managing Sustainable Development of Rural Economy and Agri Business" at BHU, Varanasi, during 21-23 January 2011**

  – Kaul, Sushila. Status and growth of agribusiness management in India.

- **13th Conference of "Society of Statistics, Computer and Applications" held at NAARM, Hyderabad during 24-26 February 2011**

  Invited Talk

  – Gupta, VK. Combinatorics in controlled sampling (Special Evening Lecture).

  – Parsad, Rajender and Gupta, VK. Design Resources Server and service oriented computing.

  Contributed Papers

  – Ramasubramanian V, Kumar, Amrender, Bhatia, VK and Premi, Sarvesh Kumar. Technology forecasting applications for prioritizing factors in rainfed agriculture.

  – Sarkar, Susheel Kumar, Krishan Lal, Parsad, Rajender and Gupta, VK. Generation of fractional factorial experiments robust against linear-trend.

- **National Seminar on "Recent Developments in Sampling Techniques and its Application" organized by Maharashi Dayanand University, Rohtak during 26-27 March 2011**

  Invited Talk

  – Parsad, Rajender. Optimal controlled sampling plans.

  – Sud, UC. Small area estimation and its application.

PARTICIPATION

Conferences/Workshop/Brainstorming Sessions

- International conference on Dynamics of rural transformation in emerging economies at New Delhi during 14-16 April 2010

- National conference on Knowledge management in the globalized era at NASC Complex, New Delhi during 21-23 April 2010 organized by Association of Agricultural Librarians and Documentalist of India

- Brain storming session on Survey on measuring outcomes for Children at National Academy of Statistical Administration; Greater Noida on 29 April 2010

- XI AICRP workshop at NRCSS, Ajmer during 05-06 July 2010

- Talk on Role of biotechnology for conservation and use of plant genetic resources by Dr. Emile Frison, Director General, Biodiversity International on 27 July 2010 at NASC Complex, New Delhi

- Regional workshop on FAO project on Establishment of National information sharing mechanisms on the implementation of global plan of action on 30 August 2010 at IASRI, New Delhi

- Meeting of First India-US Agriculture Dialogue Steering Committee Working Groups III: Crop and weather forecasting on 14 September 2010 at Hyderabad House, New Delhi

- Meeting with Dr. Dath K Mita Crop Assessment Analyst, USDA States Department of Agriculture, Foreign Agricultural Service, Derrick Williams III, Director, Office of Global Analysis and David Leishman, Senior Allache for Agricultural Affairs, India, Bangladesh, Sri Lanka in connection with First India-US Agriculture Dialogue Steering Committee Working Groups III: Crop and Weather Forecasting on 20 September 2010 at Mausam Vibhag, New Delhi

- International Convention on Special economic zones-policy perspectives & future scenario organized by ASSOCHAM at Hotel Le Meridian, New Delhi on 23 September 2010

- Hort-informatics workshop at IISR Calicut during 11-12 October 2010 and a presentation was made related to National Agricultural Bioinformatics Grid

- A lecture on the role of information technology in agriculture delivered by Professor Robert A. Easter, The Chancellor and Provost (Interim) of the University of Illinois held on 15 October 2010 at NASC Complex, New Delhi

- Rashtriya karyashala at National Academy of Agricultural Research Management, NAARM, Hyderabad on 29 October 2010

- National Science Congress in Indian Languages held at NPL, New Delhi during 22-23 November 2010

- Seminar on Forward market commission held at IIML-Noida Campus during 27-28 January 2011

- 15th Conference of Commonwealth statisticians at Vigyan Bhawan, New Delhi on 07 February 2011

- 14th National conference on e-governance organized by Department of Administrative Reforms and Public Grievances, Govt. of India as a Panelist in the Plenary Session-IV "ICT in Agriculture" at CIDCO, Natyagruha, Aurangabad held during 10-11 February 2011

- Meeting of the Technical Advisory Committee (TAC) at national level constituted for implementation of National Agricultural Insurance Scheme (NAIS) in the country at Krishi Bhawan, New Delhi on 14 February 2011

- Workshop on Results-Framework Documents (RFD) for Responsibility Centers (RCs) at Vigyan Bhawan, New Delhi on 22 February 2011

- Brainstorming workshop on Prospects of nanotechnology in agri-value chain at NAARM, Hyderabad on 22 February 2011

- Workshop cum meeting on E-publishing of research journals - A way forward on 26 March 2011 at NASC Complex, New Delhi

Krishi Vigyan Mela

- Institute participated in the Krishi Vigyan Mela held at IARI, New Delhi during 03-05 March 2011. Maize Agridaksh, Expert System on Seed Spices and Expert System on Wheat Crop Management were
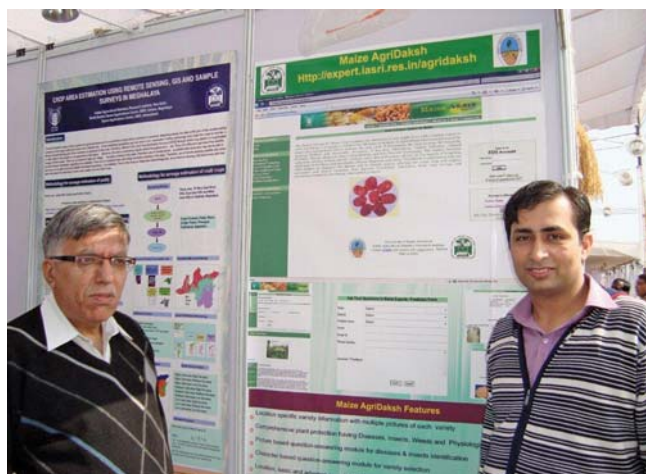
IASRI stall at Krishi Vigyan Mela, IARI, New Delhi

demonstrated to visitors, researchers and farmers on the touch screen computers. Posters on several other research achievements such as Strengthening Statistical Computing for NARS, National Agricultural Science Museum etc., were exhibited at the stall and the visitors were given leaflets and encouraged to use the web-sites.

Participation in Training Programmes

International

- Sh. Amrender Kumar was deputed to attend International training programme on Technology Forecasting at Pennsylvania State University, University Park, PA, USA from 22 April to 14 June 2010 under NAIP project "Visioning, Policy Analysis and Gender (V-PAGe) - Component II : Technology Forecasting"

- Sh. SB Lal and Smt. Anu Sharma were deputed to attend three months International training programme on Crop Science Bioinformatics at Iowa State University, Iowa, USA from 15 March to 14 June 2010. The training was sponsored by NAIP component-I

- Dr. H Ghosh attended the NAIP Training programme on "Multimarket Modelling for Policy Analysis" during 15 May to 15 August 2010 at Department of Economics, Southern Illinois University, Carbondale, USA. He studied the indirect effects of policy change of price on quantity produced and consumed of rice along with maize in terms of partial demand and supply elasticity in multimarket model set up

- Smt. Anshu Bharadwaj was deputed to attend three months International Training Course in Geo-information Science and Earth Observation - Principles and Applications of Remote Sensing and GIS from 23 September 2010 to 17 December 2010 at the ITC, Faculty for Geo-Information Science and Earth Observation, University of Twente, Hengelosestraat, Netherlands, under NAIP

- Dr. AR Rao is deputed for undergoing training in the area of Bioinformatics, in the Genomics Coordinating Centre (GCC) of Dr. Bruce S Weir, Professor & Chair, Department of Biostatistics, University of Washington, Seattle, USA from 24 February 2011 to 23 May 2011

National

- Training programme on Creative Writing in Agriculture held at Indian Institute of Mass Communication (IIMC), Dhenkanal, Orissa during 10-15 May 2010 at IIMC, Delhi during 14-18 February 2011 and 28 February-04 March 2011

A participant receiving Certificate for Creative Writing in Agriculture at IIMC, New Delhi

- All India training for trainers on Methodology for integrated sample survey scheme organized by the Department of Animal Husbandry, Dairying and Fisheries, Government of India, New Delhi at IASRI, New Delhi on 18 June 2010
- Intensive maize training for freshers organized by Directorate of Maize Research, New Delhi during 11-13 October 2010
- Basics of remote sensing, GIS and GPS offered by Indian Institute of Remote Sensing (IIRS) through satellite interactive terminal facility available in the Division of Agricultural Physics, IARI, New Delhi during 11 October-10 December 2010
- Training workshop on Bioinformatics in crop improvement at NBPGR, New Delhi during 19-25 October 2010 organized under NABG, NAIP
- Training-cum-workshop on Parallel computing and high performance computing at Centre for Development of Advanced Computing (C-DAC), Pune under the project National Agricultural Bioinformatics Grid during 07-10 February 2011
- Subject training on Bioinformatics for animal genomics and proteomics at NBAGR, Karnal from 24 February to 9 March 2011

- Subject training on Crop gene expression data analysis and structural bioinformatics organized during 01-11 March 2011 at NBPGR, New Delhi
- Subject training on Data mining and computational methods in bioinformatics for microbiological research organised during 04-15 March 2011 at NBAIM, Mau
- Training programe on Quantifying the impact of climate change on agriculture at NCAP, New Delhi during 21-25 March 2011

Invited Lectures Delivered at Other Organisations

Dr. VK Bhatia

- A lecture on Descriptive statistics and exploratory data analysis during the training programme on Research Methodology for Socio-Economic Studies organized during 19 October-04 November 2010 at National Council of Applied Economic Research (NCAER), New Delhi.

Dr. VK Gupta

- A lecture on Resolvable block designs in a UGC Refresher Course in Statistics and Mathematics organised during 10-30 November 2010 held at Kumayun University, Almora

Dr. Prajneshu

- Two lectures on Nonlinear time-series models and Fuzzy linear regression models at IIFT, Kolkata on 26 April 2010
- Two lectures on Nonlinear statistical models and their applications on 15 March 2011 at Miranda House, University of Delhi

Dr. Ranjana Agrawal

- A lecture on Preharvest forecast of crop yield-IASRI approach in a training programme on Use of crop simulation models for yield forecasting under FASAL project at IMD, Mausam Bhawan, New Delhi for the Senior Research Fellows working at various AAS units of IMD during 17-28 January 2011

Dr. Rajender Parsad

- Two lectures on Analysis of α-designs and Design resources server to the participants of the travels workshop organized by ICAR National Professor Research Unit in collaboration with Department of Statistics, College of Basic Sciences, CCS HAU, Hisar at Hisar on 16 April 2010

- Two lectures on Fundamentals of design of experiments to the participants of the training programme on Maize Training for Fresher organized at Directorate of Maize Research, New Delhi during 11-13 October 2010

- Two lectures on Design of experiments and analysis of data using statistical software to the participants of the Winter School on Designing Nutraceutical and Food Coolant Rich Vegetable Crop Plants organized by Division of Vegetable Science, IARI, New Delhi during 15 October-04 November 2010

- Two lectures on Fundamentals of design of experiments to the participants of the Winter School on Recent advances in Chemical and Non-chemical Approaches of Weed Management in Cropped and Non-cropped Areas organized during 15 November-06 December 2010 at Division of Agronomy, IARI, New Delhi

- Three lectures on Statistics: Introduction and concepts; fundamentals of design of experiments and design resources server to the participants of the training programme on Data Analysis Using SAS held at JNKVV, Jabalpur by DWM, Bhubaneshwar during 24-29 January 2011

- Two lectures on Design and analysis of microarray experiments and JMP genomics: Statistics work flow to the participants of training programme on Crop Gene Expression Data Analysis and Structural Bioinformatics under NAIP Consortium on Establishment of National Bioinformatics Grid organized at NBPGR, New Delhi during 01-10 March 2011

- Two lectures on design resources server and service oriented computing to the participants of the training programmes on Data Analysis Using SAS held at CIRB Hisar organized by Consortium partner NDRI, Karnal during 07-12 March 2011 at NDRI Karnal during 22-28 March 2011

- Four lectures on Statistics introduction and concepts; Fundamentals of design of experiments; design resources server and Service oriented computing and Base SAS to the participants of the training programme on Statistical Data Analysis Using SAS organized by NRC AF, Jhansi in technical collaboration with NAIP Consortium on Strengthening Statistical Computing for NARS during 14-18 March 2011

Dr. UC Sud

- A lecture on Agricultural statistics in India in training programme on Official Statistics at National Academy of Statistical Administration, Greater Noida (UP) during 05–09 July 2010

- A lecture on Application of sample survey in agricultural statistics in a five-week training programme on Official Statistics for ISS probationers at National Academy of Statistical Administration, Greater Noida (UP) during 05 July – 06 August 2010

- A lecture on Small area estimation in a refresher course in Statistics and Mathemetics for university/college teachers organized by the Academic Staff College, Kumaun University, Nainital during 10-30 November 2010

- A lecture on Challenges of agricultural statistical system in the National Academy of Administration System at Greater Noida on 28 December 2010

Dr. KK Tyagi

- A lecture on Determination of sample size to the participants of a Biostatistical workshop on Sample Size Analysis organized by the Department of Biostatistics, PGIMER, Chandigarh on 27 August 2010

- Two lectures on Sampling strategies for data collection in the training programme on Research Methodology for Socio-Economic Studies organized from 19 October to 04 November 2010 at NCAER

Dr. Anil Rai

- A lecture on Impact analysis of goat rearing in training programme for Veterinary officers of Bihar Government on 13 April 2010 at Central Research Institute on Goat, Mathura

- A lecture on Synonymous codon usage in the sensitization training programme under NABG project at NBFGR, New Delhi during 24-28 January 2011

- A lecture on Logistic regression modeling using SPSS/SAS of survey data at Computer Centre, Ministry of Statistics and Plan Implementation, New Delhi on 24 February 2011

- A lecture on Statistical analysis of gene expression the subject training on Bioinformatics for Animal Genomics and Proteomics at NBAGR Karnal during 24 February-09 March 2011

- A lecture on Synonymous Codon usage in microbes in the subject training on Data Mining and computational methods in Bioinformatics for Microbiological Research at NBAIM, Mau during 04-15 March 2011

- A lecture on Categorical data analysis and logistic regression in sample surveys in refresher training course on SPSS for Senior ISS officers at Computer Centre, Ministry of Statistics and Programme Implementation, New Delhi during 22-26 March 2010

Dr. SP Bhardwaj

- Two lectures on Price discovery in commodity markets and Price volatility in agricultural commodities in a UGC sponsored Faculty Development programme held at Department of Commerce, Pondicherry University, Pondicherry during 25-26 September 2010

Dr. Krishan Lal

- Five lectures on Design resources server, Descriptive statistics, Test of significance, Correlation and regression and Design of experiments as a Guest Faculty to the participants of the training programme on Strengthening Statistical Computing for NARS using SAS held at MPUA&T, Udaipur during 22-27 November 2010

- Five lectures on Design resources server, Descriptive statistics, Test of significance, Correlation and regression, Principal component analysis, Cluster analysis, Repeated measures analysis and Design of experiments as a Guest Faculty to the participants of the training programme on Strengthening Statistical Computing for NARS using SAS held at MPUA&T, Udaipur during 14-19 February 2011

Dr. Seema Jaggi

- Two lectures on Correlation and regression analysis and Testing of hypothesis and also conducted practical sessions on these topics using SPSS during a training programme on Basic Statistics and Application of SPSS from 30 August to 06 September 2010 at Recruitment and Assesment Centre, Defence Research and Development Organization, Delhi

- Two lectures on Correlation and regression analysis, and Testing of hypothesis on 26 October 2010 in a training programme on Research

Methodology for Socio-Economic Studies at NCAER

Dr. AR Rao

- A lecture on Bioinformatics in the session Natural Resource Management and Engineering during Interactive session on "Biotechnology Research in ICAR" held at NASC Complex on 26-27 July 2010

- A lecture on Statistical and computational genomics lab facility at Central Rice Research Institute, Cuttack on 30 August 2010

- Two lectures on Multivariate analytical techniques: PCA, factor analysis, cluster analysis and exercises on multivariate analytical techniques using SPSS during a training programme on Basic Statistics and Application of SPSS from 30 August to 06 September 2010 at Recruitment and Assesment Centre, Defence Research and Development Organization, Delhi

- A lecture on Application of bioinformatics tools in analysis of genome structure of eucaryotes to the participants in the National Training Programme organized by National Bureau of Plant Genetic Resources, New Delhi on Bioinformatics in Crop Improvement during 19-25 October 2010

- Two lectures on Multivariate analytical techniques: data reduction techniques and data classificatory techniques to the participants in the training programme on Research Methodology for Socio-Economic Studies organized by NCAER during 19 October to 04 November 2010

- Two lectures on Multivariate analysis during one week training programme on SPSS for ISS officers and seniors officers of the Sttate/UTs, Ministry of Statistics and Programme Implementation, New Delhi during 6-10 December 2010

Dr. Cini Varghese

- Two lectures on Nonparametric tests and also conducted practical session using SPSS during a training programme on Basic Statistics and Application of SPSS from 30 August to 06 September 2010 at Recruitment and Assesment Centre, Defence Research and Development Organization, Delhi

Dr. Ramasubramanian V.

- A lecture on Statistical aspects of risk assessment modelling in the training workshop on Decision

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Support Tools for Agriculture Risk and Management at NCAP, New Delhi during 2-5 August 2010

- A lecture on Time series models for price forecasting in the workshop on Quantitative Modeling Approaches for Economic Policy Analysis in Agriculture at NCAP, New Delhi during 12-13 August 2010

- Two lectures on Logistic regression and Time series analysis in the training programme on Recent Methodology for Socio-economic Studies conducted at NCAER, New Delhi held during 19 October-4 November 2010

- A lecture on Use of models in crop-weed competition studies in the winter school on Recent Advances in Chemical and Non-chemical Approaches of Weed Management in Cropped and Non-cropped Areas conducted at Division of Agronomy, IARI, New Delhi during 15 November- 6 December 2010

- Five lectures on Time series analysis using SAS, Non-linear models viz. growth models, logistic regression and probit models using SAS, Design Resources Server of IASRI-SAS aspects and Use of SAS macros in the training programme on Data Analysis using SAS at ICAR Research Complex for NEH region, Umiam, Meghalaya during 7-11 March 2011

Dr. Prachi Misra Sahoo

- A lecture on Spatial statistics and its applications in agriculture in winter school on Remote Sensing with Special Emphasis on Input use Efficiency held in the Division of Agricultural Physics, IARI, New Delhi during 15 February-11 March 2011

Dr. Sudeep

- A lecture on Expert system for maize crop in the Intensive Maize training programme for freshers at DMR, New Delhi on 13 October 2010

- Conducted two days training at IASRI during 15-17 January 2011 as a part of 21 days CAFT training programme entitled Innovative Extension Models for Sustainable Agriculture organized at Division of Agricultural Extension, IARI during 04-24 January 2011

Sh. KK Chaturvedi

- A lecture on Multimedia and Sharable Content Object Reference Model in MOODLE during one day workshop on Computerization of Research Project Information (RPF-I) and Content

Management for E-Learning System using MOODLE at NDRI, Karnal on 26 April 2010

- Two lectures on Data organization and management and the Modules of DSS in the training programme held at NCAP, New Delhi during 2-5 August 2010

- A lecture on Design and management of biological databases at NBPGR, New Delhi in training on Bioinformatics in Crop Improvement during 19-25 October 2010

Sh. SN Islam

- A lecture on Importance of expert system for seed spices during a training programme Seed Spices Cultivation in the Dry land Area at Hyderabad organized during 14-15 November 2010

- A lecture on Expert system at Holy Cross KVK, Hazaribagh (Jharkhand) on 26 November 2010

Sh. HO Aggarwal

- A lecture on Knowledge management for varieties, insects, pests and diseases in Agridaksh in the training programme Innovative Extension Models for Sustainable Agriculture, conducted by Agricultural Extension Division of IARI during 04-24 January 2011

Sh. Pal Singh

- Two lectures on MS Front page and involved in practical sessions in 21 days CAFT training programme entitled Innovative Extension Models for Sustainable Agriculture organized at IARI Extension Division during 04-24 January 2011

Dr. N Sivaramane

- Two lectures on Regression analysis with qualitative variables and Demand analysis in a training programme on Research Methodology for Socio-Economic Studies held at National Council of Applied Economic Research (NCAER), New Delhi during 19 October-04 November 2010

- Four lectures on Base-SAS at University of Agricultural Science, Bangalore during 17-18 January 2011

- Two lectures on Efficiepcy analysis using data envelopment analysis program and stationarity and cointegration analysis using eviews in a training on Institutional Change for Inclusive Agricultural Growth

held at Division of Agricultural Economics, IARI during 15 February-7 March 2011

Sh. SB Lal

- A lecture on Computer basics for bioinformatics in sensitization training on Bioinformatics in Crop Improvement (under NABG, NAIP) organized at NBPGR, New Delhi during 19-25 October 2010

Smt. Anu Sharma

- A lecture on Basics of computer programming in bioinformatics during training on Bioinformatics in Crop Improvement organized at NBPGR, New Delhi during 19-25 October 2010

Sh. Wasi Alam

- A lecture on R and its application in bioinformatics on 12 March 2011 at NBPGR, New Delhi

Sh. Amrender Kumar

- A lecture on Pre-harvest forecast of crop yield-IASRI approach (Practical)-training programme on Use of Crop Simulation Models for Yield Forecasting under FASAL project during 17-28 January 2011 at IMD, Mausam Bhawan, New Delhi

- Forty Four lectures on Probability and statistics-school of computer and systems sciences, Jawaharlal Nehru University (JNU), New Delhi in the academic session of 2010-11

Sh. Eldho Varghese

- Two lectures on Descriptive statistics and conduct practical session on Descriptive Statistics using SPSS during a training programme on Basic Statistics and Application of SPSS from 30 August-06 September 2010 at Recruitment and Assesment

Centre, Defence Research and Development Organization, Delhi

- Two lectures on SPSS for Multivariate analysis under a refresher training programme on SPSS for ISS officers and senior officers of the states/UTs organised by Ministry of Statistics and Programme Implementation, Government of India during 21-25 February 2011

VISIT ABROAD

- Dr. VK Bhatia was deputed to attend the ISO/TC/69 Technical Committee/ Sub-Committees and Working Groups held at Paris, France during 14-18 June 2010

- Dr VK Bhatia and Dr UC Sud were deputed to attend 5th International Conference on Agricultural Statistics during 13-15 October 2010 at Kampala, Uganda.

- Dr. Prajneshu visited Department of Mathematics and Statistics, University of North Carolina at Greensboro, USA and delivered two invited talks on Non-linear time-series models and their applications on 03 June 2010 and Fuzzy regression analysis and its applications on 10 June 2010

- Dr. Sushila Kaul visited Bilgi University, Istambul Turkey to attend 10th Conference of Economic Modelling during 07-10 July 2010

- Dr. Sangeeta Ahuja was deputed to attend International Conference on Data Mining during 12-14 July 2010 at Berlin, Germany

Radio Talk/TV Interview

- डॉ. विजय कुमार भाटिया ने दिनांक 25 जून 2010 को ''भारतीय कृषि सांख्यिकी अनुसंधान संस्थान किसानों के हित में'' विषय पर चर्चा की ।

Workshops, Conferences, Meetings, Seminars and Annual Day Organized

CONFERENCES

- **XVI National Conference of Agricultural Research Statisticians** was organized during 23-24 December 2010. The conference was attended by participants from 10 different States. The Inaugural Address was delivered by Dr. CD Mayee, Chairman, ASRB; Keynote Address by Dr. VK Gupta, ICAR National Professor and Valedictory Address by Professor TCA Anant, Chief Statistician of India and Secretary, Ministry of Statistics and Programme Implementation. During the conference following technical sessions were organized:

  – Action Taken on the Recommendations made during the Last Conference (Chairman: Dr. NPS Sirohi, ADG (Engineering))

  – Priorities for Research in Agricultural Statistics: Current Status and Future Challenges (Chairman: Dr. Aloke Dey, INSA Senior Scientist, ISI, Delhi; Conveners: Dr. UC Sud and Dr. A Dhandapani)

  – Priorities for ICT in Agriculture (Chairman: Dr. SK Raheja, Former Director, IASRI, New Delhi; Conveners: Dr. RC Goyal and Dr. RC Agrawal)

  – Priorities for Human Resource Development in Agricultural Statistics and Computer Applications (Chairman: Dr. Bal BPS Goel, Former Director, IASRI, New Delhi; Conveners: Dr. Krishan Lal and Dr. B Singh)

A view of XVI Plenary Session of National Conference of Agricultural Research Statisticians

  – Presentation of Reports by Conveners of different Sessions and Summary of Recommendations

Dr. Rajender Parsad was the Organizing Secretary of the Conference.

WORKSHOPS ORGANISED

Launch Workshop of NAIP Consortium on Strengthening Statistical Computing for NARS

Dr. S Ayyappan, Secretary, DARE and Director General, ICAR inaugurated the Launch Workshop of NAIP Consortium on Strengthening Statistical Computing for NARS on 08 June 2010 in presence of Dr. Bangali Baboo, National Director, NAIP, Dr. MM

Pandey, DDG (Engineering), Dr. AK Singh, DDG (Natural Resource Management), Dr. SK Datta, DDG (Crop Sciences), Dr. KD Kokate, DDG (Agricultural Extension), Dr. VK Gupta, ICAR National Professor, Dr. Mruthyunjaya, Former National Director, NAIP, Dr. Ramesh Chand, Director, National Centre for Agricultural Economics and Policy Research, Dr. Sain Dass, Director, Directorate of Maize Research, Dr. HS Gaur, Dean and Joint Director Education, IARI, New Delhi, Dr. NT Yaduraju, National Co-ordinator, NAIP, Dr. VK Bhatia, Director, Indian Agricultural Statistics Research Institute and many other dignitaries. This project is a realization of the visualization of research managers, research facilitators, researchers and trainers to create a sound and healthy statistical computing environment for the benefit of scientists of NARS. The goal of the project is to provide research guidance in statistical computing and computational statistics so as to provide enabling statistical computing facilities to the researchers of NARS. The efforts would not merely be focused on an interface of statistics, computer science and numerical analysis, but it would also involve designing of intelligent algorithms for implementing statistical techniques particularly for analyzing massive data sets, simulation, bootstrap, etc.

The availability of healthy statistical computing environment would enable the researchers in NARS to undertake probing, in-depth, appropriate, intractable analysis of data generated from agricultural research including those in advanced research areas like biotechnology, genomics, forecasting, agricultural field experiments, surveys, microarrays, massive data sets such as climate change, biodiversity, market intelligence, etc. It would also facilitate data sharing over web and creation of analytics over the web useful

A view of Launch Workshop of NAIP Consortium on SSCNARS

for All India Co-ordinated Research Projects and other Network Projects of NARS.

Dr. Ayyappan emphasized the need to sensitize the researcher managers about the capabilities of this high end statistical computing environment in making the agricultural research globally competitive, visible and acceptable. To this end IASRI has to play a proactive role by describing success stories, capabilities and features of the statistical computing environment through presentations in Director's Conferences, SAU Vice-Chancellor Conferences, Dean's Meetings and other important fora.

The launch of this timely initiative to reinvigorate the agricultural research system with advanced computing facilities and development of computing skills would make 08 June 2010 as a red letter day for NARS. This would provide enhanced visibility to IASRI and agricultural statistics discipline in NARS. This project has brought all 151 NARS organizations in a closed network. The training component of the project is also very exhaustive and targets at training 1500 agricultural research scientists in the country in the usage of high-end statistical package. These would then become trainers and in turn train other agricultural research scientists. Such an effort would have a multiplier effect.

Launch Workshop of National Agricultural Bioinformatics Grid (NABG)

Dr. S Ayyappan, Secretary (DARE) and Director General (ICAR), inaugurated the Launch Workshop of National Agricultural Bioinformatics Grid (NABG) at Indian Agricultural Statistics Research Institute (IASRI), New Delhi on 18 September 2010. This project is funded by NAIP ICAR under Component-1. Under this project supercomputing facilities for undertaking research in the field of Agricultural Bioinformatics is being developed at IASRI along with High Performance Computing infrastructural facilities at five National Bureaus related to crop science, animal science, fisheries, agriculturally important microbes and insects namely NBPGR, New Delhi; NBAGR, Karnal; NBFGR, Lucknow; NBAIM, Mau and NBAII, Bangalore. This would be national facility which will provide computational framework to support biotechnological research in the country. The website of NABG (http://www.iasri.res.in/nabg) was also launched by Dr. S Ayyappan, Hon'ble Secretary, DARE and Director General, ICAR.

Inaugural Function of Launch Workshop of NABG

In order to keep pace with the research and developments in agricultural bioinformatics at global level, country needs expertise and exposure in this area of research. Therefore, establishing National Agricultural Bioinformatics Grid (NABG) will help in developing databases, data warehouse, software and tools, algorithms, genome browsers and high-end computational facilities through systematic and integrated approach in the field of agricultural bioinformatics. NABG is also aimed for capacity building for research and development in agricultural bioinformatics and in turn agricultural biotechnology. Further, it is also going to provide platform for inter-disciplinary research in cross-species genomics. It is expected that, in due course of time, information and knowledge generated through research on bioinformatics from the genomic knowledge base will start flowing downward and experimentations in different sectors of agriculture will be able to evolve internationally superior competitive varieties/breeds and commodities in agriculture. The objectives of NABG are to develop agricultural bioinformatics grid for the country, to create local databases and Bioinformatics Data Warehouse (BinDW) for genomic resources across species, Human resource development in agricultural bioinformatics and to create and promote inter-disciplinary research groups with focus on agricultural bioinformatics.

In order to sustain this activity Council established the Centre of Agricultural Bioinformatics (CABin) with the status of a Division in this Institute. The main responsibility of the CABin is to integrate a number of other institutions/organizations in order to provide computational framework and support to carry out biotechnological research. This network of institutions is based on two-tier architecture and it will be able to bridge the gap between genomic information and knowledge, utilizing statistical and computational sciences. Also, this model will help in the development of partnerships at various levels among national and international organizations. Further, this will also establish functional linkages among researchers and scientists in the field of Bioinformatics and related fields.

World Statistics Day

The United Nations Statistical Commission (UNSC) decided during its 41st Session in February 2010 to celebrate 20 October 2010 as World Statistics Day under general theme 'Celebrating the Many Achievements of Statistics: Service, Professionalism and Integrity' and UN General Assembly has resolved to designate 20 October 2010 as World Statistics Day.

Celebration of World Statistics Day

Institute celebrated the first World Statistics Day on 20 October 2010. During these celebrations a Symposium on "Statistics in Agricultural Development" was organized. In this symposium two Guest Speakers Dr. RPS Malik, IWMI-India, New Delhi and Dr. Seema Bathla, School of Social Sciences, Jawaharlal Nehru University, New Delhi delivered the invited talks on Irrigation Subsidies: Some Methodological Considerations and Understanding and Quantifying Linkages between Agriculture and the Macro Economy respectively. Dr. Rajender Parsad was the convener for this Symposium.

Workshops Organised under Research Projects

Project Information & Management System of ICAR

An on-line system namely "Project Information &

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Management System of ICAR" (PIMS-ICAR) has been designed and developed at IASRI, New Delhi to help in taking decisions to check duplication in research projects both at divisional as well as inter divisional level of ICAR. The system is being strengthened for modules on Data Management; Detection to Check Duplication in Research Projects; Projects On-line Monitoring; Reports & Queries; and User Management & Administration. The system has been hosted at http://pimsicar.iasri.res.in on the server of IASRI, New Delhi. The module for projects data management has user interfaces for on-line data entry, data updating, and modification with respect to ongoing projects data as per RPF-I as well as for the completed projects wherein facility has also been provided to upload RPF-III document in Doc/PDF/Scanned file format into the system. To take action on the decision taken in the meeting on "Integration of IT efforts in ICAR" held on 25 August 2010 at IASRI, New Delhi under the chairmanship of Dr. S. Ayyappan, Secretary, DARE and Director General, ICAR, 4 Zonal Workshops for Sensitization-cum-Training on PIMS-ICAR for the Nodal Officers of ICAR institutes were organized by IASRI, New Delhi at 4 locations in collaboration with NAARM, Hyderabad; DWM, Bhubaneswar; and CIAE, Bhopal during October – November 2010. The Nodal Officers from 77 ICAR institutes attended the zonal workshops organized by the team members of PIMS-ICAR at the above locations.

Participants during the Workshop on PIMS-ICAR

In the zonal workshops a brief introduction on PIMS-ICAR along with the objectives and the role and responsibilities of Nodal Officers at their respective institutes were discussed. The procedural flows as well as the working of the system including access rights of the Nodal Officer were demonstrated. Live demonstration cum practical session on the data management module for Ongoing Projects Data Entry as per RPF-I and for Completed Projects Data Entry Process including the process for upload of digital copy (Scanned/PDF/Doc file) of RPF-III into PIMS-ICAR were presented. Reference guides for data management has been prepared and made accessible on PIMS-ICAR site for the Nodal Officers/ PIs of the projects. The problems faced by the Nodal Officers in initiating data entry task from their respective institutes and their suggestions for achieving the targets and improvement in the system were deliberated.

As an outcome of the zonal workshops, the Nodal Officers from 77 institutes have initiated project data entry process for more than 2400 ongoing and 800 completed projects into PIMS-ICAR from their respective institutes.

Sensitization cum Training Workshops for Nodal Officers of NISAGENET

The NISAGENET is accessible at http://www.iasri.res.in/Nisagenet/ to provide Country/State/university/College level reporting on agricultural education in India. Under NISAGENET the information on Academic, Infrastructural facilities, Budget provision, Manpower and Research & Development activities of all the Agricultural Universities and Deemed universities of ICAR along with their constituent/affiliated colleges is being collected and compiled. Keeping in view the necessity and importance of NISAGENET, ICAR has approved it as a regular ongoing activity of the Council and made mandatory for all the Agricultural Universities and their constituent/affiliated colleges to participate and provide data as per requirements from time to time.

To provide realistic and up-to-date reporting and to expedite the data entry process, updating, validation of the existing data from all the Agricultural Universities along with their constituent/affiliated colleges a Sensitization-cum-Training Workshop for Nodal Officers of NISAGENET was organized at IASRI, New Delhi during 27-28 December 2010.

The nodal officers/representatives from 26 Universities participated in the workshop. Dr. Kusmakar Sharma, ADG(HRD), Education Division of ICAR, New Delhi inaugurated the workshop. Dr. RC Goyal with

A view of NISAGENET Workshop

NISAGENET team sensitized the participants through demonstration and practical hands on training. To emphasize the utility and importance a demonstration on the Online Query/Reporting System of NISAGENET was also given to the participants.

The Valedictory Programme was chaired by Dr. Arvind Kumar, Deputy Director General (Education), ICAR, New Delhi. He expressed the strong need of strengthening NISAGENET with up-to-date data. He assured to provide necessary support from the Council for providing quality and quantity data for NISAGENET.

In order to provide realistic and up-to-date reporting through NISAGENET, two more Sensitization-cum-Training Workshops for the Nodal Officers have been organized by the Education Division of ICAR and IASRI at Anand Agricultural University, Anand during 22-23 March 2011 and at IASRI, New Delhi during 28-29 March 2011. 15 and 21 Nodal Officers and their Associates from different agricultural universities participated in the workshops respectively.

In the workshops, the objectives and the role and responsibilities of Nodal Officers at their respective universities were discussed. The procedural flows as well as the working of the system including access rights of the nodal officers were demonstrated. Live demonstrations cum practical session on the data management module were presented. Reference guides for data management has been prepared and made accessible on NISAGENET site for the nodal officers.

Travel Workshops Organised as Outreach Activity of the Institute

A Travel training Workshop on Resolvable Designs and Design Resources Server was organized by ICAR National Professor Research Unit in collaboration with Department of Statistics, College of Basic Sciences, CCS HAU, Hisar at Hisar on 16 April 2010. Dr. VK Gupta, National Professor, ICAR, Dr. Rajender Parsad, Head of Division, Design of Experiments and Dr. LM Bhar, Senior Scientist were the faculty members. Fifty participants attended the Workshop.

INTERACTIVE MEET

- A one day Interactive Meet on **Role of IASRI in Improving R&D Efficacy of NARS** was organized on 21 August 2010 at the Institute. Hon'ble Dr. S Ayyappan, Secretary, DARE & Director General, ICAR chaired the meeting. During the meeting discussion on mandate, objectives and activities of IASRI and expectations from the Institute to improve R & D efficacy in NARS through application of statistics and use of IT and computational techniques were made.

Secretaty, DARE and Director General, ICAR addressing the partiticipants of Interactive Meet on Role of IASRI in Improving R&D Efficacy of NARS

- A meeting on **Integration of IT Efforts in the ICAR** was held on 25 August 2010 at NASC Complex, New Delhi under the Chairmanship of Hon'ble Dr. S Ayyappan, Secretary, DARE & Director General, ICAR.

- An Interactive Meet on **Enhancing the Role of IASRI in R&D Efficacy of NRM Division of ICAR Institutions** was held on 22 September 2010 under the Chairmanship of Dr. AK Singh, DDG (NRM). In this meeting all Directors of ICAR Institutes under

NRM Division and all Project Co-ordinators of AICRPs of NRM Division participated. The meeting was also attended by Dr. MM Pandey, DDG (Engg.), Dr. VK Bhatia, Director, IASRI, Dr. VK Gupta, ICAR National Professor and scientists from IASRI, New Delhi.

DDG (NRM) addressing the participants of Interactive Meet on the Role of IASRI in R&D Efficacy of NRM Division of ICAR

- Interactive Meeting on the **Role of IASRI in Enhancing R&D Efficacy of NARS with Animal Science Division of ICAR** was held on 27 October 2010 at the Institute. The meeting was Chaired by Dr. MM Pandey, DDG (Engg.), ICAR, New Delhi. The meeting was attended by Dr. VK Bhatia, Director, IASRI, Dr. VK Gupta, ICAR National Professor, Dr. CS Prasad, ADG (AS), ICAR, Dr. RK Sethi, Director, CIRB, Hisar, Dr. Devendra Swaroop, Director, CIRG, Mathura, Dr. BK Joshi, Director, NBAGR, Karnal, Dr. KT Sampat, Director,

DDG (Engg.) addressing the participants ofInteractive Meet on the Role of IASRI in Enhancing R&D Efficacy of NARS with Animal Science Division of ICAR

NIANP, Karnataka, Dr. Prabhu Das, Project Director, PDNDMS, Karnataka, Prof. AK Mishra, Project Director, PDC, UP and scientists from IVRI, Izatnagar, NDRI, Karnal and IASRI, New Delhi.

- Organized Interactive Meet on **Information and Communication Technology in ICAR** was held during 03-04 November 2010 at NASC Complex, New Delhi under the Chairmanship of Dr. S Ayyappan, Secretary, DARE and DG, ICAR, New Delhi. Dr. PK Malhotra made a presentation on Applications of IT/ICT technologies in agricultural research and development. Meeting was attended by all the Scientists of IASRI, Scientists of Computer Application discipline of different ICAR institutes and all the Incharge of ARIS Cells of ICAR institutes.

Secretary, DARE and Director General, ICAR addressing Select Group of Scientists and Information Management Specialists

- A Meeting of a select group of scientists and information management specialists was organized at NASC Complex, New Delhi on 29 November 2010 to find out the ways for providing greater impetus to research in ICT, Information Communication Management (ICM) for improving agricultural research and development in India and to draw a road map IT/ICT for ICAR. The meeting was chaired by Dr. S Ayyappan, Secretary, DARE and Director General, ICAR and co-chaired by Dr. Ajit Maru, Senior Knowledge Officer, GFAR, FAO. The meeting was attended by 37 participants including Shri Rikin Gandhi, CEO, Digital Green, Dr. TV Prabhakar, Prof. (IIT), Kanpur, Dr. Pier Paolo Ficarrelli, ILRI, Dr. Sanjay Chaudhary, Prof. (DA-IICT), Gandhinagar, Dr. Krishna Alluri, British

Columbia, Canada, Dr. MM Pandey, DDG(Engg.), ICAR, Dr. AK Singh, DDG(NRM), ICAR, Dr. KML Pathak, DDG(Animal Science), ICAR, Dr. Arvind Kumar, DDG(Education), ICAR, Dr. HP Singh, DDG(Horticulture), Dr. RB Singh, Former Chairman, ASRB, Dr. Mruthyunjaya, Former National Director, NAIP, Dr. S Mauria, ADG (IP&TM), ICAR, Dr. V Venkatasubramanian, ADG (Ag. Extn.), ICAR, Dr. CS Prasad, ADG (Animal Science), Dr. TP Trivedi, Project Director, DIPA, ICAR, Dr. VK Gupta, ICAR National Professor, Dr. VK Bhatia, Director, IASRI and Head of Divisions and Scientists from IASRI, NBPGR and ICAR.

The some of the statistical researchable issues/ recommendations emerged from interactive meets are as follows:

- IASRI should plan and organize meetings with different SMDs to identify need-based researchable issues

- There is a strong need to strengthen the human resource at IASRI to intensify research efforts

- Efforts should be made in developing framework of linking of AICRPs for online data submission, data analysis and generation of reports through SAS EBI Server. To begin with prototype may be developed for one AICRP.

- Mechanism may be developed for maintaining qualitative improvement and regular updates of databases created under Integrated Agricultural Resources Information System and information system on designed field experiments.

- 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 on priority.

- Development of model assisted survey sampling techniques for precise estimation of crop yield and other parameters of interest including micro level parameters in agricultural surveys may be taken up.

- Remote sensing technology and GIS tools for precise estimation of crop acreage/crop production

may be explored. Development of spatial decision support systems using remote sensing and geographic information systems may be taken up in collaboration with other NARS Organizations.

- Development of models for forecasting of yields and forewarning of crop/animal diseases should be taken up on priority.

- Strengthening of Web resources on design of experiments should be continued. For strengthening this useful resource, efficient designs and analytical technique may be developed through basic research and innovative applications in agricultural sciences.

- Web resources may also be developed for other areas such as Sample Survey, Statistical Genetics etc.

- A mechanism may be developed for involvement of IASRI in the beginning of the experiment itself. The technical programme of all new experiments to be taken up under different AICRPs may be finalized in consultation with IASRI, so as to have the efficient design for experimentation and analysis of experimental data.

- The efforts on developing expertise on agro-meteorological modeling; bio-climatic zoning may be initiated.

- Research work on development of models for soil test based recommendations for crop sequences, development of forewarning models for crop protection, climate change needs to be developed, mapping of agro-forestry areas through spatial models, studying the effect of effluents in sewage water used for irrigation, estimation of climatic parameter at agro-climatic zone level, plot sampling in design field experiments etc. needs to be taken up at priority.

- Statistical tools need to be developed for judging the superiority of indigenous and exotic breeds of cattle.

- A committee was constituted to frame

– A policy for data sharing, data management, strengthening and integration of databases.

– Assess the ICT initiatives taken by ICAR

– Suggest the roadmap of ICT in ICAR for next five years

SPECIAL MEET

- संस्थान में हिन्दी की प्रगति का आकलन करने के लिए संसदीय राजभाषा समिति की दूसरी उप-समिति द्वारा 27 सितम्बर, 2010 को संस्थान के कार्य का निरीक्षण किया गया।

Other Symposia/Workshops

Following invited paper session were organised during 64th Annual Conference of ISAS on the theme **Statistics and Informatics for Massive Data Sets** held jointly by Department of Agricultural Statistics, BCKV, Kalyani and Department of Statistics, Kalyani University, Kalyani at FTC, Kalyani**.**

- Data Management and Statistical Analysis in Agriculture (Conveners: Rajender Parsad, BMK Raju and PK Sahu).
- Dimension Reduction and Classification Procedures (Conveners: A Dhandapani, Alka Arora and C Pal).
- Estimation Problems in Multidimensional Data Sets, Challenged Ahead (Conveners: UC Sud, J Jayashankar and D Mazumdar).

ANNUAL DAY CELEBRATIONS

- The Annual Day of the Institute was celebrated on 02 July 2010. Dr. Madan Mohan Pandey, Deputy Director General (Engineering), ICAR was the Chief Guest of the function and Dr. Swapan Kumar Datta, Deputy Director General (Crop Science), ICAR delivered the Nehru Memorial Lecture entitled 'A Journey for Next Generation Seed'. Nehru Memorial Gold Medal for the year 2009 was awarded to Sh. Prabina Kumar Meher, M.Sc. (Agricultural Statistics) student and for the year 2009 was awarded to Sh. Ashutosh Karna, M.Sc. (Computer Application) student. V.V.R. Murthy Award for the year 2007-09 was awarded to Sh. Prabina Kumar Meher, M.Sc. (Agricultural Statistics) student. Annual Report of the Institute for the year 2009-10 was released on the Annual Day.

Seminars

Salient outcomes from the completed research projects undertaken in 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 projects proposals. Outline of Research Work (ORW) seminars, Course seminars and Thesis seminars were delivered

Release of Annual Report during Annual Day Function

by the students of M.Sc. and Ph.D., Agricultural Statistics and M.Sc., Computer Application.

During the period under report, a total of 104 seminar talks were delivered. Out of these, 64 were student seminars, 35 by scientists of the Institute and 05 by Guest speakers as follows:

Guest Seminars

- Dr. KV Palanichamy, Director, Biostatistics and Statistical Programming, Kendle India, Ahmedabad. Experiences of a Practicing Statistician on 09 April 2010.
- Dr. CS Jonathan Liu, Vice President, State College, Pennsylvania. Soft Genetics-Software Tools for Genetic Analysis on 23 June 2010.
- Dr. DS Rathore, Founder Director, Wisdom International & Former Vice Chancellor, HPKV, Palampur. Wisdom for Happy Life on 23 September 2010.
- Dr. Mary Crowe, Director of the Office of Undergraduate Research and Dr. Jan Rychtar, Associate Professor, Dept. of Mathematics & Statistics, University of North Carolina at Greensboro, Greensboro, North Carolina, USA. A Mathematical Model of Stealing with Asymmetrical Information on 13 December 2010.
- Dr. KV Palanichamy, Director, Biostatistics and Statistical Programming, Kendle India, Ahmedabad. A trip into statistics on 18 March 2011.

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Distinguished Visitors

INDIAN

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

Prof. TCA Anant
Chief Statistician and Secretary
Ministry of Statistics and Programme Implementation
Government of India

Dr. Pronab Sen
Former Chief Statistician and Secretary
Ministry of Statistics and
Programme Implementation
Government of India

Dr. CD Mayee
Chairman, ASRB, ICAR, New Delhi

Dr. RB Singh
Former Chairman, ASRB, ICAR, New Delhi

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

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

Dr. Mruthyunjaya
Former National Director, NAIP

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

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

Dr. SK Datta
DDG (Crop Sciences), ICAR, New Delhi

Dr. KD Kokate
DDG (Extension), ICAR, New Delhi

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

Dr. HP Singh
DDG (Horticulture), ICAR, New Delhi

Dr. KML Pathak
DDG (Animal Science), ICAR, New Delhi

Dr. NK Singh
National Professor ICAR
NRCPB, New Delhi

Dr. Bikas Kumar Sinha
Former Member, National Statistical Commission and
Professor, Indian Statistical Institute, Kolkata

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

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

Dr. RK Gupta
South Asia Co-ordinator, CIMMYT
India Officer, NASC Complex, New Delhi

Dr. DS Rathore
Founder Director, Wisdom International &
Former Vice Chancellor, HPKV, Palampur

Dr. CS Prasad
ADG (Animal Science), ICAR, New Delhi

Dr. LS Rathore
ADG (Meterology), India Meterological Department,
New Delhi

Dr. NPS Sirohi
ADG (Engg.), 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. AK Vashist
ADG(PIM), ICAR, New Delhi

Dr. NT Yaduraju
National Co-ordinator, NAIP, ICAR, New Delhi

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

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

Dr. Devendra Swaroop
Director, CIRG, Mathura

Dr. Ramesh Chand
Director, NCAP, New Delhi

Dr. RK Sethi
Director, CIRB, Hisar

Dr. BK Joshi
Director, NBAGR, Karnal

Dr. KC Bansal
Director, NBPGR, New Delhi

Dr. Sain Dass
Former Director, Directorate of Maize Research,
New Delhi

Dr. Sai Ram
Director, Directorate of Maize Research,
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,

Prof. AK Mishra
Project Director, Project Directorate of Cattle,
Meerut

Dr. AK Srivastava
Former Joint Director, IASRI, 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, Government 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, India

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

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

Dr. D. Chaudhary
Department of Animal Husbandry, Dairying &
Fisheries, Ministry of Agriculture, GOI

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. Raj Vir Singh
Member, Commission for Agricultural Costs & Prices
Ministry of Agriculture, GOI

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

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

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

Dr. TV Prabhakar
Prof. (IIT), Kanpur

Shri Rikin Gandhi
CEO, Digital Green, New Delhi

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

FOREIGN

Dr. CS Jonathan Liu
Vice President, State College, Pennsylvania

Dr. Jan Rychtar
Associate Professor, Department of Mathematics &
Statistics, University of North Carolina at
Greensboro, Greensboro, North Carolina, USA

Dr. Mary Crowe
Director of the Office of Undergraduate Research
Department of Mathematics & Statistics
University of North Carolina at Greensboro
Greensboro, North Carolina, USA

Dr. Ajit Maru
Senior Knowledge Officer, GFAR, FAO, Rome

Dr. Krishna Alluri
British Columbia, Canada

Dr. Pier Paolo Ficarrelli
International Livestock Research Institute, India
Office, NASC Complex, New Delhi

Dr. Sat Gupta
Department of Mathematics and Statistics
University of North Carolina, Greensboro
North Carolina USA

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Indian farmers to get bioinformatics grid

Published: Wednesday, Feb 9, 2011, 11:16 IST
By Arun Jayan | Place: Pune | Agency: DNA

The Centre for Development of Advanced Computing (C-DAC), the pioneer of supercomputing in the country, is now assisting the Indian Council of Agricultural Research (ICAR) to establish a national agricultural bioinformatics grid.

The initiative, the first of its kind in the country, will help scientists enhance agricultural productivity and address problems of food security.

Under the project, a three-day training-cum-workshop on 'parallel and high performance computing' began at C-DAC on Monday, with the participation of several scientists and researchers from New Delhi's Indian Agricultural Statistics Research Institute (IASRI) and other ICAR institutions.

The workshop will provide an insight into different aspects of high performance computing (HPC) with the goal of capability building in solving complex problems in agriculture and biotechnology. Speaking to DNA, C-DAC's group coordinator and head (HPC solutions group), Goldi Misra, said the use of HPC would help scientists address the problem of food scarcity at the grass-roots level.

"Now scientists have to wait for a production cycle to end to analyse various issues like quality of seed, weather pattern and quality of produce. But with the use of HPC the same can be known using simulation. This is for the first time in the country that a national agricultural bioinformatics grid is going to be started and C-DAC will be helping set it up," he said.

The World Bank-funded project in the first phase will connect National Bureau of Plant Genetic Resources, New Delhi; National Bureau of Animal Genetic Resources (NBAGR) Karnal; National Bureau of Fish Genetic Resources, Lucknow; National Bureau of Agriculturally Important Microorganisms, Mau; and National Bureau of Agriculturally Important Insects, Bangalore.

"It will be rolled out from next month and is expected to be completed within a year. These institutions will be connected with high-speed network in the first phase. Once completed, the researchers will be able to handle huge datasets and also perform complex analytical processes," said Misra.

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15

IASRI Personnel

IASRI consists of Scientific, Technical and Administrative personnel headed by the Director. The Heads of different Divisions/ In-Charge of Cells and other officers at managerial positions are:

Director
Dr. VK Bhatia

ICAR National Professor
Dr. VK Gupta

Head, Division of Biometrics renamed as Division of Biometrics and Statistical Modelling (w.e.f. 02 August 2010)
Dr. Prajneshu

Head, Division of Forecasting Techniques (upto 01 August 2010)
Dr. (Mrs.) Ranjana Agrawal

Head, Division of Econometrics (upto 01 August 2010)
Dr. SP Bhardwaj (A)

Head, Division of Forecasting and Econometrics Techniques (w.e.f. 02 August 2010)
Dr. (Mrs.) Ranjana Agrawal

Head, Division of Computer Applications
Dr. PK Malhotra

Head, Division of Design of Experiments
Dr. Rajender Parsad

Head, Division of Sample Survey
Dr. UC Sud

Head, Centre for Agricultural Bio-informatics [CABin] (w.e.f. 02 August 2010)
Dr. Anil Rai (A)

Professor (Agricultural Statistics)
Dr. VK Bhatia

Professor (Computer Application)
Dr. PK Malhotra

In-charge, Research Coordination and Management Unit and Member Secretary, IRC
Dr. Rajender Parsad

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

Vigilance Officer
Dr. PK Malhotra

Transparency Officer & Nodal Officer, RTI (w.e.f 15 January 2011)
Dr. Prajneshu

Welfare Officer
Dr. PK Batra

In-charge, National Agricultural Science Museum
Dr. (Mrs.) Sushila Kaul

Librarian
Dr. (Mrs.) P Visakhi (upto 13 February 2011)
Sh. Praveen Kumar Saxena (w.e.f.14 February 2011)

Senior Administrative Officer and Head of Office
Sh. PS Syal

Finance and Accounts Officer
Sh. Krishan Kumar

Public Information Officer
Sh. Nika Ram (upto 20 May 2010)
Sh. PS Syal (w.e.f. 21 May 2010)

रविवासरीय

हिन्दुस्तान

जनबीन

प्रशिक्षण कार्यक्रम संपन्न

रांची | सांख्यिकी विश्लेषण सॉफ्टवेयर के प्रयोग द्वारा आंकड़ों का विश्लेषण विषय पर रांची कृषि कॉलेज में आयोजित प्रशिक्षण शनिवार को संपन्न हुआ। पाठ्यक्रम समन्वयक प्रकाश कुमार ने बताया कि इसमें 28 वैज्ञानिकों ने हिस्सा लिया। डॉ डीके पांडा, डॉ लाल मोहन भार, डॉ संजीव कुमार एवं एस साहू प्रशिक्षक के तौर पर मौजूद थे। हार्प प्लांट के प्रधान डॉ शिवेंद्र कुमार ने प्रशिक्षणार्थियों के बीच प्रमाण पत्र बांटे।

Scientific analysis of data must for successful research

HT Correspondent

jam.live@hindustantimes.com

RANCHI: Agricultural universities and research institutes of Indian Council of Agricultural Research (ICAR) are continuously generating a lot of data and scientific analysis. For this reason using universally accepted techniques and tools was necessary for its utilisation in improving farm production, productivity and mitigating the climate change related problems in the country, said Dr DK Panda, scientist of Bhubaneshwar-based Directorate of Water Management (DWM) on Saturday.

He was addressing the valedictory session of the six-day training programme on 'Data analysis using statistical analysis software (SAS)' organised jointly by DWM and Birsa Agricultural University (BAU) at Ranchi Agriculture College.

"Data acquired in laboratory and on-farm research using electronic and other recording devices and from archived sources are required to be subjected to descriptive, inferential, diagnostic and analytical processing for best use," Panda added.

The programme was organised under the project 'Strengthening statistical computing for national agricultural research system (NARS)' sponsored by the World Bank-aided National Agricultural Innovation Project (NAIP). DWM, Bhubaneshwar is acting as the lead centre for 22 institutions of eastern India.

Dr Shivendra Kumar, head of ICAR's Horticulture and Agroforestry Research Programme (HARP) gave away certificates to the trainees and advised them to use the practical knowledge and skills acquired here in their research works.

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26 pages including four pages of HT City and four pages of Sunday Magazine

Scientific analysis of data must for successful research

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jam.live@hindustantimes.com

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INTERVI
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vibra

Famous film and TV Sanjay Mishra is in Ran recently won the Star Award for best actor in role for 'Phans Ga Obama. He talked to Bhattacharya about his and feelings. Excerpts

You came to Ranchi with award. Why?

I have brought this a home to my dadi. I wo aware but did not go to rec it. My director received lost my father last year, there is no elder in the fa with whom I could share jo. So I came to Ranchi nded it over to my gra nother.

How are you attached to Jharkhand and Bihar?

I was born in Pa dadaji Jagdeep Nara was the ADM of R have been visiting and on. My relat shifted to Ranchi me. And travelling Patna, Ranchi, Bena es one a lot. The cu is so vibrant and v

id you choose

Young talents

Any Other Relevant Information

National Agricultural Science Museum

The National Agricultural Science Museum (NASM), situated at NASC Complex, Dev Prakash Shastri Marg, Opposite Dasghara Village, Pusa Campus, New Delhi came into existence during 2004 and was inaugurated by H.E. Hon'ble President of India, Dr. A.P.J. Abdul Kalam on 03 November 2004.

The NASM is looked after by a Central Management Committee constituted at the ICAR Headquarter level and is comprised of:

Dr. MM Pandey	Deputy Director General (Engg.)	Chairman
Dr. P Chandra	Assistant Director General (PE)	Member
Sh. VP Kothiyal	Director (Works)	Member
Sh. Rabindra Patra	Director (Finance)	Member
Sh. PK Jain	Under Secretary (GAC)	Member
Dr. VK Bhatia	Director, IASRI	Member Secretary

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

In NASM, interesting information on agriculture for farmers, agriculture students, college and school children as well as general public is available. The exhibits in the Museum are a combination of electronics, computer hardware/software, mechanical devices, art and science objects. Special feature of this Museum is to provide complete knowledge on the agricultural subjects through audio, video, slides and computer medium using touch screen facility.

The Museum is open to visitors on all days from 10.30 a.m. to 4.30 p.m. except Monday - the weekly holiday. It is NOT closed even for lunch break. This grand Museum is fully air-conditioned. There is a nominal entry fee of Rs. 5 per head but the groups of students nominated by schools, colleges and farmers are exempted from entrance fee.

During the period under report many prominent persons visited the Museum which included Hon'ble Prime Ministers/Ministers of various countries, Head of Agricultural/Research Departments, etc. Besides this, farmers belonging to different parts of India also visited Museum and gained vital knowledge from the exhibits displayed. In all 21,815 visitors visited the Museum and 3,712 tickets were sold. The functioning of the Museum was appreciated by all the visitors, especially by high dignitaries and foreigners. Some of the distinguished foreign visitors are:

Afghanistan Tony McDonald, Mahboob Waizi

African Countries Anduamampianina Nicola, Razakamiaramaniana, Getachew Alemn, Tolessa Debele, Geletu Bejija, Tilahun Geleto, Niguse Haqazi, Sunday Mutabazi, Imleda Night Kashaija, Jane Wamuongu, Birru Yitafem

Australia	Meryl Williams	**Mongolia**	Sukhbaatar Jigjidpurev
Bangladesh	Wais Kabir, A.Z.M. Shafiqul Alam, Md. Abdur Razzaque, Md. Abdul Hamid, Azharul Islam Talukdar	**Myanmar**	Aung Hlaing, Yu Yu Than
		Nepal	Thakur Uday Chandra
Bhutan	Sonam Tamang	**Nigeria**	Philip Ikeazor
Brunei	Rusali Hj Sapar, Ak Hj Shahrul Rizan Bin Pg Hj Othman	**Norway**	Gry Synne Vag
		Oman	Mohammed Salim Saif Al-Nadabi
Cambodia	Sam Nuov, Meas Pyseth, Phnom Penh	**Papua New Guinea**	Regina Nukundj
Canada	L. Monaotesse, F. Jacovella, Dannis Abrahan, Butty Forbes, Alphonsus Utioh, Alanna Koch, Jennifer Evanlio, Phillip Stephan, Chandra Madramooto	**Philippines**	William D Dar, Romeo S. Recide, Leah A. Samson
		Singapore	Lee See Mooi, Wag Liag, Wang Kok Liang, Lee Siew Mooi
China	Jikun Huang, Du Min Liang-Pai-Huang, Lang-Che Kuo	**South Africa**	Tsakain Ngomane, Viachaskar Doletarace, Atul Padacmal, Richard Wakerord, Meschok Malinga, Thozi Gwanya, David Mahlobo, Gugile Nilminti, Norman Shushu, Molapo Qhobela
Denmark	Sarjen Burchardt		
Egypt	Namet Adly Naguib Baskharoun, Mohammad Ismail Sayed Ahmed		
Ethiopia	Tolessa Debele, EIAR, Aliye H. Asoba, Gebremichael Negus, N.D. Mullu, Guled Abdulahi, James Puot Choil, Mohamed Sherif, Ahmad Seid	**Sri Lanka**	K.M. Karunanayke, S.M. Mamadua, Murgasu Thianglingam, Mihindukulsurya Joseph, Markus Fernando, S.M.H.N. Samarakon, Subasinha Arakichebi Kanal Nanshri Jayathirika, H.A. Rathnasiri, G. W. Nani Dharsaini D.Silva, Thorange Ruwini dyamili Padmasiri, Silaraja Theev Aselen, Hasanthi Inoka Vikrmasurya, Hetti Acharchilej Jkjitha Nandinin Vijyasinha, G.D. N. Siriyalatha, S.A. Dasanayke, Rathnayake Mudiyansleng, Deepa Nimali Rathnayake, Yddugalaj lalmani, M.N. Ratnayke, Dompi Gamaj Sudharshi Prera, Vishapani Rajpesha, Idirisinhe Arachchiji Kingsale Idirisinhe
Indonesia	Bess Tiesnamrti, Simon P. Ginnin, Sri Wijayanti, Suryadi Abdul Munir, Zulkifli Ali, Sri Wijayanti		
Italy	Ayurzana Runtsagdavea		
Jordan	Fawaz Abdel-Hafiz Abu Salem, Nabeel Mohammad Banihani		
Kazakistan	Dilyara, Bibimariyan, Bitora, Abdrahman, Feruza		
Lao, People's Democratic Republic	Somphanh Chanphengxay, Inthadom Akkharath		
Malaysia	Shariffah Binti Nazari, Dato Mohd Hashim Bin Abdullah, Amir Hamzah Bin Harun, Dato Sulaiman Bin Md Zain	**Syria**	Rania Haj Abdo, Samer Faeez Alras
		Thailand	Preyanat Thiabratana, Wanwipa Suwannarak, Jirawan Yamprayoon
Maldives	Adma Trarore		
Mauritius	Buchaya Rajman, Konjul Soorooparsad, Beeharry, Rambhujun Maheshwar, Jayelall Mattarooa, Chunnoo, Madhuri, Kooujul K., Sheela Bhujun, Jugdeo Rughoobur, Parmamud Mattarooa, Liloutee Mattarooa, B. Doobraz, B. Patpur, Boodhram Danwantee	**Turkey**	Boris Ugaker
		USA	Robert Easter, KC Ting, Paul John Boettcher, Deborah Delmar
		Uganda	Jmelda NK Jashaija, Anduamam Pianina
		United Kingdom	Ten students from UK, Nigel Poole

Vietnam	Nguyen Thi Phuong Thanh, Wanwipa Suwannarak
Yemen	Mufadhal Ahmed Hussein Al-Harazi, Ali Abdullah Saleh Benganaan, Kalifa Traore, Egteehad Ali Abdo, Ahmed Naseer Ateik Al-Maethali, Abdulhakim Mohammed Hussein
Zimbabwe	Mabel Hungwe

Besides this, farmers belonging to different parts of India, students of various schools, State Agricultural Universities/Colleges in India and abroad gained vital knowledge from the exhibits displayed in the Museum. Sponsored farmer groups from Centre for Agriculture and Rural Development, IFFCO, NABARD and various NGOs visited NASM. In addition, trainees of Summer School/Winter School as well as other trainings from various ICAR institutes visited NASM.

Annual Day of NASM was organized and celebrated on 9 November 2010 at AP Shinde Symposium Hall, NASC Complex. The Chief Guest of the function was Dr. Panjab Singh, Advisor, Agriculture Plantation, ETA Star and Former Secretary, DARE and Director General, ICAR. The function was Chaired by Dr. S Ayyappan, Secretary, DARE and Director General, ICAR. Dr. CD Mayee, Chairman, Agricultural Scientists Recruitment Board was the special Guest and other dignitaries present on the dias included Dr. MM Pandey, Deputy Director General (Engineering) and Dr. VK Bhatia, Director, IASRI. On this occasion Dr. S Ayyappan, motivated brilliant students to persue agriculture sciences as their main subject for career. Quiz competitions, interactive sessions, visits and other

A student receiving prize during Annual Day Function of NASM

mass awareness activities have been taken up to popularize and publicize the Museum. Winners of the Essay and Quiz competitions held on 19 October 2010 were awarded certificates and mementos. Four mobile agricultural museums for Kolkata, Mumbai, Chennai and North-East region will be introduced soon for disseminating agricultural related knowledge, said Dr. Ayyappan. For regular updating and adding new literature a virtual tour of NASM was also launched through ICAR website (www.icar.org.in) on the occasion. A film on NASM and booklet ''The Saga of Indian Agriculture'' was also released.

A team of Doordarshan TV channel visited Museum for the entire coverage of the Annual Day of the Museum and Incharge, Museum was interviewed by the team and the same was telecasted on its channel programme "Krishi Darshan" on 10 November 2010.

Research Coordination and Management Unit (RCMU)

RCMU is responsible for documentation and dissemination of scientific output of the Institute through IASRI News and Annual Report, etc. It also organizes National Conferences of Agricultural Research Statisticians once in three years and conducts meetings of Senior Officers (SOM) every month. The Unit also assists the Research Advisory Committee (RAC) and Quinquennial Review Team (QRT), Consultancy Processing Cell (CPC), Institute Technology Management Committee (ITMC), Institute Technology Management Unit (ITMU) and Planning Monitoring and Evaluation (PME) Cell. The unit is also responsible for

Celebration of Annual Day Function of NASM

correspondence with ICAR, ICAR Institutes, SAUs and other organizations in India and abroad. The other functions of the Unit are: to examine the new research project proposals before these are considered by the Institute Research Committee (IRC) in respect of importance of problem, its design and final requirements; to monitor the progress of on-going research projects and to bring out half yearly monitoring progress reports; to prepare annual action plan, activity milestones, SFC memo, monthly targets and progress of the Institute, half yearly scientific targets and achievements, quarterly performance review, to maintain the Research Project Files (RPF), monthly progress of identified thrust areas and also their submission to ICAR. The Unit also provides help in Art, Photography and Reprographic Services. The unit also brings out quarterly newsletters, Annual Report of the Institute and other research and dissemination bulletins.

Consultancy Processing Cell (CPC)

As per the ICAR Rules and Guidelines for Training, Consultancy, Contract Research and Contract Services 1997 a Consultancy Processing Cell (CPC) has been functioning at the Institute since 16 August 1997. This Cell was reconstituted w.e.f. 17 August 2009 with the following composition:

Dr. Prajneshu, HD (Biometrics & Statistical Modelling)	Chairman
Dr. PK Malhotra, HD (Computer Applications)	Member
Dr. Rajender Parsad, HD (Design Experiments) and Incharge (RCMU)	Member
Senior Administrative Officer and Head of Office	Member
Finance and Accounts Officer	Member
Sh. PP Singh, Technical Officer	Member-Secretary

The functions of the Cell are:

− To give broad guidelines for consultancy work
− To bring out consultancy information system, catalogues periodically
− To identify and prepare list of consultants in different fields; the consultants could be retired Scientists/ Officers of proven experience
− To prepare a roster of available human resources on the basis of time schedule
− To identify team for specific consultancy assignments and periodic reviews of progress
− To prepare consultancy proposals as per prescribed flow chart

Six meetings on 28 April, 01 May, 28 May, 2010, 18 January, 28 January and 29 March, 2011 were held for finalizing the proposals of 07 consultancy trainings/5 consultancy advisory services received by Consultancy Processing Cell as per ICAR Guidelines and getting approval of the Director. Out of 07 proposals of consultancy trainings 05 have been conducted during this year and 02 will be conducted in 2011-12. The acceptance of contracting party for all 05 consultancy research studies is awaited.

Priortization, Monitoring and Evaluation (PME) Cell

To facilitate all activities related to priority setting, monitoring and evaluation a Priortization, Monitoring and Evaluation (PME) Cell is working at the Institutes since 24 March 2001. This Cell was reconstituted w.e.f. 16 September 2009 with the following composition:

Dr. PK Malhotra, HD (CA)	Nodal Officer
Dr. Rajender Parsad, HD (DE) and Incharge (RCMU)	Member
Dr. UC Sud, HD (SS)	Member
Dr. Ashok Kumar, Principal Scientist	Member
Dr. Dharm Raj Singh, Scientist	Member
Sh. Samir Farooqi, Scientist	Member
Sh. PP Singh, Technical Officer	Member Secretary

The terms of reference of the Cell are:

− Sensitization of policy makers, managers, scientists and others about the need for research priority assessment
− Prioritization of Institute's programmes
− Tracking of current resource allocations
− Interface with ARIS, SREP, ATMA, IVLP, TAR and KVK for research, extension education and other services
− Facilitate monitoring and evaluation of research projects of the Institute/SAU
− Participation in monitoring and evaluation (site-level) activities of NATP/NAIP
− Impact analysis, especially that of research and extension activities

Three meetings of the PME Cell were held to discuss

1. Thrust Areas and Flagship Projects for various Divisions of the Institute for preparing the Research Priority Areas of the Institute for XII Plan document were finalized in a meetings held on 03 and 06 May 2010.

2. Project proposal on Prediction in Agriculture through Neuro-Fuzzy Approach for DST Funding was finalized in a meeting held on 21 March 2011.

Institute Technology Management Committee (ITMC)

As per the 'ICAR Guidelines for Intellectual Property Management and Technology Transfer/ Commercialization' a Institute Technology Management Committee (ITMC; short title for Institute Intellectual Property Management and Technology Transfer/Commercialization Committee, IIPM&TCC) has been constituted for addressing Intellectual Property (IP) related matters of the Institution as detailed in the ICAR Rules and Guidelines for Training, Consultancy, Contract Research and Contract Services, 1997. This Committee was reconstituted with the following composition w.e.f. 06 May 2010:

Dr. VK Bhatia Director, IASRI	Chairman
Dr. PK Malhotra HD & Professor (Computer Application), IASRI	Member
Dr. Anil Rai Principal Scientist, IASRI (Technical Expert–A Scientist of the Institute)	Member
Dr. Seema Jaggi Senior Scientist, IASRI (Technical Expert–A Scientist of the Institute)	Member
Dr. Madhuban Gopal Principal Scientist and National Fellow, IARI (IPR Expert–A Scientist from ICAR Institute in the Zone)	Member
Dr. Rajender Parsad, HD (DE) and Incharge, RCMU, IASRI	Member Secretary

Institute Technology Management Unit (ITMU)

As per the 'ICAR Guidelines for Intellectual Property Management and Technology Transfer/ Commercialization' an Institute Technology Management Unit (ITMU; short title for Intellectual Property Management and Technology Transfer Commercialization Unit at Institute level IPM&TTU) for management of its IP/ Deemed IP and transfer/commercialization of technologies has been constituted for pursuing all IP protection, maintenance and transfer/commercialization related matters at the institute level as per these guidelines and any other administrative or policy decisions taken in the ICAR from time to time. This will seek any specific, case-to-case basis advice/ assistance from the Zonal Agro-Technology Management Centres (ZTMCs) at the zonal level. The composition of the ITMU is as given below:

Dr. Rajender Parsad HD (DE), Incharge (RCMU)	Officer Incharge
Dr. Tauqueer Ahmad, Senior Scientist	Member
Sh. PP Singh, Technical Officer	Member

A joint meeting of Institute Technology Management Committee (ITMC) and Institute Technology Management Unit (ITMU) was held on 31 July 2010 to finalize the cost of licenses of various softwares developed by the Institute, to Copyright the Institute Softwares, to discuss the IPR issues for deputing Dr. AR Rao for a training programme on Bioinformatics under NAIP and Budget utilization for 2010-11. The revised cost of licenses of the statistical packages developed by the Institute are available at www.iasri.res.in/iasri website/software.htm Dr. Tauqueer Ahmad, and Sh. PP Singh attended ICAR Zonal Technology Management and Business Planning and Development (ZTM-BPD) North Zone I meeting-cum-workshop- 2010-11 at IARI, New Delhi during 17-18 March 2011. A presentation on IP Assets of Institute was also given during this workshop. During the year applications were submitted to the Registrar, office of Copyrights, New Delhi for registration of copyright of the following six assets:

1. Statistical Package for Agricultural Research Data Analysis (SPAR 2.0)
2. Statistical Package for Factorial Experiments (SPFE 1.0)
3. Statistical Package for Animal Breeding (SPAB 2.0)
4. Statistical Package for Augmented Designs (SPAD)
5. Software for Survey Data Analysis (SSDA 1.0)
6. Online Design Resources Server (DRS)

Dr. Tauqueer Ahmad, Member ITMU participated in the training programme on Intellectual Property Rights and Technology Licensing in Agriculture held at National Academy of Agricultural Research Management (NAARM), Hyderabad, Andhra Pradesh during 02-11 March 2011.

Two Statistical laboratories were inaugurated on 08 June 2011:

– **Strengthening Statistical Computing for NARS Laboratory**

Strengthening Statistical Computing for NARS Laboratory was inaugurated by Dr. S Ayyappan, Secretary, DARE & Director General, ICAR

– **Centralized Statistical and Computational Genomics Lab (SCGL)**

Centralized Statistical and Computational Genomics Lab (SCGL) Facility was inaugurated by Dr. MM Pandey, DDG (Engineering), ICAR

Institute Joint Staff Council

The Institute has a Joint Staff Council (IJSC) to promote harmonious relations and secure the best means of co-operation between the Council/IASRI as employer and the general body of its employees in matters of common concern for ensuring a high degree of efficiency in the service. The Institute Joint Staff Council constituted on 13 April 2010 for a period of three months is as follows:

Dr. VK Bhatia	Director	Chairman
Official-side Representatives		
Dr. PK Malhotra	HD (CA)	Member
Dr. Rajender Parsad	HD (DE) and Incharge RCMU	Member
Dr. PK Batra	Principal Scientist and Welfare Officer	Member
Dr. KK Tyagi	Principal Scientist	Member
Sh. Krishan Kumar	F&AO (Ex-Officio)	Member
Sh. PS Syal	Senior Administrative Officer (Ex-officio)	Member
Sh. SK Singh	Technical Officer (T-7-8)	Member-Secretary
Staff-side Representatives		
Sh. KB Sharma	Assistant	Secretary
Sh. Rajesh Kumar	T-2	Member, CJSC
Sh. Satya Pal Singh	Technical Officer(T-5)	Member (till 18.03.2011)
Sh. Mukesh Kumar	LDC	Member
Sh. Rajnath	Skilled Supporting Staff	Member
Sh. Ashok Kumar	Skilled Supporting Staff	Member

Three meetings of the Institute Joint Staff Council were held on 29 May, 27 August and 10 December 2010 under the Chairnamship of Director, IASRI.

IASRI Employees Co-operative Thrift and Credit Society Limited

The Society, registered with the Registrar, Co-operative Societies, Delhi Administration, Delhi continued its activities during 2009-10 in similar manner as during the past years by advancing regular and emergent loan to its members and looking after their welfare. The source of funds of the society is Share money (value of each share is Rs. 50), compulsory deposit (Rs. 200 per month from each member) and fixed deposits. The present strength of members is 330. The Management Committee of the Society for the period 2009-2012 is as follows:

Sh. UC Bandooni	President
Miss 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
Sh. Parbhu Dayal	Member
Sh. Rajnath	Member

– The Society has advanced Rs. 97,97,800 (Rupees Ninety seven lakh ninety seven thousand eight hundred only) to its members as loan.

– An amount of Rs. 751 (Rupees Seven hundred fifty one only) each was given as gift to members on their retirement from the Institute.

– The financial help of Rs. 3000 (Rupees three thousand only) was extended from the member welfare fund of the society to the family of (late) Sh. K.P. Singh.

Institute Grievance Committee

The Grievance Committee of the Institute (constituted as per ICAR rules) provides the employees a forum to ventilate their grievances relating to official matters and for taking remedial measures. The Grievance Committee constituted on 02 March 2010 for a period of two years is as follows:

Official-side Representative	
Dr. VK Bhatia	Chairman
Dr. (Smt.) Ranjana Agrawal	Member
Sh. Krishan Kumar	Member
Sh. PS Syal	Member
Smt. Sushma Gupta	Member Secretary
Staff-side Representative	
Sh. Pal Singh	Member
Sh. Vijay Pal Singh	Member
Sh. Chander Vallabh	Member
Sh. Charan Singh	Member

Three meetings of the Grievance Committee of the Institute were held on 23 June, 08 October 2010 and 05 March 2011.

ICAR Staff Welfare Fund Scheme

The employees of the Institute have constituted a ICAR Staff Welfare Fund previously known as Benevolent Fund from their own contributions to provide relief to the families of the employees who die in harness and are left in an indigence condition. During the year, Gifts of Rs. 16,200 were distributed to seventeen retiring personnel of the Institute. A relief of Rs. 21,500 was provided to the grieved family of (Late) Sh. KP Singh on his untimely death.

The Committee of the Institute for ICAR Staff Welfare Fund Scheme, reconstituted for a period of two years w.e.f. 18 December 2010 is as follows:

Dr. PK Batra, Principal Scientist & Welfare Officer	Chairman
Dr.(Mrs.) Seema Jaggi, Principal Scientist	Member
Sh. PS Syal, Senior Administrative Officer	Member
Sh. Krishan Kumar, F&AO	Member
Sh. KB Sharma, Assistant & Secretary, IJSC	Member
Sh. Chander Vallabh, AAO	Member

Women Cell

A Women Cell has been set up at the Institute on 27 January 2000. The cell functions for the welfare of women in general. It caters to the issues pertaining to the grievances of women employees. The present compositions of Women Cell w.e.f. 23 October 2009 is as follows:

Dr. Ranjana Agrawal	Principal Scientist & HD (FT)	Chairperson
Dr. Seema Jaggi	Senior Scientist	Member
Ms. Vijay Bindal	Technical Officer	Member
Smt. Sushma Banati	Senior PS	Member
Smt. Sushma Gupta	Asstt. Admn. Officer	Convenor

Hostel Activities

There are three well furnished hostels, viz. Panse Hostel-cum-Guest House, Sukhatme Hostel and International Training Hostel (ITH) to cater the residential requirements of the students of M.Sc., Ph.D. courses and Senior Certificate Course (SCC) at the Institute within its premises. Officers and trainees of the various other refresher, short-term and ad-hoc training courses organised at the Institute are also provided residential accommodation at the Panse Hostel-cum-Guest House and ITH. Boarding and lodging arrangements are made available for the guests who stay in Guest House from different Departments/ Organisations. Ample facilities exist for the cultural activities and sports for the hostel inmates.

Sukhatme Hostel mess is run by the students on Co-operative basis. The general management of the Sukhatme Hostel is vested with the Warden, who is assisted by the Prefect and other students. A General Body meeting of IASRI hostel inmates was held on 24 September 2010 under the Chairmanship of Dr. Ranjana Agrawal, Warden. For smooth functioning of the hostel activities, the Executive Committee members elected for the session 2010-11 are:

Warder	Ranjana Agrawal
Prefect	Arpan Bhowmik
Mess Secretary / Assistant Prefect	Sandip Sadhu
Cashier	Nirupam Ghosh
Cultural Secretary	Kallol Sarkar
Assistant Cultural Secretary	Chandan Kr. Deb
Maintenance Secretary	Sankalpa Ojha
Assistant Maintenance Secretary	Nibash Debbarma, Kamalakant Kattari & Prakash Kumar
Health Secretary	Kader Ali Sarkar
Sports Secretary	Upendra Pradhan
Assistant Sports Secretary	Pratyush Dasgupta
Common Room Secretary	Rakesh Ranjan
Assistant Common Room Secretary	Chiranjit Mazumdar
Computer Lab. Secretary	Vijay Kr. S.
Auditors	Sudhir Srivastava Rohan Kr. Raman & Kanchan Sinha
Communication Secretary	Sumit Chowdhury, Raju Kumar & Shreekumar Biswas
Warden's Nominees	Ankur Biswas

Preceding Annual Day of the Institute on 02 July 2010, a sports week was organised in Sukhatme Hostel wherein students and staff at IASRI participated in various sports like table-tennis, badminton and musical chair, etc.

International Training Hostel/Panse Guest House

A total of 1,792 Trainees/Guests from ICAR Institutes, SAU's/Officials from Central/State Governments/Private Organisations and Foreign Trainees from various institutes were stayed at ITH and about 3,059 guests were stayed at Panse Guest House during the period. Smt. Sushma Banati is the Incharge of the Guest Houses of the Institution and she is assisted by Sh. Sunil Kumar.

Recreation and Welfare Club

The Institute has a Recreation and Welfare Club which provides facilities for indoor and outdoor games to promote social and friendly relations among the members and general recreation and welfare of its members. The club organises sport tournaments annually at Institute level for different games/events. The functioning of the Recreation and Welfare Club is monitored by Institute Sports Committee.

Sports Activities

During the period under report the Institute Sports Contingent participated in Inter-Zonal Sports Meet 2010-11 organized by CAZRI, Jodhpur from 09 November 2010 and secured Championship Trophy in Table Tennis (Team Events-Men).

Institute also partcipated in ICAR Zone II (Central Zone) Inter-Institutional Sports Meet 2011 organized by Directorate of Weed Science Research, Jabalpur during 15-19 February 2011. Our Kabaddi team displayed an outstanding performance by defeating all the other teams comfortably. Table Tennis(Men) maintained its supremacy by defeating all of their rivals without conceding even a single game. Sh. MM Maurya brought laurels to the Institute by winning the Chess(Men)

Kabbaddi Team of the Institute with Chef-de-Mission

trophy. Sh. PR Paite brought Silver Medal by securing second position in Javeline Throw. Smt. Vijaya Lakshmi Murthy annexed runners-up position in Table Tennis(Women-Singles) and Table Tennis(Women-Doubles) by partnering with Dr. Ranjana Agrawal. Shri OP Khanduri was Chef-de-Mission.

A participant of ICAR Zone II receiving runners up prize of Table Tennis (Women Single)

Director, IASRI in his felicitation remarks congratulated the outstanding sports persons for their performances and expressed his wishes for others to perform better in future.

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भारतीय कृषि सांख्यिकी अनुसंधान संस्थान में राजभाषा के बढ़ते चरण

भारतीय कृषि सांख्यिकी अनुसंधान संस्थान में वर्ष-दर-वर्ष हिन्दी के प्रगामी प्रयोग में अभिवृद्धि हो रही है । भारत सरकार की राजभाषा नीति को संस्थान में सुचारु रूप से कार्यान्वित किया जा रहा है । राजभाषा विभाग द्वारा जारी वार्षिक कार्यक्रम में निहित लक्ष्यों को इस संस्थान में लगभग पूरा कर लिया गया है । संस्थान द्वारा समस्त प्रशासनिक कार्य शत-प्रतिशत हिन्दी में और यथाआवश्यक द्विभाषी हो रहा है । वैज्ञानिक कार्यों में भी हिन्दी के प्रयोग को प्रोत्साहित किया जाता है । न केवल मात्रात्मक रूप में बल्कि हिन्दी के प्रयोग में गुणवत्ता की ओर भी ध्यान दिया जा रहा है ।

संस्थान के पूर्वानुमान तकनीक प्रभाग की अध्यक्षा, डॉ. रंजना अग्रवाल को केन्द्रीय सचिवालय हिन्दी परिषद् द्वारा आयोजित अखिल भारतीय वैज्ञानिक तथा तकनीकी विषयों पर हिन्दी लेख प्रतियोगिता के अन्तर्गत उनके लेख "मौसम चरों पर आधारित फ़सलों का पूर्वानुमान" के लिए अखिल भारतीय महिला (विशेष) पुरस्कार (2008-09) प्रदान किया गया तथा भारत सरकार, सूचना एवं प्रसारण मंत्रालय के प्रकाशन विभाग द्वारा आयोजित "भारतेन्दु हरिशचन्द्र पुरस्कार योजना" के अन्तर्गत प्रथम पुरस्कार प्राप्त उनकी पाण्डुलिपि "विज्ञान में ताक-झाँक" को भारत सरकार के सूचना एवं प्रसारण मंत्रालय के प्रकाशन विभाग द्वारा प्रकाशन की स्वीकृति प्रदान कर दी गयी है ।

प्रतिवेदनाधीन अवधि में संस्थान में राजभाषा कार्यान्वयन समिति की तिमाही बैठकें नियमित रूप से आयोजित की गयीं । इन बैठकों में राजभाषा अधिनियम 1963 की धारा 3(3) के अनुपालन को सुनिश्चित करने, राजभाषा विभाग द्वारा जारी वार्षिक कार्यक्रम की विभिन्न मदों, हिन्दी पत्रिका के प्रकाशन, कार्यशालाओं के नियमित आयोजन, हिन्दी सप्ताह के आयोजन इत्यादि पर विस्तार से चर्चा हुई । राजभाषा कार्यान्वयन समिति की बैठकों का आयोजन 24 अप्रैल 2010, 24 जुलाई 2010, 27 अक्टूबर 2010 तथा 26 फरवरी 2011 को हुआ ।

इस वर्ष में संस्थान के कर्मियों के लिए चार कार्यशालाएँ आयोजित की गयीं । पहली कार्यशाला 28 जून 2010 को "एम.एस. एक्सिल का प्रयोग" विषय पर आयोजित की गयी । इस कार्यशाला में संस्थान के संगणक अनुप्रयोग प्रभाग के तकनीकी अधिकारी, श्री पन्ना लाल गुप्ता द्वारा प्रतिभागियों को व्याख्यान दिया गया । द्वितीय कार्यशाला 29 सितम्बर 2010 को "इण्टरनेट व ई-मेल का कार्यालय में उपयोग" विषय पर आयोजित की गयी । इस कार्यशाला में संस्थान के संगणक अनुप्रयोग प्रभाग के तकनीकी अधिकारी, श्री सुभाष चन्द्र ने प्रतिभागियों को इण्टरनेट व ई-मेल के सम्बन्ध में जानकारी दी । इस वर्ष की तृतीय कार्यशाला का आयोजन "इण्टरनेट व ई-मेल (पार्ट-II)" विषय पर हुआ । इस कार्यशाला में संस्थान के संगणक अनुप्रयोग प्रभाग के ही तकनीकी अधिकारी, श्री एस. के. सबलानिया एवं श्री सुभाष चन्द्र ने प्रतिभागियों को इण्टरनेट व ई-मेल के सम्बन्ध में अतिरिक्त जानकारी उपलब्ध करायी जिसका प्रतिभागियों द्वारा अपने दैनिक कार्य में उचित ढंग से उपयोग किया जा सके। चतुर्थ कार्यशाला 24 मार्च 2011 को "हिन्दी में ई-मेल का प्रेषण" विषय पर आयोजित की गयी। इस कार्यशाला में संस्थान के सहायक अभियन्ता,

श्री संतोष कुमार सिंह द्वारा प्रतिभागियों को हिन्दी में ई-मेल करने के सम्बन्ध में जानकारी उपलब्ध करायी गयी ।

संस्थान में कार्यरत सभी हिन्दीतर भाषी अधिकारियों/कर्मचारियों द्वारा हिन्दी ज्ञान सम्बन्धी प्रशिक्षण पूरा किया जा चुका है । आज तक की स्थिति के अनुसार, संस्थान में अब कोई ऐसा हिन्दीतर भाषी अधिकारी/कर्मचारी शेष नहीं रह गया है जिसे हिन्दी ज्ञान सम्बन्धी प्रशिक्षण दिया जाना शेष हो । इसके अतिरिक्त, "हिन्दी शिक्षण योजना" के अन्तर्गत संस्थान में हिन्दी आशुलिपि के प्रशिक्षण का लक्ष्य भी संस्थान द्वारा पूरा कर लिया गया है तथा केवल दो टंककों का हिन्दी टंकण परीक्षा का पूरक परिणाम होने के कारण उनके द्वारा हिन्दी शिक्षण योजना के अन्तर्गत शीघ्र होने वाली हिन्दी टंकण परीक्षा दी जानी है ।

संस्थान में वार्षिक कार्यक्रम में निहित लक्ष्यों को पूरा करते हुए संस्थान के अधिकारियों/कर्मचारियों द्वारा अपनी ओर से लिखे जाने वाले सभी पत्र तो हिन्दी अथवा द्विभाषी रूप में लिखे ही गये साथ ही, 'क', 'ख' तथा 'ग' क्षेत्रों से अंग्रेज़ी में प्राप्त पत्रों के उत्तर भी शत-प्रतिशत हिन्दी में अथवा द्विभाषी रूप में दिये गये । 'क' तथा 'ख' क्षेत्रों की राज्य सरकारों एवं उनके कार्यालयों और गैर-सरकारी व्यक्तियों के साथ पत्राचार शत-प्रतिशत हिन्दी में अथवा अपेक्षानुसार द्विभाषी रूप में ही किया गया । संस्थान के विभिन्न वैज्ञानिक प्रभागों तथा प्रशासनिक अनुभागों द्वारा आयोजित की जाने वाली बैठकों की कार्यसूची तथा कार्यवृत्त शत-प्रतिशत हिन्दी में अथवा द्विभाषी रूप में जारी किये गये ।

अपना प्रशासनिक कार्य शत-प्रतिशत हिन्दी में करने के लिए भारत सरकार, गृह मंत्रालय, राजभाषा विभाग द्वारा जारी वार्षिक कार्यक्रम में निहित लक्ष्य को संस्थान द्वारा पहले ही प्राप्त कर लिया गया है । अपना कार्य शत-प्रतिशत हिन्दी में करने के लिए इस समय संस्थान में दस अनुभाग विनिर्दिष्ट हैं ।

प्रशासनिक कार्य के अतिरिक्त संस्थान में वैज्ञानिक प्रकृति के कार्यों में भी हिन्दी के उपयोग को प्रोत्साहित किया जाता है । वैज्ञानिकों ने अपनी परियोजना रिपोर्टों के सारांश द्विभाषी रूप में दिये, विद्यार्थियों द्वारा अपने शोध-प्रबन्धों में द्विभाषी रूप में सार प्रस्तुत किये गये। वैज्ञानिकों एवं तकनीकी कर्मियों द्वारा हिन्दी में शोध-पत्र पोस्टर तैयार करने के साथ-साथ शोध-पत्र भी प्रकाशित किये गये। संस्थान से बाहर आयोजित हिन्दी कार्यशाला में भी संस्थान के वैज्ञानिक द्वारा सहभागिता की गयी ।

संस्थान की वेबसाइट द्विभाषी है जिसको समय-समय पर अद्यतन

किया गया । इस वर्ष संस्थान की वेबसाइट पर उपलब्ध "हिन्दी-सेवा लिंक" में वाक्यांशों की द्विभाषी सूची शामिल की गयी ।

गृह मंत्रालय, राजभाषा विभाग द्वारा जारी तथा परिचालित विभिन्न नकद पुरस्कार योजनाएँ संस्थान में लागू हैं । संस्थान के कर्मियों ने इन योजनाओं में भाग लिया ।

हिन्दी गतिविधि के रूप में, 06 सितम्बर 2010 को संस्थान में शिक्षक दिवस का आयोजन किया गया तथा इस अवसर पर मुख्य अतिथि, प्रोफ़ेसर अरूण कुमार निगम जी को सम्मानित किया गया ।

शिक्षक दिवस के दौरान मुख्य अतिथि को सम्मानित करने का एक दृश्य

संस्थान में 14 से 20 सितम्बर 2010 के दौरान हिन्दी सप्ताह का आयोजन किया गया। इस दौरान आयोजित कार्यक्रम/प्रतियोगिताएँ इस प्रकार हैं : डॉ. दरोगा सिंह स्मृति व्याख्यान, प्रभागीय चल-शील्ड, प्रश्न-मंच, अन्ताक्षरी, हिन्दी श्रुतलेख एवं शब्दार्थ लेखन प्रतियोगिता,

हिन्दी सप्ताह के आयोजन का एक दृश्य

हिन्दी वर्तनी प्रतियोगिता एवं शोध-पत्र-पोस्टर-प्रदर्शन प्रतियोगिता । 14 सितम्बर 2010 को हिन्दी दिवस के अवसर पर "डॉ. दरोगा सिंह स्मृति व्याख्यान" के साथ-साथ हिन्दी सप्ताह का उद्घाटन भी हुआ । यह वैज्ञानिक व्याख्यान भारतीय कृषि अनुसंधान परिषद् के सहायक महानिदेशक (एच.आर.डी.) एवं परीक्षा नियंत्रक, डॉ. सुखदेव शर्मा द्वारा "भारत में कृषि शिक्षा" विषय पर दिया गया। समारोह की अध्यक्षता राष्ट्रीय कृषि आर्थिकी एवं नीति अनुसंधान केन्द्र के निदेशक, डॉ. रमेश चन्द जी द्वारा की गयी । हिन्दी सप्ताह के समापन समारोह के अवसर पर संस्थान के निदेशक, डॉ. विजय कुमार भाटिया द्वारा इस दौरान आयोजित विभिन्न प्रतियोगिताओं के सफल प्रतियोगियों को पुरस्कृत किया गया।

संस्थान में दिनांक 14-20 सितंबर 2010 के दौरान आयोजित किये गये हिन्दी सप्ताह के अन्तर्गत पोस्टर प्रस्तुतीकरण प्रतियोगिता के अन्तर्गत शोध-पत्र

- कुमार, प्रमोद एवं तोमर, राजेन्द्र सिंह: विविधिकरण या तीव्रीकरण प्रक्रिया द्वारा उपयोगी फसलक्रम का चयन ।

- प्रज्ञेषु, घोष, हिमाद्रि, एवं वधवा, सविता: जनरलाइज्ड लैम्बडा आबंटन (जी.एल.डी.) का यूनीमॉडल वर्षा आँकड़ों में उपयोग ।

- पॉल, ए.के., बेहरा, एस.के. एवं वाही, एस.डी. - एनोवा विधि द्वारा मासटाईटिस रोग की अनुवांशिकता का अनुमान ।

- सिंह, पॉल, मरवाह, सुदीप, अग्रवाल, हरि ओम एवं सिंह, हरनाम - मक्का फसल सूचना तंत्र ।

संस्थान में हिन्दी के प्रागामी प्रयोग की स्थिति का जायजा लेने के लिए संसदीय राजभाषा समिति की दूसरी उपसमिति द्वारा 27 सितम्बर, 2010 को संस्थान में हिन्दी कार्यों का निरीक्षण किया गया ।

संस्थान द्वारा हिन्दी पत्रिका, "सांख्यिकी-विमर्श" के छठे अंक का प्रकाशन किया गया। इस अंक में संस्थान के कीर्तिस्तम्भ, कृषि अनुसंधान सांख्यिकीविदों के राष्ट्रीय सम्मेलन, राजभाषा से सम्बन्धित कार्यों/गतिविधियों की जानकारी तथा प्रतिवदेनाधीन अवधि के दौरान किये गये अनुसंधानों एवं अन्य कार्यों के संक्षिप्त विवरण के साथ-साथ कृषि सांख्यिकी एवं कृषि में संगणक अनुप्रयोग से सम्बन्धित विभिन्न लेखों एवं शोध-पत्रों को प्रस्तुत किया गया है। प्रतिवेदनाधीन अवधि के दौरान संस्थान में आयोजित डॉ. दरोगा सिंह स्मृति व्याख्यानमाला के अन्तर्गत 19वें वैज्ञानिक व्याख्यान को आमन्त्रित ज्ञानवर्धक लेख के रूप में इस पत्रिका में सम्मिलित किया गया है । अन्त में, पाठकों के हिन्दी ज्ञानवर्धन के लिए दैनिक स्मरणीय शब्द-शतक हिन्दी व अँग्रेज़ी में दिया गया है ।

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

कृषि वानिकी आंकड़ों का विश्लेषण सिखाया

झाँसी : राष्ट्रीय कृषि नवोन्मेषी परियोजना के लिये संख्यकीय संगणना के सुदृढ़ीकरण के तहत कृषि वानिकी आंकड़े के विश्लेषण पर प्रशिक्षण शिविर का आज समापन हो गया। कृषि वानिकी अनुसंधान केन्द्र झाँसी द्वारा यह कार्यक्रम भारतीय कृषि सांख्यिकी अनुसंधान संस्थान के तत्वावधान में किया गया। मुख्य अतिथि डॉ. अरविन्द कुमार ने वैज्ञानिकों को अनुसंधान में सॉफ्टवेयर एवं सांख्यिकी पैकेजों का समुचित उपयोग कर वैध निष्कर्ष निकालने में होने वाली सहायता पर प्रसन्नता व्यक्त की। डॉ. राजेन्द्र प्रसाद ने एसएएस सॉफ्टवेयर की उपयोगिता बतायी। राष्ट्रीय प्राध्यापक डॉ. वी के गुप्ता ने कहा कि यह प्रशिक्षण कृषि वानिकी जगत से जुड़े लोगों के लिये कारगर साबित होगा। इस आयोजन में डॉ. ए के हाण्डा, डॉ. अजीत का विशेष सहयोग रहा।

कृषिवानिकी आंकड़ों के विश्लेषण पर प्रशिक्षण शुरू

नगर संवाददाता
झाँसी, 12 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 आंकड़ों के विश्लेषण पर प्रशिक्षण शुरू हो गया। कार्यक्रम का आयोजन राष्ट्रीय कृषिवानिकी अनुसंधान केन्द्र के द्वारा भारतीय कृषि सांख्यिकी अनुसंधान संस्थान पूसा नई दिल्ली के सौजन्य से किया है।

कार्यक्रम में अखिल भारतीय समन्वित कृषिवानिकी परियोजना के अन्तर्गत देश के विभिन्न प्रांतों में फैले 25 केन्द्रों से आये वैज्ञानिकों भाग ले रहे हैं। डॉ. एस.के.ध्यानी निदेशक राष्ट्रीय कृषिवानिकी अनुसंधान केन्द्र ने प्रशिक्षण कार्यक्रम का उद्घाटन करते हुए सांफ्टवेयर की उपयोगिता पर प्रकाश डाला।

डा. राजेन्द्र प्रसाद प्रमुख अन्वेषक एवं प्रभागाध्यक्ष ने 6 दिवसीय कार्यक्रम की रूपरेखा का परिचय देते हुए एस.ए.एस. साफ्टवेयर की विशेषताओं पर प्रकाश डाला। कार्यक्रम में विशिष्ट अतिथि के रूप में उपस्थित वी.के.गुप्ता राष्ट्रीय प्राध्यापक ने सभा को सम्बोधित करते हुए कहा कि एस.ए.एस. साफ्टवेयर पर आयोजित यह प्रशिक्षण कार्यक्रम कृषिवानिकी जगत से जुड़े लोगों के लिए कारगर साबित होगा। अंत में प्रदीप कुमार मल्होत्रा ने आभार व्यक्त किया। प्रशिक्षण कार्यक्रम के आयोजन में केन्द्र के वैज्ञानिक डा.ए.के.हाण्डा एवं डा. अजीत का योगदान है।

आंकड़ों के बेहतर विश्लेषण पर जोर

झाँसी: राष्ट्रीय कृषि नवोन्मेषी परियोजना के लिये सांख्यिकीय संगणना के सुदृढ़ीकरण के तहत एसएएस सॉफ्टवेयर के उपयोग द्वारा कृषि वानिकी आंकड़ों के विश्लेषण पर प्रशिक्षण कार्यक्रम आयोजन किया गया।

राष्ट्रीय कृषि वानिकी अनुसंधान केन्द्र झाँसी के निदेशक डॉ. एस के ध्यानी ने प्रशिक्षण का उद्घाटन करते हुये आंकड़ों के बेहतर ढंग से होने वाले विश्लेषण के लाभ बताये। प्रमुख अन्वेषक एवं प्रभागाध्यक्ष डॉ. राजेन्द्र प्रसाद ने सॉफ्टवेयर की विशेषताओं पर प्रकाश डाला। डॉ. वी के गुप्ता ने कहा कि सॉफ्टवेयर पर आयोजित यह प्रशिक्षण कृषिवानिकी जगत से जुड़े लोगों के लिये कारगर साबित होगा। बाद में डॉ. प्रदीप कुमार मलहोत्रा ने सभी का आभार व्यक्त किया।

कृषिवानिकी आंकड़ों 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 आंकड़ों के विश्रृषण पर प्रशिक्षण कार्यक्रम 17 जनवरी को प्रारंभ होकर आज संपन्न हो गया।

कार्यक्रम का आयोजन राष्ट्रीय कृषिवानिकी अनुसंधान केन्द्र, झांसी के द्वारा भारतीय कृषि सांख्यिकी अनुसंधान संस्थान भाकृअनुप, लाईब्रेरी एवेन्यू, पूसा, नई दिल्ली-110, 012 के सौजन्य से किया गया है। कार्यक्रम में अखिल भारतीय समन्वित कृषिवानिकी परियोजना के अन्तर्गत देश के विभिन्न प्रान्तों में फैले 25 केन्द्रों से आये वैज्ञानिकों ने भाग लिया। डा. एस के ध्यानी निदेशक, राष्ट्रीय कृषिवानिकी अनुसंधान केन्द्र, झांसी ने प्रशिक्षण कार्यक्रम की सफलता पर प्रसन्नता जाहिर की।

कार्यक्रम में मुख्य अतिथि के रूप में उपस्थित डा. अरविन्द कुमार, उप महानिदेशक शिक्षा, भारतीय कृषि अनुसंधान परिषद, नई दिल्ली ने प्रशिक्षण कार्यक्रम द्वारा वैज्ञानिकों को अनुसंधान में सॉफ्टवेयर एवं सांख्यिकीय पैकेजों का समुचित उपयोग कर वैध निष्कर्ष निकालने में होने वाली सहायता पर प्रसन्नता व्यक्त की। डा. राजेन्द्र प्रसाद, कंसोर्टियम प्रमुख अन्वेषक एवं प्रभागाध्यक्ष, परीक्षण अभिकल्पना, भाकृसाअस, नई दिल्ली ने कार्यक्रम की विस्तृत ब्यौरा देते हुए एस ए एस साफ्टवेयर की उपयोगिता बताई।

कार्यक्रम में विशिष्ट अतिथि के रूप में उपस्थित डा. वी के गुप्ता, राष्ट्रीय प्राध्यापक ने सभा को सम्बोधित करते हुए कहाकि एस ए एस, साफ्टवेयर पर आयोजित यह प्रशिक्षण कार्यक्रम कृषिवानिकी जगत से जुड़े लोगों के लिए कारगर साबित होगा। प्रशिक्षण कार्यक्रम के आयोजन में केन्द्र के वैज्ञानिक डा. ए के हाण्डा एवं डा. अजीत का योगदान है। प्रशिक्षणार्थियों ने कार्यक्रम की रूपरेखा, संचालन एवं विषयवस्तु की सराहना की।

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. Planning, designing and analysis of experiments planned ON STATION under the Project Directorate of Farming Systems Research.
   Anil Kumar, Aloke Lahiri(till 30.09.2010), OP Khanduri

3. Planning, designing and analysis of ON FARM research experiments planned under Project Directorate of Farming Systems Research.
   NK Sharma, PK Batra, OP Khanduri

4. Planning, designing and analysis of data relating to experiments conducted under AICRP on long-term fertilizer experiments.
   DK Sehgal, Krishan Lal, SMG Saran (till 30.06.2010), Shashi Dahiya

5. Agricultural field experiments information system.
   PK Batra, OP Khanduri, DK Sehgal, Rajender Parsad, Sudeep

6. Genaralized row-column designs for agricultural experiments.
   Cini Varghese, Seema Jaggi

Completed

7. Planning, designing and analysis of experiments relating to AICRP on STCR (completed on 28.05.2010)
   Aloke Lahiri, VK Gupta, Rajender Parsad; A Subba Rao, Y Muralidharudu (IISS, Bhopal); Abhishek Rathore (IISS, Bhopal).

New Initiated

8. A study on fertilizer response ratios for various crops and crop sequence (initiated on 01.04.2010).
   NK Sharma, PK Batra

9. Analysis of experimental designs with t-family of distributions (initiated on 01.05.2010).
   Krishan Lal, Rajender Parsad, VK Gupta, Lalmohan Bhar

10. A study on multiple bio-assays (initiated on 01.05.2010).
    Lalmohan Bhar, VK Gupta

11. Response surface methodology incorporating neighbour effects (initiated on 01.09.2010).
    Eldho Varghese, Seema Jaggi

12. Development of innovative convenience food as protein supplement (initiated on 01.04.2009 Association of IASRI 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**

13. Weed assessment and management in the crops and cropping system (initiated on 01.04.2009 Association of IASRI w.e.f. 29.12.2010).

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

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

On Going

14. Development of forecasting module for podfly, *Melanagromyza obtusa* Malloch in late pigeonpea.

IIPR, Kanpur:	**SK Singh**
IASRI,New Delhi:	**Ranjana Agrawal**, Amrender Kumar

Completed

15. Use of discriminant function and principal component techniques for weather based crop yield forecast (completed on 30.06.2010).
Chandrahas, Ranjana Agrawal, SS Walia (till 31.12.2009)

16. Stochastic process modeling and forecasting through discrete nonlinear time series approach (Department of Science and Technology, Government of India) (completed on 28.02.2011).
Himadri Ghosh, Prajneshu

New Initiated

17. Weather based forewarning models for Onion Thrips (*Thrips tabaci* Lindeman) (initiated on 01.04.2010).
Amrender Kumar, PS Srinivas (DOGR, Pune), SC Mehta, Ranjana Agrawal

18. Weather based forewarning of mango pests (initiated on 01.04.2010).
Ranjana Agrawal (IASRI, New Delhi); Rakesh Chandra, G Pandey, AK Misra (CISH, Lucknow); BR Salvi, MB Dalvi, AY Munj (RFRS, Vengurle); NI Shah, Hemant Sharma, GB Kalariya (AES, Paria); K Ray, A Samanta,(BCKV, Mohanpur); Rajesh Kumar, SN Ray, Mithelesh Kumar(BAC, Sabour); A Bhagwan, B Mahindar, D Anitha Kumari (FRS. Sangareddy)

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

On Going

19. Sampling methodology for estimation of meat production in Meghalaya (Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, Government of India).
Hukum Chandra, UC Sud, AK Gupta and DC Mathur

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

NCAP, New Delhi	**SS Raj** (CPI)
IASRI, New Delhi	**Anil Rai**, PK Malhotra, Ramasubramanian V, KK Chaturvedi(till 31.08.2010)

21. Visioning, Policy Analysis and Gender (V-PAGe) Sub-Prog. III: Policy analysis & market intelligence (NAIP Component–I: Consortium Partner).

NCAP, New Delhi	**Ramesh Chand** (Consortium Leader)**, P Ramasundaram** (CPI)
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, KK Chaturvedi (till 31.08.2010)

22. Visioning Policy Analysis and Gender (V-PAGe) Sub-Prog. II: Technology forecasting (NAIP Component–I:

Consortium Partner).

NCAP, New Delhi	**Ramesh Chand** (Consortium Leader)**, P Ramasundaram** (CPI)
IASRI, New Delhi	**VK Bhatia**, Ramasubramanian V, Amrender Kumar, Satya Pal, Anil Rai, KK Chaturvedi (till 31.08.2010)
IARI, New Delhi	Girish Kumar Jha

Completed

23. Econometric study of long-run effect of public investment in irrigation on food grains productivity (completed on 20.08.2010).
Ashok Kumar, SP Bhardwaj

24. Developing remote sensing based methodology for collecting agricultural statistics in North-East hilly region (Space Application Centre, Ahmedabad) (completed on 30.09.2010).
Prachi Misra Sahoo, Anil Rai, Tauqueer Ahmad, Samir Farooqi

25. An econometric analysis of groundwater markets in Indo-Gangetic Plains of India (completed on 30.11.2010).
DR Singh, AK Vasisht, Prawin Arya , Ashok Kumar, Mahender Singh

New Initiated

26. Farm power machinery use protocol and management for sustainable crop production (initiated on 01.04.2010 Association of IASRI 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
IASRI, New Delhi	**Tauqueer Ahmad**

27. District-level poverty incidence estimation from NSSO data using small area estimation technique (CSO, MOS& PI, Government of India)(initiated on 15.09.2010).
UC Sud, Tauqueer Ahmad, VK Jain

MODELING AND SIMULATION TECHNIQUES IN BIOLOGICAL SYSTEMS

On Going

28. Whole genome association analysis in common complex diseases: An Indian initiative (DBT Fuded).
BK Thelma(UDSC, New Delhi); Ramesh C. Juyal(NII, New Delhi); Sanjay Jain (DU, Delhi); **AR Rao** (IASRI, New Delhi); Ashok Kumar(AIIMS, New Delhi); Ajit Sood (DMC, Ludhiana)

29. Bioprospecting of genes and allele frequency for abiotic stress tolerance (NAIP Component-IV: Consortium Partner)

NRCPB, New Delhi	**T Mohapatra** (CPI)
IASRI, New Delhi	**AR Rao**, SB Lal, Sudeep

New Initiated

30. 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) (initiated on 28.10.2010)

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

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DEVELOPMENT OF INFORMATICS IN AGRICULTURAL RESEARCH

On Going

31. Management system for post graduate education.
    Sudeep, Hari Om Agarwal, Pal Singh

32. Machine learning approach for data mining.
    IASRI, New Delhi: **Anshu Bharadwaj**, Shashi Dahiya
    NCAP, New Delhi: Rajni Jain

33. Project information and management system of ICAR (PIMS-ICAR).
    RC Goyal, PK Malhotra, VH Gupta, Sudeep, Alka Arora, Pal Singh

34. National information system on agricultural education network in India (NISAGENET-III).
    RC Goyal, VH Gupta

35. Software for survey data analysis 2.0.
    SB Lal, Anu Sharma, VK Mahajan, Hukum Chandra, Anil Rai

36. Development of expert system on seed spices.
    IASRI,New Delhi   **SN Islam**, Hari Om Agarwal
    NRC on Seed Spices, Tabiji, Ajmer: RK Kakani, Krishna Kant, OP Aishwat, MA Khan, GK Tripathi

37. Development of web enabled statistical package for agricultural research (SPAR 3.0).
    Sangeeta Ahuja

38. Development of gender information system for agriculture.
    NRCWA, Bhubneshwar   **HK Dash,** M Srinath and Sabita Mishra
    IASRI, New Delhi   **SB Lal,** Anu Sharma, Anil Rai

39. Expert system for maize crop (Collaboration with Directorate of Maize research).
    IASRI, New Delhi   **Hari Om Agarwal**, Sudeep, Harnam Singh Sikarwar
    DMR, New Delhi   **Virendra Kumar Yadav** (CCPI), Sain Dass (upto June 2010), Jyoti Kaul,
                            Sangit Kumar, P. Kumar, K. P. Singh, Chitermal Parihar (since February 2010)

40. Strengthening Statistical Computing for NARS (NAIP Component-I: Consortium Leader with 08 other Consortium Partners).
    VK Bhatia (Consortium Leader), **Rajender Parsad** (Consortium PI), PK Malhotra, VK Gupta, VK Mahajan, Seema Jaggi, Samir Farooqui, Ramasubramanian V, LM Bhar, AK Paul, N Shivaramne

Completed

41. An eLearning solutions for agricultural education using MOODLE(completed on 18.08.2010).
    Shashi Dahiya, Anshu Bharadwaj, KK Chaturvedi, Seema Jaggi, Cini Varghese

42. Strengthening, refining and implementation of expert system on wheat crop management (DOC: 24.08.2010).
    SN Islam, HO Agarwal, Mohd. Samir Farooqi, KK Chaturvedi, HS Sikarwar

43. Web solutions for partially balanced incomplete block designs (completed on 30.11.2010).
    Anu Sharma, Cini Varghese, Seema Jaggi

44. Knowledge data warehouse for agricultural research(completed on 30.09.2010).
    Anil Rai, PK Malhotra, Seema Jaggi, KK Chaturvedi, Prachi Misra Sahoo, Mohd. Samir Farooqi

45. Decision support system for manpower planning – PERMISnet-III (completed on 31.01.2011).
    Alka Arora, Balbir Singh, Samir Farooqi, Shashi Dahiya, Anil Rai

New Initiated

46. Establishment of National Agricultural Bioinformatics Grid (NABG) in ICAR(NAIP Component-I: Consortium Leader with 05 other Consortium Partners) (initiated on 01.04.2010).
    VK Bhatia (Consortium Leader), **Anil Rai** (Consortium PI), PK Malhotra, KK Chaturvedi (on study leave from 31.08.2010), SB Lal, Anu Sharma, Samir Farooqi, Sudeep, Hukum Chandra, AR Rao, Seema Jaggi

Acronyms

AARDO	Afro-Asian Rural Development Organization
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
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)
CISH	Central Institute for Subtropical Horticulture
CRIDA	Central Research Institute for Dryland Agriculture
CSO	Central Statistical Organization
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
FRS	Fruit Research Station
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
IRRI	International Rice Research Institute

IVRI	Indian Veterinary Research Institute
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
NARS	National Agricultural Research System
NASM	National Agricultural Science Museum
NASA	National Academy of Statistical Administration
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
NESAC	North Eastern Space Applications Centre
NII	National Institute of Immunology
NRCPB	National Research Centre on Plant Biotechnology
NRCSS	National Research Centre on Seed Spices
NSSO	National Sample Survey Organisation
PDFSR	Project Directorate of Farming System Research
RCNEHR	Research Complex North Eastern Hilly Region
RFRS	Regional Fruit Research Station
SAARC	South-Asian Association for Regional Co-operation
SAC	Space Application Centre
SAU	State Agricultural University
STCR	Soil Test Crop Response Correlation
UAS	University of Agricultural Sciences
UDSC	University of Delhi, South Campus
UP	Uttar Pradesh
USDA	United States Department of Agriculture
V-Page	Vision Policy Analysis and Gender