ANNUAL REPORT

1999-2000

भाकृअनुप
ICAR

INDIAN AGRICULTURAL STATISTICS RESEARCH INSTITUTE

(ICAR)

Library Avenue, New Delhi- 110 012

MILESTONES

1930	• Institute made a modest beginning as Statistical Section under ICAR
1940	• Activities of the Section increased with appointment of Dr PV Sukhatme
1945	• Re-organisation of statistical section into statistical branch which soon acquired international recognition as a centre for research and training in the field of Agricultural Statistics
1949	• Re-named as Statistical Wing
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
1959	• Re-designated as Institute of Agricultural Research Statistics (IARS)
1964	• Installation of IBM 1620 Model-II Electronic Computer • Signing of the Memorandum of understanding with IARI, New Delhi and new courses leading to M.Sc. and Ph.D. degrees in Agricultural Statistics in collaboration with IARI
1970	• Declared as a full fledged Institute in the ICAR system, headed by Director
1976	• A new three storeyed Computer Centre Building was constructed
1977	• Installation of third generation computer Burroughs B-4700
1978	• Name changed to Indian Agricultural Statistics Research Institute (IASRI) with a full fledged discipline of `Agricultural Statistics'
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 was initiated.
1992	• Administration-cum-Training Block of the Institute was inaugurated
1993-94	• M.Sc. degree in Computer Application in Agriculture was changed into M.Sc. (CA)
1997	• Revived the Senior Certificate Course in 'Agricultural Statistics and Computing'

GOAL

Indian Agricultural Statistics Research Institute (IASRI) promotes and conducts research, education and training in Agricultural Statistics and Computer Application in Agriculture

MANDATE

- To undertake basic, applied and adaptive research leading to new developments in Agricultural Statistics and related fields for bridging gaps in the application of Statistical Techniques to the problems of Agricultural Research.
- To provide advisory/consultancy services to agricultural scientists, planners, policy makers and others on their statistical and computing requirements.
- To assist in the development and strengthening of National Agricultural Statistics System.
- To act as a repository of information on Agricultural Statistics for research and dissemination of such information.
- To conduct post-graduate and in-service training courses in Agricultural Statistics and Computer Application in Agriculture.
- To develop the Institute as an Advanced Centre of Excellence for education and training in Agricultural Statistics and Computer Applications.
- To liaise with ICAR Institutes, SAUs and State Agricultural/ Animal Husbandry/ Veterinary Sciences departments etc. and undertaking sponsored research & training for national and international organisations.

CREDIT LINE

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ANNUAL REPORT

1999-2000

INDIAN AGRICULTURAL STATISTICS RESEARCH INSTITUTE
(I.C.A.R.)
LIBRARY AVENUE, NEW DELHI – 110 012

PREFACE

It gives me immense pleasure in presenting the Annual Report 1999-2000 of the Institute before you. The report depicts a panorama of research activities, notable research achievements and human resource development activities in Agricultural Statistics and Computer Application in Agriculture.

As a premier Institution in the country, Indian Agricultural Statistics Research Institute (IASRI) shoulders its responsibility by promoting and conducting research and human resource development activities in Agricultural Statistics and Computer Application in Agriculture. As in the past, the Institute continued its service to fulfil its aims and mandate through its various divisions, units and cells.

Besides this, the Institute continued to provide its consultancy services, technical guidance to various researchers in the country. Bio-informatics Centre of the Institute provided service to the scientists in the National Agricultural Research System (NARS) in terms of searching from the bibliographic databases and a large number of abstracts have also been provided to various ICAR Institutes.

Outcome of this report is a collective effort rendered by Heads of Divisions, scientists and other staff of this Institute. I wish to express my sincere appreciation to all of them for their sincere and whole-hearted support and cooperation in carrying out the function and activities of the Institute and for providing requisite material for compilation of this report.

I take this opportunity to express my commendable appreciation to Dr AK Srivastava, Joint Director, Dr DK Agarwal, Scientist In-charge, Research Co-ordination & Management Unit, Sh PP Singh and Sh J Srinivasan, Technical Officers for compilation and editing the report and for bringing out this report in time. I express my thanks to Sh Mahesh Chander, Stenographer and Smt. Rajni Gupta, Sr. Clerk for type-setting the manuscript on computer.

I hope this publication will be of immense use and informative for the scientific fraternity of NARS. Suggestions and comments, if any, for improvement in subsequent volumes of the reports are most welcome.

SD SHARMA
DIRECTOR

CONTENTS

EXECUTIVE SUMMARY

Indian Agricultural Statistics Research Institute (IASRI) established in 1959 was mainly responsible for promoting and 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 assist in the development and strengthening of National Agricultural Statistics System, 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, to develop the Institute as an Advanced Centre of Excellence in education and training in Agricultural Statistics and Computer Applications and to undertake sponsored research and training of national and international organisations in these disciplines.

A number of research projects are undertaken in the different divisions of the Institute namely Sample Survey, Design of Experiments, Biometrics, Forecasting Techniques, Econometrics and Computer Applications. During the year under report, there were 30 ongoing research projects and one revolving fund project covering the main thrust areas, like poultry meat production, inland fish catch estimation, production and area estimation, assessment and evaluation studies, remote sensing and geographic information system, development of databases, cropping system research, information system for agricultural and animal experiments, experimental designs for agricultural, animal, agro-forestry and fishery research, statistical investigations in genetics and bio-technology, forecasting techniques in agricultural system, technological change, risk and uncertainty in agriculture, and modelling for agricultural planning. In some of these studies, Institute is collaborating with various Institutes and also user organisations. The Research Coordination and Management Unit (RCMU), apart from coordination and management work, brought out Annual Report of the Institute, Quarterly IASRI News and Monitoring Progress Reports, EFC Memo for IX Plan and its mid - term appraisal.

The Division of Sample Survey is mainly involved in the development of sample survey techniques for estimation of various parameters of interest relating to crops, livestock, fishery and allied fields. Nine research projects were taken-up covering the thrust areas like poultry meat production, inland fish catch estimation, production and area estimation, assessment and evaluation studies and remote sensing and geographic information system. Agricultural research is a vital input for planned growth and sustainable development of agriculture in the country. The Division has taken the lead in publication of Agricultural Research Data Book since 1996. The Agricultural Research Data Book 1999, which is the fourth in the series is an attempt to put together main components/indicators of the information pertaining to agricultural research, education and related aspects from different sources scattered over various types of published and unpublished records. The Division has been organising number of sponsored training programmes funded by organisations outside the ICAR system. This reflects a positive step of the Division towards resource generation efforts by the Institute.

Number of projects have also been prepared in the form of consultancy efforts to be funded from other agencies. The beneficiaries of these research projects, training programmes as well as consultancy are spread over the Institutes in National Agricultural Research System, State Departments of Agriculture; Directorate of Economics & Statistics, Department of Animal Husbandry & Dairying in Ministry of Agriculture; Central Statistical Organisation and National Sample Survey Organisation etc. A remote sensing laboratory equipped with suitable hardware for digital image processing and GIS software has been established in the Division at the Institute.

The Division of Design of Experiments has undertaken study of designs for two or more sets of treatments applied at different periods of experimentation funded by AP Cess fund, I.C.A.R The study basically deals with the development of experimental designs in which different sets of treatments are applied in succession in a block design setting or row-column setting. Characterization and optimal properties have been studied for non-interacting sets of treatments applied in succession. An attempt has also been made to study the situation when treatments applied in succession in block design are interacting. Some methods of construction of designs are also provided alongwith a catalogue of efficient designs. This study will prove immensely useful to scientists, students and other research workers engaged in research related to such kind of situations.

The data received from different collaborative projects under AICRP during the year were analyzed using appropriate statistical techniques. Two training programmes for the senior level scientists of Indian Council of Forestry Research and Education were organized on Research Methodology with special emphasis on Statistics.

The Division of Biometrics has the responsibility to undertake research in modelling and computer simulation techniques in agriculture systems; Statistical investigations in genetics and biotechnology; and teaching and training in agricultural statistics and computer applications. During the year, a project 'Studies on growth pattern and heritability of fitness traits in Indian breeds of goats' was in operation and two new research project proposals were initiated, which were approved by SRC held during February, 2000. These proposals are "Empirical investigations on the influence of fixed effects on the estimates of heritability" and "Development of statistical procedures for selecting genotypes simultaneously for yield and stability".

The Division of Forecasting Techniques for Crops, Diseases and Pests was renamed in the month of January, 2000 as Division of Forecasting Techniques with the mandate to assess early agro-meteorological crop yield and to develop early warning system, use of remotely sensed data in yield forecast, forecasting of livestock population, milk production, fish production, production of poultry, assessment of losses due to factors like floods, droughts etc.

Studies on forecasting techniques for developing statistical techniques in the field of forecasting crop yields and impending attack of pests and diseases were undertaken. 'Study on development of forewarning system for aphids on potato' revealed that two types of models are suitable (i) Non-linear model in which different cosine functions have been used, (ii) Higher degree complex polynomial models developed using Group Method of Data Handling (GMDH) technique. The predicted values from these models are very close to the observed ones. It is possible to forewarn about aphid population two weeks in advance based on weather variables.

In a study, Bayesian probability model has been used for developing forecast models for wheat. On the basis of the responses obtained from farmers in two rounds of inquiries average prior probabilities of getting yield in various classes were computed. Taking into account actual harvest yield of these respondents, posterior probabilities were obtained. Using these posterior probabilities Bayesian forecast for the next year was computed. The forecast had an S.E. of 1.83 q/ha.

The Division of Statistical Economics was also renamed in the month of January, 2000 as Division of Econometrics. The mandate of the Division is to undertake work relating to models for agricultural planning, non-linear economic models, study of technological change and its diffusion. Studies pertaining to risk and uncertainty in agriculture and agricultural development and poverty alleviation. During the year, the divisional scientists were engaged on projects dealing with resource use efficiency in poultry production in Haryana and study of micro-irrigation system on crop production, saving of resources, income and employment in Mahendergarh and Gurgaon District.

The Division of Computer Applications is involved in providing training in Information Technology under Revolving Fund Scheme. The Division has provided Selective Dissemination of Information Services to research workers of the NARS. The Division is developing a National Information System on Agricultural Education (NISAGE). The work for the development of NISAGE is in progress. One of the components of NATP is institutionalization of improved research priority setting and project monitoring and evaluation (PME) mechanism in the NATP and NARS. The Division has initiated the entrusted responsibility of monitoring and concurrent evaluation under PME component of NATP and a Project Information and Management System (PIMS) is under development. The Division provided Advisory and Consultancy services in the Computerisation and Processing of data of ARS/NET/SRF-99 and Finance and Accounts Officer-99 examinations for Agricultural Scientists Recruitment Board (ASRB). The Division continued to provide computer services in the Institute and strengthened the computing facilities in the Institute. The Division also earned Rs. 4.86 lakhs as a part of resource generation activity.

Research Coordination and Management Unit (RCMU) is responsible for documentation and dissemination of scientific output of the Institute, organisation of National Conferences of Agricultural Research Statisticians once in three years, organisation of meetings of SRC, RAC, QRT and Heads of Divisions and Principal Scientists of the Institute, correspondence with ICAR, ICAR Institutes, SAUs and other organisations in India and abroad from time to time, to examine the new Research Project proposals before these are considered by the SRC in respect of importance of problems, 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 Milestone, EFC Memo, to maintain the Research Project Files and also their submission to ARIC (ICAR) and the Unit also provides help in Art, Photography & Reprographic Services.

The meetings of Research Advisory Committee, Management Committee and Staff Research Council were held and decisions taken were implemented.

Training Administration Cell (TAC) is responsible for planning, organisation and co-ordination of the entire Post-graduate teaching and training programmes of the Institute in collaboration with PG School, IARI, to provide guidance to students in their research/training programmes, ad-hoc courses on specialised topics in Agricultural Statistics

& Computer Applications and training courses under the aegis of Centre of Advanced Studies in Agricultural Statistics & Computer Applications.

The scientists of the Institute participated in number of workshops, seminars, summer Institutes related to the disciplines of agricultural statistics and computer applications. A number of research papers highlighting the results achieved in various studies were published by the scientists of the Institute. Consultancy was given to different organisations.

INTRODUCTION

Brief History

The Institute made a modest beginning in 1930 as a small Statistical Section, in the then Imperial Council of Agricultural Research, to assist the State Departments of Agriculture and Animal Husbandry in planning their experiments, analysis of experimental data, interpretation of results as 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 research was initiated for developing objective and reliable methods for collecting yield statistics of principal food crops. The efficiency and practicability of these methods were demonstrated in different states for estimating yield by crop cutting experiments. The recognition which this method attained was such that 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 and statistical staff were the activities initiated in this period resulting in the re-organization of the Statistical Section into a Statistical Branch with permanent footing in 1945 accompanied by appropriate expansion in its strength. The designation of Statistician was changed to Statistical Advisor. The Statistical Branch soon acquired international recognition as a centre for research and training in the field of Agricultural Statistics. In 1949 it was named as Statistical Wing of the ICAR. 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. In August, 1955, the Statistical Wing moved to its present campus. 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 2nd of July 1959. It is to commemorate this important event, that the Annual Day of the Institute is celebrated on this day every year. An important landmark in the development of the Institute was the installation of an IBM 1620 Model-II Electronic Computer in 1964. Another major landmark for the Institute was the signing of a Memorandum of Understanding with Indian Agricultural Research Institute (IARI), New Delhi in 1964, consequent to which new courses leading to M.Sc. and Ph.D. degrees in Agricultural Statistics were started in collaboration with IARI in October, 1964. In April, 1970, the Institute was declared as a full-fledged Institute in the ICAR system and is, since then, headed by a Director. Since 1st 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.

Since the activities of the Institute expanded manifold, a new three-storey Computer Centre building was constructed in the campus of the Institute in 1976. A third generation computer Burroughs B-4700 system was installed in March,1977. A large

number of computer programmes for specific problems as also general purpose application software were developed. The Burroughs B-4700 system was replaced in 1991 by a Super Mini COSMOS-486 LAN Server which was subsequently replaced by a PENTIUM-90 LAN Server, a more powerful system having state-of-art technology. Computer laboratories equipped with Pentium, 486, 386 PC/AT's, dumb terminals and printers, etc. have been set up in each of the six divisions as well as in Research Coordination and Management Unit of the Institute. Keeping eye on the technological developments in the Information Technology (IT) field, the new operating systems and the large number of machines connected on the network, it was necessary to upgrade/replace the existing computer hardware and also purchase new computers. Accordingly, 4 Server with 3 Nodes, 1.0KVA UPS System, Computer System (Wipro),1100 Laser Jet Printer,1100 - A Laser Jet Printer, 4050 Laser Jet Printer, Note Book Computer, Desk Jet Printer, nine 0.5 KVA, UPS System, A-4 Size Scanner, CD-Writer, two Over Head Projectors were procured and installed. . User friendly software packages like operating system (MS DOS Ver. 6.2 and MS Windows 95), Word Perfect 6.0, E-mail Services, SPSS, SAS, Image Processing Software, Harvard Graphics, LOTUS, dBASE IV, SCO-UNIX, ORACLE, MS-Office Suite, Microsoft Visual Studies 97, Microsoft Office 97, Microsoft Project 98, STAR3, Norton Anti-virus packages, and a few others have also been made available. Borland Turbo C++, Geo Media Software were also purchased to keep pace with the new emerging technology. Besides this, every section of the Institute has been equipped with PC AT's and printers.

A lab on Remote Sensing (RS) and Geographic Information System (GIS) has been developed consisting of NT Server - Prioris M x 6200, Two Nodes - Pentium III, venturis FX-2, 5166, Monitor 21" (Color), 10 Base-T Ethernet Hub, Magellan UPS Model, Digitiser, SG V A0 size, UPS 3.0 KVA, Printer EPSON Stylus color 1520, Workstation Wipro Grafika Pentium III, Node Pentium III Wipro Mentor as hardware and ER Mapper 5.5, PC ARC/INFO, Microstation 95, Geomedia Professional, ARC/INFO, Workstation 7.2.1, ERDAS Imagine 8.3.1 as softwares in the institute with the help of funds received through two AP Cess Fund projects.

With the advances in Information Technology and the requirements at IASRI, the new structured cabling for 65 nodes at IASRI's computer center building using the world class standard AMP products was done under the ARIS programme. The 65 nodes with the transfer speed of 100 MBPS were installed and for managing all these nodes the "NETCONNECT" rack was installed where the cables from different rooms terminate and the patch cords from these are used to connect in the 24 Port Bay Networks hubs. The two new 24 port Bay Networks hubs along with the existing two 16 port hubs were mounted on the rack for managing the whole network. All the four hubs are now cascaded and with this the Internet connection has become much faster. The existing LAN has been strengthened by extending connectivity to 68 nodes using the structured cabling. In all 202 nodes are now on the network. Email and Internet services are now available to all the scientific/administrative staff in the Institute.

In order to remove and rectify deficiencies in the existing documentation services dealing with agriculture, the Food and Agriculture Organisation of the United Nations initiated a series of studies in 1971, to establish the Information System for Agricultural Sciences and Technology (AGRIS). The Institute is one of the National input centres, for adding our inputs to the System every month. The Institute provides selective information services to scientists in the ICAR Institutes and Agricultural Universities on references to documents relating to areas of their specific interest. The bibliographic databases in Biotechnology and

Animal Science Research are being maintained in the Bio-Informatics Laboratory providing Selective Dissemination of Information (SDI) services on VETCD, BEASTCD and AGRICOLA databases.

From October, 1983 to March, 1992 the Institute also functioned as a Centre of Advanced Studies in Agricultural Statistics and Computer Applications under the aegis of the United Nations Development Programme (UNDP). This programme aimed at developing a Centre of Excellence with adequate infrastructure and facilities to undertake advanced training programmes and to carry out research on various aspects of agricultural statistics and computer application. Under this programme, thirteen distinguished statisticians and computer experts from abroad (19 visits; over 21.5 man months) visited the Institute for a period of four to eight weeks with a view to interacting with the scientists of the Institute, giving seminars/lectures and suggesting improvements in the research programme of the Institute. Seventeen scientists from this Institute had received training (covering 80 man months) abroad, in different areas of research, extending over periods of 5-6 months each. In addition, a new course leading to M.Sc. degree in Computer Application in Agriculture was initiated from the session 1985-86 which was subsequently changed into M. Sc. (CA) from the session 1993-94.

In view of growing demand from various quarters, the Institute revived the Senior Certificate Course in 'Agricultural Statistics and Computing' in 1997 with change in the course curriculum keeping in view the demand of well trained manpower in Agricultural Statistics.

The Institute has achieved international recognition for its high quality research and teaching work in the field of Agricultural Statistics. 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.

Organisational Set-up

The Institute has six Divisions, one Unit and one Cell to undertake research, training, consultancy, documentation and dissemination of scientific output. Council has approved the continuation of the Divisions of Forecasting Techniques for Crops, Diseases and Pests, and Statistical Economics with revised names and thrust areas. The new set up of the Institute is as follows:

Divisions:

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

Unit:

- Research Co-ordination and Management

Cell:

- Training Administration

Financial Statement

Budget statement for the year 1999-2000

(Rs. in lakhs)

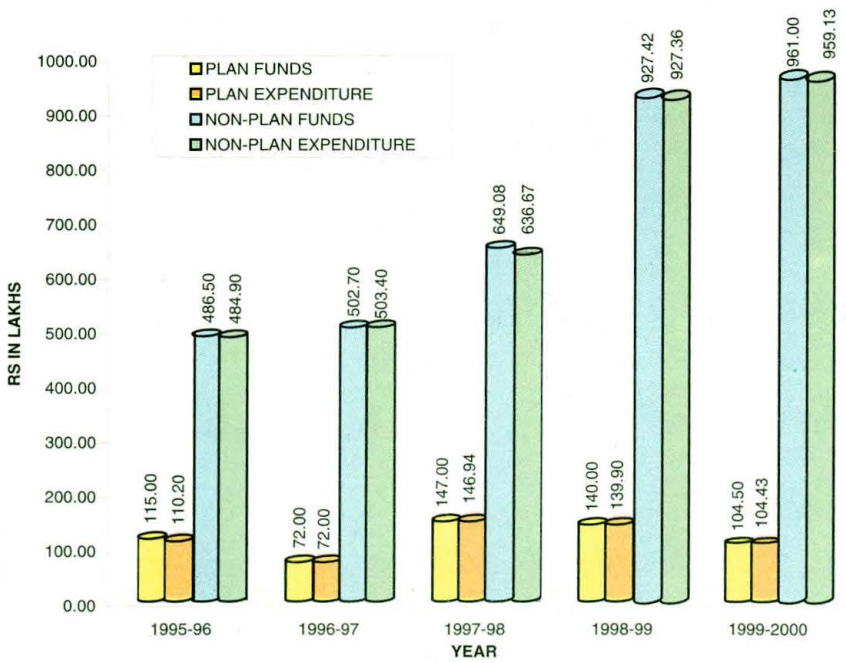
Code	Head of Account	Budget		Expenditure	
		Plan	Non-Plan	Plan	Non-Plan
02	Establishment Charges		859.81		858.25
06	Overtime Allowance		0.89		0.89
10	Travelling Expenses	4.50	2.80	4.48	2.74
15	a. Other Charges Incl. Equipment	63.00	65.00	62.83	65.25
	b. One time catch up grant for equipment	13.00		13.23	
20	a. Works	9.00	22.00	9.38	22.32
	b. One time catch up grant for renovation of works	13.70		13.74	
25	Fellowships/Scholarship/Award	1.30	10.50	0.77	9.68
	GRAND TOTAL	**104.50**	**961.00**	**104.43**	**959.13**

Abstract (1999-2000)

(Rupees in Lakhs)

	Budget	Expenditure
Plan including one time catch up grant	104.50	104.43
Non-Plan	961.00	959.13
TOTAL	**1065.50**	**1063.56**

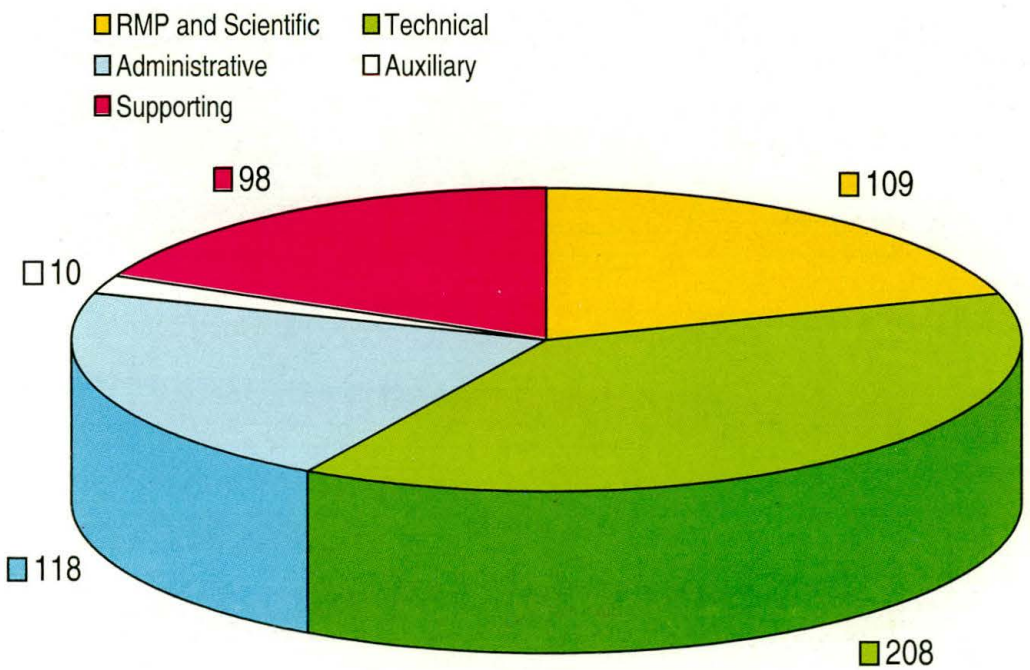
BUDGET FOR THE YEARS 1995-96 TO 1999-2000



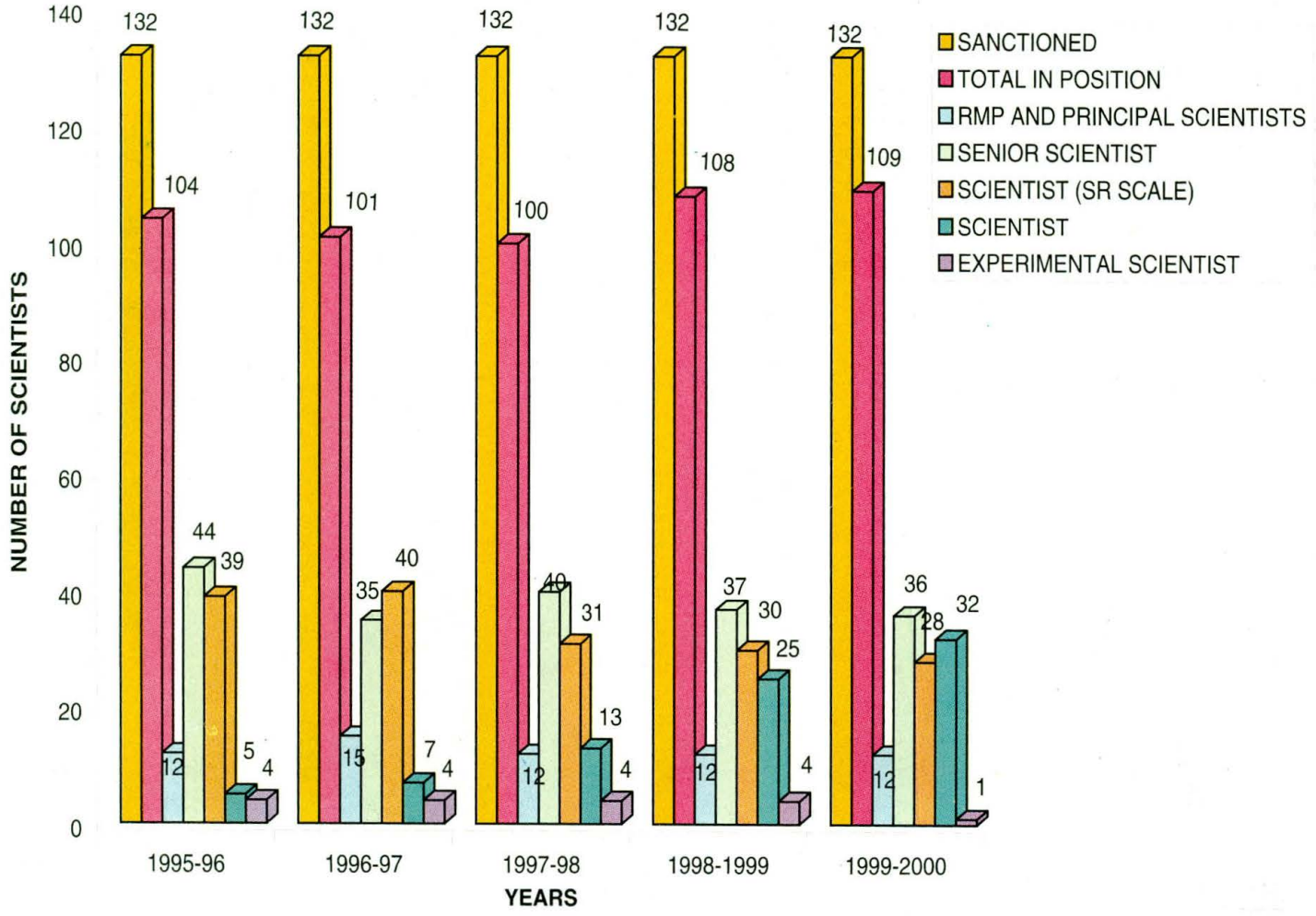
Staff Position
(As on 31.03.2000)

Sr. No.	Manpower	No. of posts sanctioned	No. of posts filled
1.	Director	1	1
2.	Joint Director	1	1
3.	Scientific	130	107
4.	Technical	290	208
5.	Administrative	121	118
6.	Auxiliary	14	10
7.	Unclassified	1	-
8.	Supporting	98	98
	TOTAL	**656**	**543**

STAFF STRENGTH IN POSITION AS ON MARCH 31, 2000



SCIENTIFIC STRENGTH (SANCTIONED AND IN POSITION) FROM THE YEARS FROM 1995-96 TO 1999-2000



RESEARCH ACHIEVEMENTS

DIVISION OF SAMPLE SURVEY

Mandate	Thrust Areas
To evolve sample survey techniques for estimation of various parameters of interest relating to crops, livestock, fishery, forestry and allied fields and to develop techniques for analysis of survey data.	• Poultry meat production • Inland fish catch estimation • Production and area estimation • Assessment and evaluation studies • Remote sensing and geographic information system

Thrust area-wise list of projects in operation is given in Chapter 11. The progress of the projects are given below:

Poultry Meat Production

1. Pilot sample survey to develop a sampling methodology for estimation of poultry meat production

The objectives of the study are (i) to estimate the poultry meat production through existing integrated sample surveys for estimation of livestock products, (ii) to estimate the poultry meat production through organised farms, and (iii) to develop a suitable sampling technique for estimating the poultry meat production integrating the results obtained under (i) and (ii) above.

To estimate the total poultry meat production in a district, a sampling methodology was adopted at two levels. At first level, samples of organized poultry farms of each type and size were selected separately by the method of uni-stage simple random sampling. Similarly, at second level, sample of villages at first stage and households rearing poultry birds in their backyard at second stage were selected by the method of two-stage simple random sampling. The project report has been revised in the light of internal referee's comments.

Inland Fish Catch Estimation

2. Sample survey to evolve methodology for estimation of fish catch from rivers or streams of the hilly areas

The objective of the project is to evolve suitable sampling methodology for estimation of fish catch from rivers and streams of the hilly areas. This study is being undertaken in three districts of Himachal Pradesh viz. Bilaspur, Kangra and Mandi. The preparation of data files pertaining to all the three selected districts viz. Bilaspur, Kangra and Mandi were completed. Preliminary investigations were carried out on these data files and number of secondary tables on fish catch and fishing & selling practices adopted in

the region were worked out and tabulated. The estimation procedure to work out the estimates of fish catch has been finalised. The programme to compute these estimates is under preparation.

Production and Area Estimation

3. A study for estimation of area and production of important vegetable crops on the basis of partial harvest

The objectives of the study are (i) to develop a suitable theoretical framework for sampling from two dimensional population spread over space and time with particular reference to vegetable crops, (ii) to apply and test the theory on secondary data collected under earlier vegetable surveys at IASRI in order to develop a suitable methodology for estimating the production of vegetable crops based on partial harvests, and (iii) to estimate the total production of important vegetable crops and their yield rates on the basis of partial harvest.

In view of multiple pickings of vegetable crops, the observations on selected fields for estimation of production of vegetable crops is spread over time. The project study was planned in two phases. In the first phase of the study, the methodological aspects of the problem for estimation on the basis of first phase study were tackled. The problem was tackled in a general perspective for sampling from two dimensional populations where, in one of the dimensions selection of sampling units were considered while in the other dimension sampling was spread over time in which the selected units were observed. An approach for a variety of sampling designs associated with sampling over time was developed using the varying probability sampling methods. This method was tested on secondary data in which the different duration of time intervals on which data was to be collected and also the periodicity for the systematic sampling interval were tackled. It was found that a span of 7 days in the gap of 14 days was a suitable plan for observing partial harvest data for different vegetable crops. The vegetables considered for the study were tomato, brinjal, tori, loki and karela. In the second phase, a pilot survey was conducted in rural areas of Delhi. The estimation procedure for obtaining yield rates and total production of vegetable crops utilizing primary data has been finalised and are being worked out for different vegetable crops for which data has been collected.

The theoretical framework will lead to suitable methodology for estimating the production of crops and commodities with multiple observations. The methodology will provide estimates on the basis of partial harvest data.

4. Pilot sample survey for estimating the area and yield rates of ginger and potato in hilly areas

The objectives of the project are to develop sampling methodology for (i) estimating the area under ginger and potato, and (ii) estimating the yield rates of ginger and potato.

The design adopted for the survey was stratified multi-stage random sampling, the strata being Community Development Blocks. The villages growing ginger/potato were the primary stage sampling units. For area estimation enquiry, cultivators in a village growing ginger/ potato were second stage sampling units. For crop cutting experiments, the fields within selected villages and a plot/ sub plot within selected fields were selected. The usual method for estimating the area and average yield are being adopted.

The data preparation was completed in respect of both the crops viz. potato for the year 1997-98 pertaining to East Khasi Hills and ginger for the year 1997-98 pertaining to East

Garo Hills. All the data were transferred on floppies. Estimation procedure was developed for area and yield rates. Analysis was under progress.

Assessment and Evaluation Studies

5. Estimation of flow and change in dynamic populations

The objectives of the project are (i) to estimate the structural changes in the population due to cross-movements of units in various classes between two occasions under general developmental phenomenon, (ii) to estimate the structural changes in the population due to various causal factors, (iii) to estimate the parameter for characteristic of interest in respect of a stationary population and structural changes occurring in that population, and (iv) to estimate the changes in the parameter for the characteristic on account of the structural changes occurring in the population due to cross-movements of units in various classes between two occasions.

The structural changes in the population due to cross movements of unit in various classes over the two occasions under general developmental phenomenon would be theoretically estimated in the first objective in terms of number of units in the population. In the second objective the structural changes in the population due to cross movements of units in various classes over the two occasions would be estimated under various causal factors in terms of units in the population. Population parameters (Mean $\bar{y}$ or total $N\bar{y}$) for a characteristic (Y) of interest of the first and on the second occasion and for the structural changes occurring in the population would be estimated in the third objective. In the parameter for the characteristic for the structural changes over the two occasions would be obtained. The estimators for the above mentioned parameters in respect of various classes of the population would also be obtained. Minimum Variance Linear Unbiased Estimators (MVLUE's) of all the parameters would be developed by making use of the projective geometry approach and Transition Probability Matrix approach. The report was under revision in view of the internal referee's comments.

Theoretical development of the estimators would be useful for estimating the flow of units in various classes in a dynamic population in order to assess the social and economic development of the population engaged in agriculture sector, industry sector etc., due to general developmental phenomenon.

6. To study the effect of various input components on the yield of important vegetable crops

The objectives of the project are (i) to study the functional relationship between the yield of important vegetable crops and various input components, and (ii) to study the response of changing levels of different inputs on the yield of vegetable crops.

To study the relationship between input components and the yield of important vegetable crops, the following functions have been fitted to the data: (i) general linear function, (ii) square root function, (iii) double log model, and (iv) semi-log model. Estimates of elasticity together with their 95 percent confidence limits have been worked out to study the response of changing levels of different input components on the yield of selected vegetable crops under study.

The project is based on secondary data collected under the project " Pilot sample survey for estimation of losses, price spread at various stages of marketing and cost of cultivation of vegetable crops, Pune" during the period 1986-88. Linear function, square root function, double-log and semi-log models have been applied for studying the functional relationship

between yield and various input components. The results reveal that irrigation, fertilizer and labour had contributed significantly towards the yield of vegetable crops. Insecticides and pesticides had significant effect towards the yield of tomato while bullock labour to potato only. The regression coefficients are significant mostly in case of double-log function. It indicates that double-log function has better specification towards the yield of vegetable crops than other models studied. The value of R^2 is moderately high and significant in case when double-log function is fitted. Estimates of elasticity together with their 95 percent confidence limits have been analyzed to study the response of changing levels of different input components on the yield of selected vegetable crops under study. Increase in human labor has a reciprocal relationship with the yield of brinjal only while in case of tomato if the use of insecticides and pesticides is increased 100%, approximately four times increase in the yield of tomato is expected under the ideal conditions. Irrigation and fertilizer had also indicated the positive effect except for tomato and guwar. The estimates of elasticity are positive and significant though of small magnitude. Mostly positive response to the changing levels of fertilizer, irrigation and human labor indicate that with an increase in these components separately, an increase in the yield of vegetable crops is expected.

Remote Sensing and Geographic Information System

7. Use of remote sensing technology in crop yield estimation surveys

The main objectives of the project are (i) to test the methodology of stratification based on satellite data in crop yield estimation surveys, (ii) to obtain improved estimator of crop yield from crop yield estimation surveys using post-stratification based on spectral data, and (iii) to examine the usefulness of spectral data under study for stratification in crop yield estimation surveys for subsequent year.

As per the recommendations in the previous study conducted in Sultanpur district of U.P., it was suggested that the study may be repeated on more locations and over different periods before this technique can be recommended for operational use. District Rohtak was selected to repeat the study.

The satellite data in the form of vegetation indices has been utilized for stratification of crop area in homogeneous crop condition areas like high growth, average growth, poor growth etc. Crop yield data based on crop cutting experiments has been used to develop post-stratified estimator of crop yield.

Improved crop yield estimator for wheat crop using remote sensing satellite data along with the crop yield data based on crop cutting experiments was developed. Satellite data in the form of vegetation indices like RVI and NDVI used for post stratifying the crop area in the district and a post stratified estimator of crop yield has been developed which is considerably more efficient as compared to the usual estimator. This results suggest that for obtaining crop yield estimator of crop yield has been developed which is considerably more efficient as compared to the usual estimator. This results suggest that for obtaining crop yield estimator at district level number of crop cutting experiments can be reduced by one third without affecting the precision. Further, using small area statistics techniques efficient estimators of wheat crop yield have also been developed at tehsil level based on the crop cutting experiments planned for the district level estimates.

8. Use of Remote Sensing satellite data in crop surveys (Funded by ICAR A.P. Cess fund)

The objectives of the project are (i) to develop sampling design (involving planning

of the surveys and method of estimation) for estimation of crop acreage & crop yield and crop yield modelling based on the combined use of satellite data (IRS) and ground survey data on crop yield obtained from crop cutting experiments, (ii) to evaluate the efficiency of the proposed sampling design based on a simulation study, and (iii) to develop suitable crop yield models using multi-date spectral data.

The satellite data in the form of vegetation indices and ground survey data based on crop cutting experiments will be used. The crop cutting sites will be identified with the help of a Global Positioning System (GPS). Suitable sampling design for acreage and yield estimation will be developed and crop yield forecasting model based on satellite data will be developed.

The crop cutting experiment data for wheat crop for the year 1997-98 has been analysed. The villages selected for crop cutting experiments which were identified on the topographic maps in the scale of 1:50000 have now been identified from the spectral data of IRS-1D dated 4th February, 1998 has been rectified with the help of Ground Control Points obtained using Global Positioning System (GPS) in terms of their Latitude and Longitudes. Different image enhancement techniques haven been applied. Different vegetation indices for the data of 1996 and 1998 have been obtained. A study of change in the area under vegetation and area under wheat has been carried out. Using the satellite data of 1998 and yield model based on 1996 data, forecasting of crop yield for 1998 has been attempted.

9. Study of land use statistics through integrated modelling using Geographic Information System (Funded by ICAR A.P.Cess fund)

The objectives of the project are (i) to obtain land use statistics with the help of survey and remote sensing technique, (ii) to study the qualitative aspect of land utilisation statistics obtained through different sources i.e. census, survey and remote sensing, and (iii) to develop model for integration of statistics obtained through different sources.

Project started on 1st Sept., 1999. Till date, software and hardware related to project were procured and installation was in progress. The Survey India topo-sheets were purchased for Lalitpur district of U.P. where project has to be implemented.

10. Agricultural Research Data Book 1999

Agricultural research is a vital input for planned growth and sustainable development of agriculture in the country. Information pertaining to agricultural research, education and related aspects from different sources is scattered over various types of published and unpublished records. This **Agricultural Research Data Book 1999**, which is **fourth** in the series is an attempt to put together main components/indicators of such information. The Data Book is organized, for the purpose of convenience of the users into eight sections namely, **Natural Resources, Production and Productivity, Agricultural Inputs, Produce Management, Fisheries, Environment, Investment in Agricultural Research & Education and Human Resources** under National Agricultural Research System (NARS). It also contains at the end, **list of important National and International Institutes** associated with agricultural research and education along with their addresses and contact points.

DIVISION OF DESIGN OF EXPERIMENTS

Mandate	Thrust Areas
To develop statistical designs and methodologies for analysis of data relating to field and laboratory experimentation in agricultural and animal sciences.	• Cropping systems research • Information system for agricultural and animal experiments • Experimental designs for agricultural, animal, agroforestry and fisheries research

Thrust area-wise list of projects in operation is given in Chapter 11. The progress of the projects are given below:

Cropping Systems Research

1. Planning, designing and analysis of experiments planned on stations under the Project Directorate for Cropping Systems Research

Complex experiments were conducted at 37 research stations under All India Co-ordinated Agronomic Research Project (CSR) during 1998-99. These experiments were planned with the objectives of (i) development of new cropping systems, (ii) nutrient management in cropping systems, (iii) development of system based management practices and (iv) maximum yield research.

Designs adopted for these experiments were RBD, split plot, strip plot, factorial RBD, Split-Split plot, 3^2 x 2 partially confounded, BIBD and balanced confounded ($4x2^2$). The data of about 280 experiments pertaining to 1998-99 crop year were received during 1999-2000 and analysed. Annual Report for 1997-98 pertaining to the data of 1997-98 was published.

To achieve the maximum possible yield under different cropping systems by harnessing the synergistic effect between the management practices and input applied, an experiment was conducted on a fixed experimental site during 1998-99 in rice-wheat sequence at R.S.Pura, Varanasi, Chiplima and Ranchi. Results indicated that increased recommended fertilizer and plant population increased the yield of both the crops of rice and wheat almost at all the centres except Ranchi. Application of green manure at R.S. Pura and Varanasi had a significant effect on both the crops of rice and wheat whereas at Chiplima, it had effect only during kharif. At Ranchi, during kharif none of the effect was found significant and during rabi only green manure applied @ 10 t/ha had a significant effect.

Project leader delivered a seminar on designs and analysis of experiments, gaps and discrepancies observed in the data and also visited one of the cropping systems research centres, Junagadh to monitor the ongoing experiments.

2. Planning designing and analysis of on-farm research experiments planned under Project Directorate of Cropping

Systems Research

The objectives for "On FARM" Research are (i) to undertake socio-economic and agronomic surveys for identification of production constraints and problems, (ii) to develop/refine system based agronomic practices to increase cropping intensity and (iii) to develop farm system for enhancing crop productivity through optimizing farm inputs.

The Experiments are planned and conducted under three types of research programmes, *viz.*

i) Dynamics of cropping systems
ii) Design and testing of need based cropping systems
iii) Optimization of crop production under regional constraints

To study the dynamics of cropping system, it has been decided to conduct agronomic survey at each of the E.C.F. centres under project. A detailed questionnaire for the survey as prepared by PDCSR has been finalized in association with the Scientist of I.A.S.R.I., New Delhi, PDCSR, Modipuram and NCAP, New Delhi . This is in progress at most of the 32 of ECF centres.

The data in respect of 700 trials (1997-1998) and 2400 trials (1998-1999) were received and statistically analyzed. The consolidated results of trials were presented in the annual reports of the project for the year 1998-99 prepared by Project Co-ordinator at PDCSR with the association of scientists at I.A.S.R.I.

During the Group meeting of the Chief Scientist held at PDCSR, Modipuram during Dec. 17-18, 1999, it was decided that ECF centre should undertake experimentation on (i) sustainability issues, and (ii) fertilizer response to important cropping system of their region. For sustainability trials 3 to 4 treatments based on regional constraints in large plots are to be taken and data relating to various sustainability issues to be recorded. For determining fertilizer responses it has been proposed to conduct trials on major cropping system with the treatment combination as (1), n, np, nk, npk, symbols n, p, k represent the recommend fertilizer doses of N, P and K for the crops under study.

The statistical analysis of the trials have revealed that at centre Buldane (Mob.)Maize -Wheat & Sorghum-Wheat and at Faizabad, Rice-Wheat, Rice-Lentil-Greengram were found to be most remunerative cropping systems. Use of Isproturon @ 75 kg ai/ha + 214 Dc 0.4 kg ai/ha in wheat crop shows greater effectiveness in controlling weeds at R.S. Pura. Addition of S with recommended dose of fertilizer yielded more Soyabean grain yield at Ujjain centre.

3. Planning designing and statistical analysis of data relating to experiments conducted under All India Coordinated Research Project (AICRP) on Long-Term Fertilizer Experiments

The objectives of the project are (i) to plan and design Long-Term Fertilizer Experiments, (ii) to try alternative approaches for analysis of data and (iii) to Coordinate the work relating to statistical requirements of the project with P.C.(LTFE), Scientists-in-charge of co-operating centres and I.C.A.R.

Methodology adopted for the study are:

i) Three factor interaction model was adopted for the analysis of mono crop in the sequence over years.
ii) The data of superimposed treatments were analysed using nested two-way design model.
iii) To study the effect of extraneous factors on the cumulative yields of crops, co-variance technique was explored with previous crop yields its residuals/

available soil nutrients after the harvest of the preceding crop as co-variates.

About 800 data schedules in respect of 10-15 characters of experiments conducted during the year 1997-98, received from the co-operating centres were analysed. Results for the year 1996-97 data were scrutinized and tabulated in the form of summary and final tables to be included in the Project Report.

The data of superimposed treatments were analysed for individual as well as over years (1993-97) for two of the co-operating centres. The results indicated that reduction of phosphorus application by 50% of the optimum level could sustain the crop yields consistently for four years at Ludhiana without any adverse affect on soils.

The data from Ludhiana and Bangalore centres were analysed using co-variance technique taking previous crop yield/residuals/available soil nutrients taken after the harvest of the preceding crop as co-variate(s). The results showed that at Ludhiana for Maize-Wheat-Cowpea(F) sequence, the effect of previous crop/residuals as co-variates was more pronounced in wheat crop as compared with maize or Cowpea crop resulting in decrease in coefficient of variation. At Bangalore residuals as well as different relationship of available soil nutrients reduced the C.V. by 5 to 35% for ragi crop enhancing the precision of treatment comparison.

Analysis of 1998-99 data of various characters would be taken up for studying the yield and soil nutrients. Trends over years, plant nutrient uptake and their use efficiency as well as pooling of data over years, modification of the ongoing experimental programme would be initiated at 3 to 4 locations to be identified by P.C., LTFE.

Information System for Agricultural and Animal Experiments

4. Agricultural Field Experiments Information System (AFEIS)

The objectives of the project are (i) collection of data, (ii) transformation of experimental data in prescribed coding sheets, (iii) storing of data, (iv) validation of data, (v) updation of existing database, (vi) retrieval of information from loaded data and (vii) developing various software for validation/retrieval of data.

Methodologies adopted are:

i) During the period (1st April, 1999 to 31st March, 2000), the regular activities of the project like collection, loading and validation of experimental data, received from various regional centres, were in progress. In all, data of about 1700 experiments were reported by regional centres. After scrutiny, the data of about 1315 experiments were sent to data entry unit.

ii) Validation of experimental data of about 1500 experiments were carried out.

iii) Software for the mechanical validation of results of experiments were prepared and the mechanical validation of stored data was in progress.

iv) To remove inconsistency, if any, in the stored data, Mechanical validation of about 5,000 experiments belonging to the states of Assam, Bihar, Gujarat, Karnataka, Madhya Pradesh and Tamil Nadu were carried out.

v) Preparation of reports on the status of Agricultural field Experiments in the state of Madhya Pradesh was undertaken.

vi) For making research scientists aware of the existence of database under this project, a pamphlet on "Agricultural Field Experiments Information System"

was modified and Hindi version of the same was under preparation.

vii) To broad base the data collection from the regions not covered under present set up, the correspondence with the Director, IARI, was initiated.

viii) The retrieval of Agricultural Experiments of cultural and manurial type was done for the initiation of Project entitled "Statistical investigation on the fertilizer use efficiency in relation to cultural practices"

Future Plan of the study is:

i) To bring out status report of Agricultural Experiments in different states of the country.

ii) To explore alternate procedure of collection of experimental data.

iii) To make AFEIS project on-line on Internet.

5. Agricultural Experiments Information System for Animal Sciences

The objectives of the project are (i) to collect and compile the experimental data in the various disciplines of animal science research carried out by various Research Organizations/SAUs in the country, (ii) to put the data and results in an approved format, (iii) to prepare coding sheets and store the data through computer, (iv) to prepare index of animal experiments and (v) to prepare database for storage and retrieval of information and other miscellaneous activities related to the project.

An instructional manual for storage of data was prepared. It includes schedules, instructions, coding lists, coding sheets and other record formats for storage device. Computer programmes were also developed for storage and retrieval of the data. Database was prepared using FORTRAN language.

During 1998, the work on the preparation of format for presentation of results and index for about 525 experiments was completed. Their coding, corrections were under processing. Creation of the computer based data of animal experiments during the year 1999 was initiated.

Experimental Designs for Agricultural, Animal, Agro-forestry and Fisheries Research

6. A statistical investigation on the long-term effect of fertilizers on productivity of cereal crop sequences

The objectives of the project are (i) to estimate the overall fertilizer treatment effects for each crop sequences, (ii) to study the effect of long term fertilizer use on the yield of different crops and (iii) to develop methodology for (a) determining optimal fertilization practice for each of the crop sequences and (b) estimation of average annual net returns for the crop sequences and (iv) to develop yield prediction models for crops included in different sequences.

The methodologies in respect of objectives (ii) and (iii) were finalized and was applied to one of the centres viz. Navsari. Application of the methodology developed to other centres was in progress.

7. Designs for fitting response surfaces in agricultural experiments (Funded by ICAR A.P. Cess Fund)

The objectives of the project are (i) to obtain response surface designs for response optimization and slope estimation when various factors are with equi-spaced levels and/or have unequal dose ranges for both symmetrical as well as asymmetrical factorials, (ii) to obtain response surface designs for qualitative-cum-quantitative factors, (iii) to study the robustness aspects of response surface designs against

non-availability of data on some point(s), (iv) to prepare a catalogue of response surface designs suitable for agricultural experiments and (v) to develop a computer software for the analysis of the designs obtained and catalogued and to illustrate empirically.

Some methods of construction of slope rotatable designs with equispaced doses were obtained. Some modified and/or rotatable response surface designs for symmetric as well as asymmetric factorials were also obtained.

A catalogue of second order rotatable response surface designs for response optimisation was prepared for a maximum of 10 factors using central composite designs, Balanced Block Designs (BIB) and pairwise balanced block designs. A method of construction of modified and/or rotatable second order response surface designs for slope estimation was obtained and a catalogue of designs was also prepared. Some efficient response surface designs for slope estimation were obtained using MINIMAX criterion.

A modified second order rotatable response surface design for 3 factors each at 5 equi-spaced levels in 36 design points was adopted by a Ph.D. (Agricultural Engineering) student of IARI, New Delhi. The experiment was related to osmotic dehydration of the banana slices. The factors and levels were as given below:

	Factor	Levels
1.	Concentration of sugar Solution	45%, 55%, 65%, 75% and 85%
2.	Solution to sample ratio	2:1, 4:1, 6:1, 8:1 and 10:1
3.	Temperature of Osmosis	25^0C, 35^0C, 45^0C, 55^0C and 65^0C

8. Planning, designing and analysis of experiments relating to AICRP on soil test crop response correlation

The objectives of the project are (i) to improve the existing methodology for analysis of ongoing soil test crop response (STCR) experiments. (ii) to carry out planning and designing for the conduct of new set of experiments and subsequently to carry out the analysis of data and (iii) to develop database for STCR experiments.

The project work started in March, 2000. The project leader and one of the associates discussed at length with the project coordinator (STCR) at I.I.S.S., Bhopal on the modalities of the project regarding data-analysis and creation of database. It was decided that all the 17 centres of the STCR project would send their raw data to I.A.S.R.I. for analysis. I.A.S.R.I. would send the analysed results to the respective centres. Efforts are on for preparing the manual and coding schedules.

9. Design and Analysis of Agroforestry Experiments

The project was initiated in March, 2000 with the objectives (i) to evolve and document general methodologies for the statistical analysis of data already generated through agro-forestry experiments. (ii) to obtain appropriate designs along with the layout plans and methodology for the analysis of the experiments under agro-forestry system to be suggested to the collaborative centre(s) and (iii) to study the relationship among the various components (trees and crops) in agro-forestry system.

Agro-forestry is the science of designing and developing integrated self sustainable land management system, which involves introduction/retention of woody components including trees, shrubs, bamboos,

canes, palms, along with agricultural crops including pastures/animals simultaneously or consequential on the same unit of land and at the same time meet the ecological as well as socio-economic needs of the people.

The involvement of two or more components in this system, the long duration of tree components and seasonality of crop components, involvement of crop rotations, crop geometry of components of crop etc., introduce complexities in the designing and analysis of experiments for agroforestry research. Some of these complexities are due to multivariate nature of data, heteroscedasticity, lack of agreed assessment criterion required for projection of system performance. Therefore it is felt that these aspects may be studied in detail in the form of research project .

10. A diagnostic study of design and analysis of field experiments

The project has been initiated recently with the objectives (i) to conduct a diagnostic survey of several experiments for identifying different experimental situations so as to provide appropriate methods of analysis of data for each possible situation as well as to develop methodology for data analysis where appropriate methods of analysis are not available or suitable, (ii) to evolve appropriate and modified methods of combined analysis of data from experiments conducted at different locations and/or years by using the concept of nested models, (iii) to use the concept of multivariate analysis of variance to analyse the data of experiments with multiple responses and (iv) to develop an appropriate but exact method of estimation of variance components from an unbalanced data obtained from block designs with possibly unequal block sizes and varying replications.

DIVISION OF BIOMETRICS

Mandate	Thrust Area
To conduct basic and applied statistical research in Biometry	• Statistical investigations in genetics and biotechnology

Thrust area-wise list of projects in operation is given in Chapter 11. The progress of the project is given below:

Statistical Investigations in Genetics and Biotechnology

1. Studies on growth pattern and heritability of fitness traits in Indian breed of goats

The objectives of the study are (i) to compare different methods of estimation of heritability of fitness traits and (ii) to compare the adequacy of different non-linear models utilised for studying growth pattern.

Goats data on fitness traits like type of birth and stayability at different stages of age of animals were transformed by using sine arc transformation and thereafter half-sib correlation method was used to obtain heritability estimates of fitness traits.

Breeding data in respect of fitness traits like type of birth and stayability at different stages of age of animals for four important breed of goats namely Jamuna Pari, Beetal, Barbari and Black Bengal in 4x4 diallel crossing maintained at Udai Partap College, Varanasi (U.P.) were scrutinised. The data were transformed by applying sine arc transformation, thereafter, heritability estimates were obtained by using half-sib correlation method for four pure breeds mentioned above. Preparation of computer programs for obtaining heritability estimates by heterogenity (X^2) chi-square method was in progress.

DIVISION OF FORECASTING TECHNIQUES

Mandate	Thrust Areas
To assess early agro-meteorological crop yield and to develop early warning system, use of remotely sensed data in yield forecast, forecasting of livestock population, milk production, fish production, production of poultry products, assessment of losses due to factors like floods, droughts etc.	• Forecasting techniques in Agricultural System.

Thrust area-wise list of projects in operation is given in Chapter 11. The progress of the projects are given below:

Forecasting techniques in Agricultural System

1. Use of discriminant function of weather parameters for developing forecast model of rice crop

The objectives of the project are (i) to categorise the year into three groups on the basis of weather parameters, (ii) to develop yield forecast model using the discriminant score of weather parameters and the input variables and (iii) to examine the validity of forecast model.

The methodology consisted of: (i) Development of weather scores: The weather scores based on discriminant analysis were obtained on the basis of weather variables so as to maximise the ratio of mean squares of between and within groups. (ii) Testing of significance of centroids : The test statistics proposed by Bartlett (1947) is used to test the significance of discriminant functions based on the null hypothesis that group centroids are all equal. (iii) Classificatory analysis : The classificatory procedure for classifying the individual crop year into three groups involve the computation of distances between each individual observation from each group centroid in discriminant function. (iv) Development of forecast model : A linear multiple regression model was developed using weather score, input variables and trend.

Discriminated weather scores were calculated for individual years to use as a regressor alongwith the input variables (N,P & K) etc. for development of forecast model. The forecast models were developed using linearly/ quadratic discriminated weather scores alongwith the input variables and trend for the forecast of rice yield.

2. Pilot study for developing Bayesian probability forecast model based on farmers' appraisal data on wheat crop

The objectives of the study are (i) to develop the Bayesian probability model for forecasting the wheat crop yield and (ii) to enlist the factors affecting the crop yield based on farmers' appraisal.

The methodology consisted of conducting a survey in Muzaffarnagar district following a stratified multistage random sampling design. Taking tehsils as stratum, villages as first stage units and farmers as experts, a random sample of 90 experts was selected. The expert opinion data were collected in number of rounds by interviewing the selected experts regarding their assessments about the likely crop production and chances of occurrences. In the first round a requisite information was collected for establishing an approximate distribution of crop yield. After summarising the responses in various yield classes, each expert was asked in round 2 to estimate the chances in favour of getting yield in various classes. From these responses average prior probabilities were computed. At harvest, wheat yield data was obtained by enquiring the selected farmers. Actual harvest yield and farmers' appraisal data on yield were taken into account to obtain the posterior probabilities which were used for obtaining Bayesian forecast of crop yield for the next year.

The work of collection of data for the crop season 1998-99 was over. The collected data was scrutinised and the discrepancies observed were rectified. The data collected earlier during the crop seasons 1996-97 and 1997-98 were analysed. Based on the data collected Bayesian forecast of wheat yield for the crop season 1997-98 was obtained as 34.88 q/h with SE of forecast 1.83 q/h as against the actual yield of 29.55 q/h.

3. Development of forewarning system for aphids, myzus persicae (sulzer) on potato

The objective of the project is to develop forewarning technique to identify aphid free and low period and area for seed production.

Two types of models viz. using GMDH technique and non-linear models were developed.

(i) Models using GMDH Technique :

The work on development of week-wise models for the centres Pantnagar (U.P), Kalyani (W.B) and Deesa (Gujarat), on the secondary data pertaining to aphid population and weather variables during the period 1974-75 to 1996-97 to study the behaviour of aphid population with one/two week lagged weather variables was reported last year under All India Co-ordinated Potato Improvement Project (I.C.A.R.). The validation of models for these centres were taken up this year. For Deesa centre, on the basis of the model developed for the period 1985-86 to 1994-95, the predicted aphid population as well as the observed values pertaining to weeks Jan.I and Jan.II prevailing in 1996-97, were less than 20, assumed to be aphid - free period. The validation of model developed for centre Kalyani, was very good. The aphid population predicted for the year 1996-97 in the starting week of the crop season Jan. I, on the basis of the model for the period 1983-84 to 1994-95 was merely 6.80 against an observed value of 7. The percentage deviation works out to be only 2.83 that indicates an excellent fit of the model. The observed and predicted aphid population in the week Jan. in same year 1996-97 was less than 20 which was taken as an aphid free period.

An attempt was also made to study the effect on aphid population for a unit change in related one/two week lagged weather variables. The equation was partially differentiated w.r.t the concerned weather variable. But the partial differential equations were of very complex nature which could not be used to study the single/joint effects of weather variables on aphid population.

(ii) Non-linear Models

Week-wise non-linear models were fitted for the centres i.e., Pantnagar, Deesa and Kalyani. Here weekly aphid population was taken as dependent variable and weekly (two weeks lagged) data on temperature, humidity etc., were taken as independent variables. The relationship between aphid population and each of the independent variables was worked out. In most of the cases it was sinusoidal, i.e. cos function. Finally these functions were linearly added to get forecasting model.

The models, developed by using the data up to 1994 were fitted very well. The predicted aphid population from these models were very close to the observed values. Validation of these models were carried out using data for 1995 and 1996. Validation of results for the centre Deesa and Kalyani were very good. However, validation for the centre Pantnagar was not satisfactory for the year 1995. Moreover, for this centre, a different kind of study was carried out.

Mean, maximum and minimum values of maximum temperature, minimum temperature and relative humidity over the years were worked out. Thus a wide range of weather condition which could be prevailing in a particular week was possible. Possible aphid population was predicted through developed models for all possible range of weather conditions. Thus one can anticipate the possible aphid population well in advance for a particular week, if he or she can anticipate the possible weather condition to be prevailing during that particular week.

4. Development of early warning and yield assessment models for rainfed crops based on agrometeorological indices

The objectives of the project are (i) to prepare agrometeorological indices for early warning and yield assessment of rainfed crops (ii) to develop models using agrometeorological indices for early warning and yield assessment and (iii) to validate the models and provide early and yield assessment.

Weekly meteorological data for Raipur (M.P.), Delhi and Parbhani (Maharashtra) was collected along with the yield data for Rice (Raipur), Sorghum and Maize (Delhi) and Sorghum (Parbhani) for approximately 20 years. Other necessary information viz. soil type, water holding capacity, field capacity, wilting point, crop duration and growth phases, rooting pattern, crop coefficients were obtained from various sources. On the basis of this information analysis procedure was finalised.

Using water balance technique estimates of weekly soil moisture, actual evapotranspiration, moisture stress or surplus during the crop season were obtained for each year for all the crops and centres.

Attempts were also made to model weekly evaporation using potential evaporation values, rainfall and temperature. Trend in yield of all the crops was examined. Total and partial correlations between yield and weekly rainfall and weekly stress; between yield and phasewise rainfall and phasewise stress and phasewise deficit/surplus were obtained to arrive at suitable weights for stress at different stages of crop growth. For the yield series having significant trend these correlations were worked out with trend eliminated yield. Preparation of weighted indices were in progress.

Using weighted indices, yield models will be developed for early yield assessment and validated. Using models, early yield assessment will also be carried out.

5. Forecasting of yield loss due to weeds

The objectives of the project are (i) to investigate the intensity and growth pattern of weeds, (ii) to find out the relationship between

crop yield and weed parameters. (iii) to develop methodology for forecasting the yield loss due to weeds and (iv) to work out the economic efficiency of various herbicides.

Methodology consists of: (i) development of within year growth model. (ii) development of suitable model for studying relationship between yield and significant weed parameters to enable us to work out loss in yield due to weeds. (iii) to sketch a graph between yield loss and time of application of herbicides for finding out the suitable time of its application and (iv) to work out economic efficiency of various herbicides.

The experiment for the Soybean crop was laid out at the agronomy field of IARI. In all 16 treatments, 14 of them contained herbicides and two controls were taken. The treatments were allotted randomly in randomised block design with three replications. The observations were recorded on weed counts, dry matter accumulation and leaf area for all the treatments at 7 days interval after emergence of weeds. The actual yield of the crop was also recorded at harvest. Statistical analysis for examining the growth pattern of weed parameters was in progress.

6. Studies on bioecology and population dynamics of major pests of mango (hoppers, fruitfly, leaf webber and inflorescene midge) and guava (fruit borer)

This project started recently in collaboration with Central Institute for Subtropical Horticulture, Lucknow. The objective is to collaborate work on development of forewarning system for outbreak of fruitfly/mango hopper in mango crop. Weekly data on fruitfly population and corresponding weather parameters for the period 1993-94 to 1998-99 were received. Scrutiny of data, designing of data files with specific purpose of accommodating relevant lag variables, preliminary analysis comprising of various scatter plots and computation of correlation coefficients etc., identification of appropriate non-linear model (from families of exponential, power, growth and sigmoidal etc.) based on characteristic behaviour of fruitfly over years and computation of residuals was over and development of methodology was in progress. Additional data for 5-7 years on fruitfly and 10-12 years data on mango hopper and the corresponding weather data was awaited from CISH.

7. To develop model for forewarning about infestation of the insects for paddy crop

The objectives of the project are (i) to develop some suitable models to know the dynamics of insects in relations to weather variable and (ii) for forewarning to avoid the damage to the paddy crop with the infestation.

In this study stochastic and non-linear model will be developed to know the dynamics of insects in relation to weather parameter. Development of forewarning models for various insects will also be developed using weekly data on weather variables.

This is a collaborative project with N.D.Univeristy of Agriculture & Technology, Faizabad, U.P. The weekly data regarding various insects and weather variables were received from 1985-1994 and pre-analysis work was in progress.

In this study, suitable non-linear models will be developed for forewarning to avoid the damage to paddy crop.

8. Epidemiology and forecasting of powdery mildew and anthracnose

The objective of the project is to collaborate work on forewarning techniques for powdery mildew in mango.

Non-linear regression models where the response variable is qualitative in nature

will be developed and fitted using the available data and forewarning will be done on the basis of the fitted model.

This is a collaborative project with CISH, Lucknow from 1.10.99 onwards. The data relating to occurrence of epidemic in Mango crop along with the weather parameters were received for the period 1987-1999. The review of literature had been done. The data were scrutinised and preliminary analysis initiated.

In this study, suitable forewarning models will be developed as per the objectives formulated.

DIVISION OF ECONOMETRICS

Mandate	Thrust Areas
To undertake the work relating to models for agricultural planning, non-linear economic models, study of technological change and its diffusion, study of risk and uncertainty in agriculture and agricultural development and poverty alleviation.	• Study of Technological Change, Risk and Uncertainty in Agriculture. • Modelling for Agricultural Planning.

Thrust area-wise list of projects in operation is given in Chapter 11. The progress of the projects are given below:

Study of Technological Change, Risk and Uncertainty in Agriculture

1. Economic study of micro-irrigation system on farmers' field

The objectives of the project are (i) to study the impact of micro-irrigation on crop production, productivity, saving of resources, income and employment, (ii) to estimate the credit needs for adoption of micro-irrigation technology on farmers' fields, (iii) to examine the effects of subsidy on adoption of micro-irrigation technology and (iv) to explore the potential of the micro-irrigation technology, constraints in its adoption and production measures to be adopted in future.

Gurgaon and Mahendergarh districts of Haryana State were selected on the basis of low percentage of net irrigated area. The benefit cost ratios were calculated for both with and without subsidy on micro-irrigation system (MIS) as well as traditional system of irrigation for various crops grown in the study area to study the impact of micro-irrigation on crop productivity saving of resources, income and employment. Credit needs for adoption of MIS technology was estimated. The effect of subsidy on adoption of MIS was studied by calculating benefit cost ratios with and without subsidy and the potential of the technology was projected for the year 2005 using growth model.

Modelling for Agricultural Planning

2. Study of demand for agricultural products and its implications for food security in India

The objectives of the project are (i) to study the consumption pattern of food in rural and urban areas, (ii) to estimate demand functions and engel elasticity for these items and (iii) to study the implications for consumption pattern of poorer section of population for food security.

The study of average monthly per capita quantity of cereals over different NSS rounds indicated that during 1987-1996, the per capita consumption of cereal in rural areas was declining gradually from 14.4 kg per month to 12.9 kg per month during 1995-96. The decline was noticeable in wheat and jowar. In

urban areas the consumption of cereal was relatively low. It remained almost stable at 10.7 kg since 1991. The value of cereal consumption was higher in rural areas as compared to urban areas. The analysis further indicated that there was a beginning of decline on the share of food in total expenditure from its level of 64 percent in 1987-88 to 60.3 percent in 1995-96 in rural areas. The percentage expenditure on non food item was slowly rising. The expenditure pattern of urban areas indicated a decline in the proportion of expenditure on food items from 56.4 percent in 1987-88 to 50.1 per cent in 1995-96.

DIVISION OF COMPUTER APPLICATIONS

Mandate	Thrust Areas
To develop databases and information systems for agricultural research, to conduct post-graduate teaching and ad-hoc training courses in Computer Applications, to provide advisory and consultancy services in data processing, and to provide computer services in the Institute	• Development of databases and information system for National Agricultural Research System. • Modelling and Computer Simulation Techniques in Agricultural Systems

Development of databases and information system for National Agricultural Research System

(i) Development of databases for National Information System for Agricultural Education (NISAGE)

The Internet has gained immense popularity over the past decade and in this age of information explosion, no country, organisation and individual can afford to be ignorant of this emerging technology. It is the easiest way to link the documents and their sections in a non-linear manner, over the different network paths. A very useful application of the Internet is to design and establish an on-line information system, where the data retrieval and the data updation can be done by anyone around the globe with authorized access permissions.

Keeping in view the immense potential of Internet in transfer of Information Technology, the NISAGE on INTERNET, that is the web based on-line databases for National Information System on Agricultural Education in India, was designed using HTML 4.0, Dreamweaver, Adobe PhotoShop, ColdFusion software and the ODBC techniques.

The NISAGE system available on Internet will lay emphasis on providing a unified information system on various activities of the agricultural universities, collection, compilation and analysis of information about the activities of the agricultural universities. Accordingly it will focus on the following activities of agricultural universities:

1. General & Academic Information of the Universities.
2. Infrastructural facilities available in the Universities.
3. Budget provision for the different activities of the Universities.
4. Manpower employed in different cadres of the system.
5. Personal Information of the faculty in the University.
6. Achievements and Highlights (R&D) activities of the Universities.

The system has been designed and developed with the following objectives :

- Development of an internet based information system related to National

Agricultural Education System in India with a data bank available at the network server containing data collected from all the SAUs and Deemed Universities of ICAR.

- Development of dynamic web page solutions for data updation, modification and expansion in the database structure.
- Development of dynamic web page solutions for different reports and queries to meet the users' requirements.

Finally NISAGE on INTERNET will be an effective solution for the class of users varying from common man to the head of states. It will act as a comprehensive information directory for the administrators and managers at the international platform.

(ii) NATP Programme

The National Agricultural Technology Project (NATP) funded by the World Bank is a project designed to bring-in needed reforms in technology generation, assessment and dissemination through upgrading the skills of our scientists and extension workers. One of the main objectives of the NATP is to accelerate the process of organization and management reforms, which in turn would increase overall efficiency of the National Agricultural Research System (NARS). One of the components of NATP is institutionalization of improved research priority setting and project monitoring and evaluation (PME) mechanism in the NATP and NARS. Monitoring and evaluation mechanism would effectively assess research efforts against well-defined targets, avoid duplication of research efforts and provide feedback to research planning process. It would also help to establish link between performance evaluation and incentive mechanism. This PME activity would be implemented by integral efforts of NCAP, IASRI and NAARM.

IASRI initiated the entrusted responsibility of monitoring and concurrent evaluation under PME component of NATP. The main activities under this component are:

- Development of monitoring mechanism.
- Development of monitoring indicators at different operative levels.
- Development of Project Information and Management System (PIMS) and linking it with Internet.
- Training and workshops on monitoring and PIMS.
- Establishing network of agricultural statisticians and economists.

The progress made in the project is as given below:

A. Development of monitoring indicators and monitoring mechanism

The Monitoring Indicators for different levels i.e. (i) Site Level, (ii) Production System Level (iii) Agro-eco System Level (iv) MM/TOE/CGP Level (v) PIU Level (vi) Project Level and (vii) O&M Level were developed. Guidelines explaining the monitoring and concurrent evaluation system had also been prepared and discussed in the PME task force meeting held on September15, 1999. A monitoring mechanism was developed which shows complete structure of project, monitoring levels, doers of monitoring and reporting, direction of information flow and mid-course decisions.

B. Development of Project Information & Management System

The PIMS (Standalone Version) was designed at IASRI in five modules. All the modules were integrated in the form of a software package so called as PIMS. The system was developed using Visual Basic for the front-end and Microsoft Access for the back-end development. The introduction to NATP Module describes the general guidelines for operation and management of the projects

under NATP. The Project Data Management module was designed in three sub-modules meant for data entry of the new project information sanctioned under NATP programme, updating the existing information and browsing of the project information. The Projects Processing module was designed to generate sanction order for the newly approved projects stored under PIMS package through various input forms of second module. The Monitoring Module was designed to monitor the different activities of the projects in terms of the expected targets achieved or not, if not, the reasons and the steps taken to achieve the targets. The efforts were made to design and monitor the quarterly, half yearly and annual progress in terms of the appointments, equipment's procurement, publications, project crop conditions etc. The Reports/Queries Module contain some of the following general reports and got the facility to generate reports by selections as per the requirements of the users.

C. Organization of Workshops/Training Programs

- Dr. A.K. Jain, Sr. Scientist at ICAR (HQ) and Dr. R.K. Jain, Sr. Scientist, at IASRI attended Training cum development of a database on Project Information Management System for NATO at the International Agricultural Centre (IAC), Wageningen, Netherlands during 5th to 28th August, 1999.
- A workshop cum training programme on Monitoring Indicators and Project Information Management System was organized from 27-29th September 1999.
- A training programme on "Visual Basic 6.0, Active-X with MS-Access" conducted by ERDCI, IASRI, New Delhi, November 9-19, 2000 was arranged for 10 Scientists/ Technical staff working under this project.
- Guidelines for submission of research proposal under the NATP in a format compatible with PIMS was developed.
- User Reference Manual for PIMS was under preparation.

Advisory and consultancy services in data processing

(a) Consultancy in Computerisation and Data Processing for ASRB

The Division of Computer Applications undertook computerization and data processing of ARS/NET/SRF Examination 1999 conducted by ASRB Krishi Anusandhan Bhawan, New Delhi.

(b) Consultancy in Agricultural Research Data Processing

Seven M.Sc./Ph.D. research workers were provided help in data processing and interpretation of results as per details given below:

1. Sh. Ravi Kumar , College of Agriculture, Nagpur , PDKV (Akola)
2. Sh. M.S. Rao Dept. of Extn. B.H.U., Varanasi
3. Sh. Praveen Kumar, C.C.S., Meerut
4. Sh. Krishan Pal, J.V. College, Baraut (Baghpat)
5. Sh. Raul Edoliya, J.V.College, Baraut (Baghpat)
6. Sh. Om Singh, J.V.College, Baraut (Baghpat)
7. Sh. Emmanuel N., Allahabad Agricultural Institute, Allahabad.

Computer services

(a) Selective Dissemination of Information

Bioinformatics Centre provided services to Scientists in the NARS in terms of searching from the bibliographic databases and to the scientists of the Institute for colour output of certificates, cover pages and laser outputs for various documents. It received 41

requests from other institutes of ICAR and output of 35,728 abstracts were provided to them.

(b) Data Entry

Personal Computers in the division were used to prepare data records on floppies as under:

Total jobs	:	93
Total records created	:	84,262
Total records corrected	:	9,830

(c) Computing Facilities

(i) Purchase of Computers, Hardware and other Peripherals

Keeping an eye on the technological developments in the Information Technology (IT) field, the new operating systems and the large number of machines connected on the network, it was necessary to upgrade/replace the existing computer hardware and also purchase new computers. Accordingly, the following computer hardware and related equipments were procured and installed:

Sl.No	Item	Qty	Scheme
01	Server with 3 Nodes	04	Revolving Fund Scheme
02	1.0 KVA UPS System	01	AP-Cess
03	Computer System (Wipro)	01	AP-Cess
04	1100 Laser Jet Printer	01	AP-Cess
05	1100 - A Laser Jet Printer	01	AP-Cess
06	4050 Laser Jet Printer	01	Revolving Fund Scheme
07	Note Book Computer	01	AP-Cess
08	Desk Jet Printer	01	CAS
09	0.5 KVA UPS System	09	PLAN
10	A-4 Size Scanner	01	CAS
11	CD-Writer	01	CAS
12	Over Head Projectors	02	CAS

(ii) Remote Sensing and GIS Lab

A lab on Remote Sensing (RS) and Graphic Information System (GIS) laid at Sample Survey Block was developed in the Institute with the help of funds received through two AP-Cess fund projects. Following hardware and software were available for research, teaching and training purpose :

Hardwares:

NT Server - Prioris M x 6200
Two Nodes - Pentium III, venturis FX-2, 5166
Monitor 21" (Color)
10 Base-T Ethernet Hub
Magellan UPS Model
Digitiser, SG V A0 size
UPS 3.0 KVA
Printer EPSON Stylus color 1520
Workstation Wipro Grafika Pentium III
Node Pentium III Wipro Mentor

Softwares :

ER Mapper 5.5
PC ARC/INFO
Microstation 95
Geomedia Professional
ARC/INFO Workstation 7.2.1
ERDAS Imagine 8.3.1

(iii) Strengthening of LAN

The existing LAN was strengthened by extending connectivity to 68 nodes using the

structured cabling. In all 202 nodes are now on the network. E-mail and Internet services are now available to all the scientific/ technical/administrative staff in the Institute.

(iv) Software Packages

Few new software packages were purchased in this year. These new packages were necessary so as to keep pace with new emerging technologies:

Borland Turbo C++
Geo Media Software

(d) Activities relating to resource generation

(i) From the training programs, analyzing data on computers and sale of SPAR1 and SPBD packages, a total of Rs.1,54,742/- were generated during the year as a part of the activities in the division
(ii) As a part of the Revolving Fund Project a sum of Rs. 3,31,574/- was generated.

In addition to the above activities, the following two projects were also in operation.

Revolving Fund Project

1. Short Term Training Programs in Information Technology

The objectives are (i) to train manpower in the field of Information Technology and (ii) to expose the Scientists of NARS to latest developments in Information Technology.

Two Teaching Associate and one teaching Assistant had resigned from the Project assignment. Also, one existing Teaching Assistant was appointed as the Teaching Associate and two fresh Teaching Assistants were associated in the project.

Training courses were planned for the twenty participants in each training course but the response was not as planned. So to compensate for the loss due to less number of participants, 29-week training programs were conducted instead of 20-week programs proposed in the RFS proposal during the 2nd year as approved by the Council. During the period under report the following twenty-three training programs were organised under this scheme:

i) "MS-Office-(I)" from 12-4-99 to 17-4-99 for officials of National Research Centre on Yak, Dirang (Arunachal Pradesh) and Directorate of Water Management Research, Patna, Bihar was conducted. Three participants attended the training programme. The topics included were Introduction to Computers, Windows 95, MS-WORD, MS-PowerPoint and E-mail.

ii) "MS-Office-(II)" from 19-4-99 to 24-4-99 for officials of National Research Centre on Banana, Trichy (Tamil Nadu) and AICPIP (CPRI) Shimla, (H.P.) was conducted. Two participants attended the training programme. The topics included were Introduction to Computers, Windows 95, MS-Excel, MS-Access and E-mail.

iii) "Web Programming & Internet Technologies" from 10-5-99 to 22-5-99 for officials of ICAR institutes was conducted. Seven participants attended the training programme. The topics included were Introduction to Internet, HTML, OOP & VBS, VBScript, Browser Object Model, ACP and ASP.

iv) "MS-Office-I" from 31-5-99 to 5-6-99 for officials of ICAR institutes was conducted. Eight participants attended the training program. The topics included were Introduction to Computers,

Windows 95, MS-WORD, MS-PowerPoint and E-mail.

v) "MS-Office-(II)" from 14-6-99 to 19-6-99 for officials of ICAR institutes was conducted. Seven participants attended the training programme. The topics included were Introduction to Computers, Windows 95, MS-Excel, MS-Access and E-mail.

vi) "Relational Database Management System & Access 97" from 28-6-99 to 3-7-99 for officials of ICAR institutes was conducted. Three participants attended the training programme. The topics included were RDBMS Concepts and Access 97.

vii) "Object Oriented Programming Using C++" from 12-7-99 to 24-7-99 for officials of ICAR institutes was conducted. Two participants attended the training programme. The topics included were concepts of C++ and Object Oriented Programming (OOP).

viii) "Relational Database Management System & Access 97" from 2-8-99 to 7-8-99 for officials of ICAR institutes was conducted. Six participants attended the training programme. The topics included were RDBMS Concepts and Access 97.

ix) "MS-Office-(I)" from 16-8-99 to 21-8-99 for officials of ICAR institutes was conducted. Eighteen participants attended the training programme. The topics included were Introduction to Computers, Windows 95, MS-WORD, MS-PowerPoint and E-mail.

x) "MS-Office-(I)" from 13-9-99 to 18-9-99 for officials of ICAR institutes was conducted. Three participants attended the training programme. The topics included were Introduction to Computers, Windows 95, MS-WORD, MS-PowerPoint and E-mail.

xi) "MS-Office-(II)" from 20-9-99 to 25-9-99 for officials of ICAR institutes was conducted. Thirteen participants attended the training programme. The topics included were Introduction to Computers, Windows 95, MS-Excel, MS-Access and E-mail.

xii) "MS-Office-(II)" from 4-10-99 to 9-10-99 for officials of ICAR Institutes was conducted. Five participants attended the training programme. The topics included were Windows 98, MS-Excel, MS-Access and E-mail.

xiii) "MS-Office-(I)" from 11-10-99 to 16-10-99 for officials of ICAR Institutes was conducted. Eighteen participants attended the training programme. The topics included were Windows 98, MS-WORD, MS-PowerPoint and E-mail.

xiv) "Web Programming & Internet Technologies" from 25-10-99 to 6-11-99 for officials of ICAR Institutes was conducted. Seventeen participants attended the training programme. The topics included were concepts of Internet, Intranet, Extranet, I.E. and Netscape Navigator, HTML and VB scripts, Active X control Pad and Active Server Pages etc.

xv) "Relational Database Management System & Access 97" from 15-11-99 to 20-11-99 for officials of ICAR Institutes was conducted. Two participants attended the training programme. The topics included were RDBMS Concepts and MS- Access 97.

xvi) "MS-Office and SPSS (Statistical Package)" from 29-11-99 to 10-12-99 for officials of ICAR Institutes was conducted. Seventeen participants

attended the training programme. The topics included were Windows 98, MS-Word, MS-Excel, MS-Access , Windows SPSS, E-mail and Internet Browsing.

xvii) "Object Oriented Programming Using C++" from 13-12-99 to 24-12-99 for officials of ICAR Institutes was conducted. Four participants attended the training programme. The topics included were concepts of C++ and Object Oriented Programming OOP.

xviii) "Web Programming & Internet Technologies" from Jan 10-22, 2000 for officials of ICAR Institutes was conducted. Eight participants attended the training programme. The topics included were concepts of Internet, Intranet, Extranet, I.E. and Netscape Navigator, HTML and VB scripts, Active X control Pad and Active Server Pages etc.

xix) "MS-Office-(I)" from 31-1-2000 to 5-2-2000 for officials of ICAR Institutes was conducted. Six participants attended the training programme. The topics included were Windows 98, MS-WORD, MS-PowerPoint and E-mail.

xx) "MS-Office-(II)" from Feb 14-19, 2000 for officials of ICAR Institutes was conducted. Nine participants attended the training programme. The topics included were Windows 98, MS-Excel, MS-Access and E-mail.

xxi) "MS-Office-97" from 21-2-2000 to 4-3-2000 for officials of ASRB at ASRB office was conducted. Six participants attended the training programme. The topics included were Windows 98, MS-Excel, MS-Access and E-mail.

xxii) "MS-Office-97" from Mar 6-11, 2000 for officials and staff of N.D. University of Agriculture & Technology, Faizabad was conducted. Twenty participants attended the training programme. The topics included were Windows 98, MS-Excel, MS-Access and E-mail.

xxiii) "MS-Office-(I)" from Mar 13-18, 2000 for officials of ICAR Institutes was conducted. Four participants attended the training programme. The topics included were Windows 98, MS-WORD, MS-PowerPoint and E-mail.

Modelling and Computer Simulation Techniques in Agricultural Systems

2. On some Robust estimation of Heritability

The objectives of the project are (i) to examine the influence of non-normality and other assumptions on the estimation of heritability, (ii) to study the effect of aberrant values on the estimates of heritability and (iii) to identify and develop procedures for robust estimation of heritability.

Work in relation to objectives (i) & (ii) was initiated. In order to achieve this, samples from different populations were simulated for the situations of balanced, unbalanced, contaminated and presence of outliers. The exercise was carried out for various population parametric values of heritability. The methods of ANOVA, REML and ML were utilised. From the results so obtained it was seen that ANOVA and REML behaved almost in a similar way for all the parametric values of heritability. The ML estimates were always found to be underestimated which clearly indicates some biasedness in the estimates. The behaviour was also same for the case of unbalanced situation. The only difference between the two was the closeness to the population parametric values. In the case of unbalanced case REML estimates were very close to the population parameter as

compared to the other methods. For the case of the contaminated populations, it was once again observed that REML estimates were better estimates as compared to other two methods. Finally the influence of aberrant values were examined. For this, aberrant value was created deliberately by changing the normal value by varying degree of aberrant value and subsequently its effect on the estimate was examined. It was seen that even one observation in the data set, affects significantly to the estimate of the heritability. However, when the aberrant value was not far off from the rest of the data set, then one can depend, to a certain extent, on the procedure of REML. In the case of extreme observations even REML also fails to yield estimates close to the parametric values. It was concluded that in most of the practical situations REML estimates were more accurate and reliable as the yield unbiased estimates of the variance components.

LIBRARY AND DOCUMENTATION SERVICES

Library and Information Services plays an important role in serving the Institute's scientific, technical personnel and students as a Centre for Scientific Literature resource base related to the Institute's mandate. The Library System of the IASRI is rich resourceful centre in the country, specialised in Agricultural Statistics and Computer Application and allied fields. The Library System of the Institute provides documentation and information services to in-house scientists, students and researchers as well as users from ICAR Institutes and Agricultural Universities.

The Library Advisory Committee plays an advisory role in the management of the Library System and all proposals relating to enrichment of resource base of the Library pertaining to the scientific books, journals, equipments and library renovation etc. were finalized by this body. The Library Advisory Committee for the year 1999-2000 was as under.

1.	Dr SD Sharma	Chairman
2.	Dr AK Srivastava	Member
3.	Dr Prajneshu	Member
4.	Dr RK Pandey	Member
5.	Dr RC Jain	Member (upto Dec., 1999)
6.	Dr. Ranjna Agarwal	Member (since 1.1.2000)
7.	Dr VK Sharma	Member
8.	Dr PK Malhotra	Member
9.	Dr HVL Bathla	Member
10.	Sh Mahesh kumar	Member
11.	Sh SN jha	Member (upto 1st Aug., 1999)
12.	Sh. Chironji Lal	Member (since Aug., 1999)
13.	Sh VR Srinivasan	Member
14.	Dr SS Srivastava	Member - Secretary

Library Information Services

The Reprographic System of the Library is meeting day-to-day requirements of scientific, technical, administrative personnel and students efficiently.

To keep informed with the scientific literature in their field following documentation services are provided by the Library System

- Current Content Service
- Current Book Review
- Current Awareness Service
- Select Bibliography
- CD Searches

Brief Statistics

1)	No. of Books added	:	128
2)	No. of Grey Information material added	:	158
3)	No. of Indian & Foreign Journals subscribed	:	110
4)	No. of Publications issued from the Library	:	10500
5)	No. of Publications borrowed or lent out on ILL	:	42
6)	No. of readers who visited the Library	:	12850
7)	No. of Issues of Current Contents brought out	:	12
8)	No. of pages of scientific & technical nature reprographed	:	40674
9)	No. of reprints issued to users	:	45
10)	No. of Indian Newsletters received on complimentary basis	:	120

EDUCATION AND TRAINING

Degree Courses

The Institute continued to conduct the following degree courses in collaboration with Post Graduate School of Indian Agricultural Research Institute (IARI) 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 do courses not only in Mathematics and Agricultural Statistics but also in Agricultural Sciences like Genetics, Agronomy, Agricultural Economics, etc. All courses in Mathematics, Statistics and Computer Application, etc. are offered at this Institute while the courses in Agricultural Sciences are offered at the I.A.R.I.

The eligibility qualification for admission to Master's degree in Agricultural Statistics is a Bachelor's degree in Agriculture/ Horticulture/ Forestry/ Agroforestry/ Sericulture/ Agricultural Marketing or B.Sc. (10+2+3 system). For admission to Master's degree in Computer Application, the eligibility qualification is a Bachelor's degree in Agriculture/ Computer Science/ Agricultural Engineering / or B.Sc. (10+2+3 system)

Further for admission to Doctor's degree in Agricultural Statistics, the eligibility qualification is a Master's degree in Agricultural Statistics or Statistics or Mathematical Statistics or Bio-Statistics or Professional Statisticians' Certificate Course (PSCC) from IASRI

Number of students admitted/ Completed various courses during 1999-2000 is as follows:

i) Ph.D. (Agricultural Statistics)

Four students were admitted and four students have completed Ph.D. (Agricultural Statistics).

ii) M.Sc. (Agricultural Statistics)

Four students were admitted and two students have completed M.Sc. (Agricultural Statistics).

iii) M.Sc. (Computer Application)

Six students were admitted and three students have completed M.Sc.(Computer Application).

Prof. SD Sharma, Director addressing the participants at the Valedictory Function of the training programme on Economic theory & Econometrics

National Training Programmes

Senior Certificate Course in Agricultural Statistics & Computing

The Senior Certificate Course in Agricultural Statistics and Computing is being

organised for the benefit of research workers in Agriculture and other related fields engaged in handling Statistical data collection, processing, interpretation and employed in Research Institutes of the Council, State Agricultural Universities and State Government Departments of Agriculture, Animal Husbandry and Fisheries etc. The main objective of the course is to impart training in latest statistical techniques as well as use of computers and software packages. The course is being organised in the Institute during July 12,1999 to April 29, 2000 attended by 11 participants including 5 Departmental Candidates. The topics covered included: Statistical Methods, Statistical Economics and official Agricultural Statistics, Introduction to Computer Systems, Database Management and Software packages, Design of Experiments and Statistical Genetics, Sampling Techniques and its Applications.

Dr. Padam Singh, Additional Director General, ICMR delivering a lecture to the participants of a training programme

Centre of Advanced Studies (CAS)

The following four training programmes under CAS were organised:

(i) Advanced Statistical Techniques in Research for crop and animal improvement

(ii) Computer Intensive Techniques in Agricultural Surveys

(iii) Web Page Designing and Information System Development

(iv) Efficient experimental designs for Generation of Agricultural technologies

The Reference Manuals for the above training programmes were prepared by respective Course Directors and distributed to the participants.

The Quinquennial Review Team (QRT) of CAS visited this Institute on 16.2.2000 under the chairmanship of Dr. MV Rao, Ex. Special Director General, I.C.A.R. and the work of CAS of this Institute was very much appreciated by QRT.

Quinquennial Review Team (QRT) of CAS meeting of the Institute in progress

Other Training Programmes

Sl. No.	Type of Training	Title	Period	No. of participants
1.	Training Programme for Officials of SAU's and ICAR Institutes under Revolving Fund Project	Introduction to MS-Office	12.4.99 to 17.04.99	3

Sl. No.	Type of Training	Title	Period	No. of participants
2.	42nd "Ad-hoc Training Programme"	Use of Computers in Agricultural Research	19.04.99 to 01.05.99	23
3.	Training Programme for Officials of SAU's and ICAR Institutes under Revolving Fund Project	Introduction to MS-Office	19.04.99 to 24.04.99	2
4.	Training Programme for Officials of SAU's and ICAR Institutes under Revolving Fund Project	Introduction to Web Programming and Internet Technologies	10.05.99 to 22.05.99	7
5.	Training Programme under the Centre of Advanced Studies	Statistical Modelling for Forecasting Biological Phenomena	10.05.99 to 19.05.99	20
6.	Training Programme for Staff of the Institute	Introduction to Window- 95 and MS-Office	21.05.99 to 29.05.99	20
7.	Training Programme for Officials of SAU's and ICAR Institutes under Revolving Fund Project	Introduction to MS-Office	31.05.99 to 05.06.99	8
8.	Training Programme for Officials of Vasontadada Sugarcane Research Institute, Pune	Introduction to SPAR-1	04.06.99 to 05.06.99	7
9.	Training Programme for Officials of SAU's and ICAR Institutes under Revolving Fund Project	Introduction to MS-Office	14.06.99 to 19.06.99	7
10.	Training Programme for Officials of SAU's and ICAR Institutes under Revolving Fund Project	Relational Database Management System and Access - 97	28.06.99 to 03.07.99	3
11.	Training Programme for Sr. Level Scientists of ICFRE. Dehradun	Research Methodology with special emphasis on statistics	05.07.99 to 30.07.99	25
12.	Training Programme for Officials of SAU's and ICAR Institutes under Revolving Fund Project	Object Oriented Programming using C++	12.07.99 to 24.07.99	2
13.	Training Programme for Administrative Staff of IASRI	Use of Windows 95 and MS-Office	14.07.99 to 30.07.99	17
14.	Training Programme for Registrars/Deans of SAU's	Workshop on NISAGE	19.07.99	20
15.	Training Programme for Administrative Staff of IASRI	Introduction to Windows and MS-Office	22.7.99 to 30.07.99	20
16.	Training Programme for Officials of SAU's and ICAR Institutes under Revolving Fund Project	Relational Database Management System and Access - 97	02.08.99 to 07.08.99	20

Sl. No.	Type of Training	Title	Period	No. of participants
17.	Training Programme for Senior level Scientists of ICFRE, Dehradun	Research Methodology with special emphasis on statistics	09.08.99 to 29.08.99	20
18.	Training Programme for senior/ Middle level ISS officers from Central Statistical Organisation/ NSSO	Qualitative Aspects in Collection and analysis of Survey Data	09.08.99 to 14.08.99	20
19.	Training Programme for officials of SAUs and ICAR institutes under Revolving Fund Project	Introduction to MS-Office	16.08.99 to 21.08.99	18
20.	Training Programme for ISS Probationers sponsored by Central Statistical Organisation	Economic Theory and Econometrics	23.8.99 to 10.09.99	11
21.	Training Programme for Scientists, Assistants/ Associate Professors under NARS	Quantitative Methods in Agricultural Economics	24.08.99 to 02.09.99	25
22.	Training Programme for Senior level Scientists of ICFRE, Dehradun	Research Methodology with special emphasis on statistics	6.9.99 to 17.09.99	24
23.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Introduction to MS-Office	13.09.99 to 18.09.99	3
24.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Introduction to MS-Office	20.09.99 to 25.09.99	13
25.	Winter School for Scientists, Asstt./ Assoc. Professors under NARS	Recent Development in Survey Sampling in relation to Agricultural Research	14.09.99 to 04.10.99	19
26.	Sensitization Workshop for AEDs under NATP	Project Monitoring and Management Information system	27.09.99 to 29.09.99	10
27.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Introduction to MS-Office	04.10.99 to 09.10.99	5
28.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Introduction to MS-Office	11.10.99 to 16.10.99	18
29.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Web Programming and Internet Technologies	25.10.99 to 06.11.99	17

Sl. No.	Type of Training	Title	Period	No. of participants
30.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Relational Database Management System & Access-97	15.11.99 to 20.11.99	2
31.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Introduction to MS-Office	15.11.99 to 30.11.99	13
32.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Introduction to MS-Office	29.11.99 to 10.12.99	17
33.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Object Oriented Programming using C++	13.12.99 to 24.12.99	4
34.	43rd Ad-hoc Training Programme	Use of Computers in Agricultural Research	13.12.99 to 28.12.99	9
35.	Training Programme under the Centre of Advanced Studies	Advanced Statistical Techniques for research in crop and animal improvement	03.01.2000 to 17.01.2000	19
36.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Web Programming and Internet Technologies	10.01.2000 to 22.01.2000	8
37.	Training Programme under the Centre of Advanced Studies for Associate/Assistant Professors from SAUs/Scientists from ICAR Institutes	Computer Intensive Techniques in Agricultural Surveys	20.01.2000 to 04.02.2000	18
38.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Introduction to MS-Office	31.01.2000 to 05.02.2000	6
39.	Training Programme under the Centre of Advanced Studies	Web Programming and Information system on Internet	07.02.2000 to 26.02.2000	19
40.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Introduction to MS-Office	14.02.2000 to 19.02.2000	9
41.	Training Programme sponsored by All India Co-ordinated Research Project on Agro-Meteorology, Hyderabad	Forecasting Methodologies using Agro-meteorological data	19.02.2000 to 21.02.2000	6
42.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Introduction to MS-Office	21.02.2000 to 04.03.2000	6

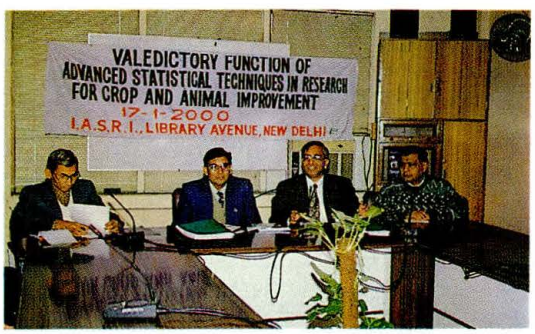
Sl. No.	Type of Training	Title	Period	No. of participants
43.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Introduction to MS-Office	06.03.2000 to 11.03.2000	19
44.	Training Programme for officials of SAU's and ICAR institutes under Revolving Fund Project	Introduction to MS-Office	13.03.2000 to 18.03.2000	4
45.	Training Programme under the Centre of Advanced Studies	Designs for Generation of Agricultural Technologies	16.03.2000 to 30.03.2000	19
46.	Training Programme Sponsored by C.I.A.E., Bhopal	Energy requirement in Agricultural Sector-Analytical Techniques and Statistical Software Packages	27.03.2000 to 05.04.2000	11

In addition to above, a specialised training programme in Official Statistics and Related Methodology was organised for 52 students of Indian Statistical Institute, New Delhi/ Calcutta/ Bangalore on June 9, 1999. Twentysix trainees of Indian Statistical Service Probationers sponsored by Central Statistical Organisation, New Delhi visited this Institute on September 24, 1999. The trainees were exposed to the latest statistical and research activities of IASRI including Biometrics, Sample Surveys, Design of Experiments, Crop Forecasting, Statistical Economics, Computer Applications etc.

Training programme for B.Sc. (Agril.Engg.) students of Tamil Nadu Agricultural University, Coimbatore was also organised during the year.

Research Fellowships

During 1999-2000, 23 M.Sc. and 12 Ph.D. students received research fellowship. 11 M.Sc. students received Junior Research Fellowship @ Rs.3600/- p.m. each besides Rs.6000/- per annum as contingent grant. Twelve M. Sc. students received IARI Junior Scholarship @ Rs.3200/- p.m. each besides Rs.6000/- per annum as contingent grant. 10 Ph.D. students received IARI Senior Scholarship @ Rs.4400/- p.m. in addition to Rs.10,000/- per annum as contingent grant and 2 Ph.D. students selected under Faculty upgradation and ICAR in-service nominee scheme(s) received IARI scholarship @ Rs.1000/- p.m. in addition to Rs.10,000/- per annum as contingent grant.



A Valedictory function of the training programme on Advanced Statistical Techniques in Research for Crop and Animal Improvement

Two Ph.D students namely S/Sh S. Ravichandran and Dhekale Janardan Sharmrao were awarded CSO fellowship @ Rs. 6000/- p.m. each besides Rs 15000/- per annum as contingent grant .

Faculty members of P.G.School, IARI in Agricultural Statistics

1. Dr.A.K.Srivastava, Joint Director
2. Dr.Prajneshu,Principal Scientist
3. Dr.H.V.L.Bathla, Principal Scientist
4. Dr.Randhir Singh, Principal Scientist
5. Dr.V.K.Sharma, Professor (Ag.Stat)
6. Dr.Ranjana Agarwal, Principal Scientist
7. Dr.V.T.Prabhakaran, Principal Scientist
8. Dr.V.K.Gupta, Principal Scientist
9. Dr.B.C.Saxena, Senior Scientist
10. Dr.D.P.Handa, Senior Scientist
11. Dr.V.K.Bhatia, Senior Scientist
12. Mrs.Asha Saxena, Senior Scientist
13. Dr.D.L.Ahuja, Senior Scientist
14. Dr.U.C.Sud, Senior Scientist
15. Dr.Chandrahas, Senior Scientist
16. Sh.S.D.Wahi, Senior Scientist
17. Dr.K.K.Tyagi, Senior Scientist
18. Dr.P.K.Batra, Senior Scientist
19. Dr.P.S.Rana, Senior Scientist
20. Dr.R.Srivastava, Senior Scientist
21. Dr.Jagbir Singh, Senior Scientist
22. Dr.M.S.Narang, Senior Scientist
23. Dr.Aloke Lahiri, Senior Scientist
24. Dr.Anil Rai, Senior Scientist
25. Dr.Seema Jaggi, Scientist (Sr. Scale)
26. Dr.Rajender Parsad, Scientist (Sr. Scale)
27. Dr.Lal Mohan Bhar, Scientist
28. Dr. Amrit Kumar Paul, Scientist
29. Dr. Tauqueer Ahmed, Scientist
30. Dr. A.R.Rao, Scientist
31. Dr.Somy Kuriakose, Scientist
32. Dr.Ramasubramanian V., Scientist
33. Dr.Girish Kumar Jha, Scientist

Faculty members of P.G. School, IARI in Computer Application

1. Prof. S.D.Sharma, Director
2. Dr.P.K.Malhotra, Professor (Computer Application)
3. Dr. R.C.Goyal, Principal Scientist
4. Sh.Mahesh Kumar, Senior Scientist
5. Dr.I.C.Sethi, Senior Scientist
6. Dr.V.K.Mahajan, Senior Scientist
7. Dr.D.K.Agarwal, Senior Scientist
8. Dr. R.K. Jain , Senior Scientist
9. Sh.Harnam Singh Sikarwar, Scientist. (Sr. Scale)

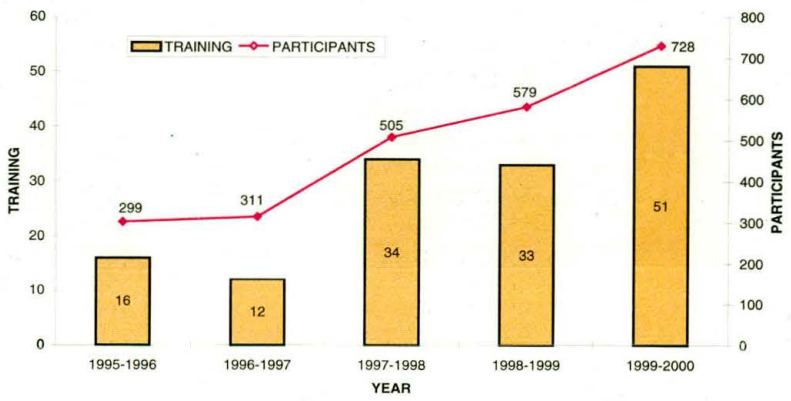
Faculty member of P.G. School, IARI in Agricultural Economics working in IASRI

Dr.R.K.Pandey, Principal Scientist

Faculty member of P.G. School, IARI in Agricultural Statistics working in Agricultural Economics Division

Dr.Amrit Kumar Vasisht, Sr. Scientist (Ag.Econ.)

TRAINING COURSES ORGANISED FROM 1995-96 TO 1999-2000



AWARDS AND RECOGNITIONS

AWARDS

- Dr. V.K. Bhatia, Senior Scientist awarded Best Teacher Award – 1998 from the P.G. School, IARI, New Delhi in the form of Cash prize of Rs. 10000/- and Certificate of merit for the excellance in teaching the discipline of Agricultural Statistics on April 15, 1999.

- Dr. V. K. Gupta, Principal Scientist & Head of Design of Experiments awarded Best Teacher Award –1999 in the form of Cash prize of Rs. 10000/- and Certificate of merit for the excellence in teaching in the discipline of Agricultural Statistics of P.G. School, Indian Agricultural Research Institute (IARI), New Delhi on March 03, 2000.

- Dr. Rajender Parsad, Scientist has received Appreciation letter from Dean, P.G. School, IARI for excellent teacher - 1999 in the discipline of Agricultural Statistics.

RECOGNITIONS

(a) Membership of Scientific Societies

Indian Society of Agricultural Statistics, New Delhi

Prof SD Sharma
Dr AK Srivastava
Dr RK Pandey
Dr Prajneshu
Dr VK Gupta
Dr HVL Bathla
Dr PK Malhotra
Dr VK Sharma
Dr Randhir Singh
Dr VK Bhatia
Sh Lal Chand
Sh SD Wahi
Dr SP Bhardwaj
Dr VK Mahajan
Dr Chandrahas,
Dr DL Ahuja
Dr KK Tyagi
Dr UC Sud
Sh RS Khatri
Sh AS Gupta
Dr Jagbir Singh
Dr GC Chawla
Dr DP Handa
Sh. JK Kapoor
Dr R Srivastava
Dr PK Batra
Dr MS Narang
Dr Aloke Lahiri
Sh HC Gupta
Sh JP Goyal
Sh DC Mathur
Smt Rajinder Kaur
Sh SC Mehta
Sh Madan Mohan
Sh Tribhuwan Rai
Sh SC Sethi
Sh DK Bhatia
Sh Satya Pal
Sh VK Jain
Sh GL Khurana
Smt. Ajit Kaur Bhatia
Sh. NK Sharma
Sh Balbir Singh
Dr Rajender Parsad
Dr Seema Jaggi
Dr LM Bhar
Dr AK Paul
Dr AR Rao
Dr Ramasubramanian V
Dr Cini Varghese
Ms Mini KG
Sh VH Gupta
Sh Rajendra Kumar
Sh KK Kher
Sh RM Sood
Dr Anil Rai
Dr Tauqeer Ahmed
Sh AK Gupta
Sh AK Mogha

Society of Statistics, Computer and Applications, New Delhi

Prof SD Sharma
Dr VK Gupta
Dr VK Sharma
Dr (Mrs) Ranjana Agrawal
Dr VK Bhatia
Smt Asha Saksena
Dr Aloke Lahiri
Sh MR Vats
Dr Rajender Parsad
Dr Seema Jaggi
Dr Somy Kuriakose
Dr Ramasubramanian V
Dr AR Rao
Ms Mini KG
Dr Cini Varghese
Ms Sonali Das

Indian Society of Agricultural Sciences, New Delhi

Dr VK Bhatia
Dr Chandrahas
Dr GC Chawla
Sh T Rai
Sh Satya Pal
Sh VK Jain
Sh GL Khurana
Smt. Ajit Kaur Bhatia
Sh HS Sikarwar
Dr Rajender Parsad
Sh Rajendra Kumar

Indian Science Congress Association, Calcutta

Prof SD Sharma
Dr BC Saxena
Dr GC Chawla
Dr Rajender Parsad
Dr Seema Jaggi

Indian Society of Agricultural Economics, Bombay

Mrs Sushila Kaul

Indian Society of Agricultural Marketing, Nagpur

Dr RK Pandey
Mrs Sushila Kaul

Computer Society of India, Bombay

Prof SD Sharma
Dr PK Malhotra
Sh Mahesh Kumar
Dr RC Goyal

Indian Statistical Association, Pune

Dr GC Chawla

Indian Econometric Society, New Delhi

Dr VK Sharma

Agricultural Economics Research Association, New Delhi

Dr VK Sharma

Indian Society for Medical Statistics, New Delhi

Dr Jagbir Singh

Acta Ciencia Indica, Meerut

Dr PS Rana

Society of Mathematical Sciences, Delhi

Dr Prajneshu

Farming System Research and Development Association , Modipuram , Meerut

Smt Rajinder Kaur
Smt Ajit Kaur Bhatia

(b) Offices in Professional Societies

Indian Society of Agricultural Statistics, New Delhi		
Prof. SD Sharma	Secretary	Executive Council
Dr AK Srivastava Dr VK Bhatia Sh RS Khatri	Joint Secretary	Executive Council
Dr HVL Bathla Dr VK Gupta Dr PK Malhotra Dr VK Sharma	Member	Executive Council
Prof SD Sharma Dr AK Srivastava Dr Prajneshu Dr VK Gupta Dr Randhir Singh Dr VK Bhatia	Member	Editorial Board
Society of Statistics, Computer and Applications, New Delhi		
Prof SD Sharma	(i) Vice President (ii) Member of the Executive Council	
Dr VK Gupta	(i) Managing Editor (ii) Member of the Executive Council.	
Dr Aloke Lahiri	Joint Secretary	
Indian Society of Agricultural Marketing, Nagpur		
Dr RK Pandey	Vice President	

LINKAGES AND COLLABORATION IN INDIA AND ABROAD INCLUDING EXTERNALLY FUNDED PROJECTS

Sl. No.	Title	Collaborative Agency	Start	Completion
1.	Sample survey to evolve methodology for estimation of fish catch from rivers and streams especially of the hilly areas.	Department of Fisheries, Himachal Pradesh	01.11.1997	30.06.2000
2.	Pilot sample survey for estimating the area and yield rates of ginger and potato in hilly areas.	Directorate of Economics & Statistics, Meghalaya, Shillong.	01.01.1997	30.06.2000
3.	Use of remote sensing technology in crop yield estimation surveys.	IIRS, Dehradun	01.04.1995	31.05.1999
4.	Use of Remote Sensing satellite data in crop surveys. (A.P. Cess Fund).		01.10.1996	31.03.2000
5.	Study of land use statistics through integrated modelling using geographic information system. (A.P. Cess Fund)	AIS & LUS, Ministry of Agriculture	01.09.1999	31.08.2002
6.	A pilot study on cost of production of Coconut in Kerala. (Funded from Coconut Development Board, Kochi, Kerala)	Central Plantation Crops Research Institute, Kasaragod (Kerala)	Approved	
7.	Sampling procedure for selection of representative samples of fertiliser from ships. (A.P. Cess Fund)	Central Fertiliser Quality Control & Training Institute, Faridabad	Approved	
8.	A study relating to formulating long term machanisation strategy for each agro-climatic zone/State (Funded from Department of Agriculture and Cooperation, Ministry of Agriculture)		Approved	
9.	Estimation of wool production - emerging data needs and a methodological reappraisal. (A.P. Cess Fund)	CSWRI, Avikanagar (Rajasthan)	Submitted	

Sl. No.	Title	Collaborative Agency	Start	Completion
10.	Assessment of harvest and post-harvest losses. (To be funded under NATP Mission Mode Programme).	▪ CIPHET, Ludhiana ▪ NDRI, Karnal ▪ CSWRI, Avikanagar ▪ IVRI, Izatnagar ▪ CARI, Izatnagar ▪ CIFT, Cochin ▪ GB Pant University of Agri. & Tech., Pant Nagar	Submitted	
11.	Digitisation of databases. (Submitted as Cooperating Centre for NATP funding) .	NBSS & LUP, Nagpur	Submitted	
12.	Crop yield estimation of smaller area level using farmers' estimates (A small study taken in district Karnal).	Department of Agriculture, Haryana		
13.	Reduction of post-harvest losses-NATP project (Associated as Cooperating Centre).	CIPHET, Ludhiana	Submitted	
14.	Designs for fitting response surfaces in Agricultural Experiments. (A.P.Cess Fund)		Feb., 1999	Jan., 2001
15.	Evaluation of Fatigue Score Card for Camels	KVK Rewari under the aegis of AICRP on Utilisation of Animal Energy.		
16.	Planning, designing and statistical analysis of data relating to experiments conducted under AICRP on Long-Term Fertilizer Experiments	Project Coordinator (LTFE) and State Agricultural Universities	April, 1997	Continuing
17.	Planning, designing and analysis of on-farm research experiments planned under the PDCSR	Directorate of Cropping Systems Research, Modipuram, Meerut	April, 1997	Continuing
18.	Planning, designing and analysis of experiments planned on stations under the PDCSR	Directorate of Cropping Systems Research, Modipuram, Meerut	April, 1997	Continuing
19.	Planning, designing and analysis of experiments relating to AICRP on Soil test crop response correlation	Project Coordinator (STCR), Indian Institute of Soil Science (ICAR), Bhopal	March, 2000	Feb., 2003

Sl. No.	Title	Collaborative Agency	Start	Completion
20.	Design and analysis of Agroforestry Experiments	IGFRI, Jhansi	March, 2000	Feb., 2002
21.	Crop Forecasting models	AICRPAM, Hyderabad		
22.	Forecasting sugarcane yield.	Sugarcane breeding Institute, Coimbatore.		
23.	Pilot study on forecasting of brood-lac yield from Butea, Monosperma (palas).	I.L.R.I, Ranchi,	Oct., 1999	Sept., 2002
24.	Development of forewarning system for aphids, myzus persicae (sulzer) on potato.	NCIPM, New Delhi & AICPIP, Shimla	May, 1996	April, 2000
25.	Studies on bioecology and population dynamics of major pests of mango (hoppers, fruitfly, leaf webber and inflorescence midge) and guava (fruit borer).	CISH, Lucknow	Oct., 1999	March, 2004
26.	Epidemiology and forecasting of powdery mildew and anthracnose.	CISH, Lucknow	Oct., 1999	---
27.	To develop model of forewarning about infestation of insects for paddy crop.	N. D. Univ. of Agri. & Tech., Kumarganj, Faizabad	1.11.1999	Oct., 2002

RESEARCH COORDINATION AND MANAGEMENT UNIT

Research Coordination and Management Unit (RCMU) is responsible for documentation and dissemination of scientific output of the Institute through IASRI News and Annual Report etc. It also organises National Conferences of Agricultural Research Statisticians once in three years and conducts meetings of Heads of Divisions and Principal Scientists of the Institute from time to time. The Unit also assists the QRT and is responsible for correspondence with ICAR, ICAR Institutes, SAUs and other organisations in India and abroad. The other functions of the unit are: to examine the new Research Project proposals before these are considered by the SRC in respect of importance of problems, 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 Milestone, EFC Memo, to maintain the Research Project Files and also their submission to ARIC (ICAR). The Unit also provides help in Art, Photography & Reprographic Services.

The following activities were undertaken by the Unit during the year under report:

Publications:

- Annual Report of the Institute for the year 1998-99
  Compiled & edited by HVL Bathla, PP Singh and J Srinivasan
- IASRI News, Vol. 3, No. 3, Oct.- Dec., 1998
  Compiled & edited by HVL Bathla, PP Singh, J Srinivasan, Maharaj Swaroop, Som Dutt, and OP Singh
- IASRI News, Vol. 3, No.4, Jan.–Mar., 1999
  Compiled & edited by HVL Bathla, PP Singh, J Srinivasan, Maharaj Swaroop, Som Dutt and OP Singh
- IASRI News, Vol. 4, No. 1, Apr.–Jun., 1999
  Compiled & edited by AK Srivastava,DK Agarwal, PP Singh,, J Srinivasan, Maharaj Swaroop, Som Dutt and OP Singh
- IASRI News, Vol. 4, No. 2, Jul.– Sep., 1999
  Compiled & edited by AK Srivastava, DK Agarwal, PP Singh,, J Srinivasan, Maharaj Swaroop, Som Dutt and OP Singh
- IASRI News, Vol. 4, No.3, Oct.– Dec., 1999
  Compiled & edited by AK Srivastava, DK Agarwal, PP Singh,, J Srinivasan, Maharaj Swaroop, Som Dutt and OP Singh
- Draft proceedings of XII National Conference of Agricultural Research Statisticians held at RCA, Udaipur (Rajasthan) during Aug. 08-10, 1998
  Compiled & edited by HVL Bathla, PP Singh and J Srinivasan
- Monitoring Progress Reports for ending Mar., 1999 and Sep., 1999
- Proceedings of Staff Research Council Meetings held on Jul .28-30 1999, and Feb. 18-19, 2000

Communication of Research Material to:

ICAR

- Material for preparation of DARE-ICAR Annual Report for the year 1999-2000
- Contents for a paper entitled 'Development of Agricultural Statistics and Computer Applications' for the publication of "50 years of Agricultural Engineering Research" to be brought out by the Agricultural Engineering Division of the Council
- Present status of the points of action required on recommendation of PM's Council on Trade & Industry and the special subject group in Food & Agro Industries Management Policy set up
- Reply of audit para regarding the Quinquennial Review Team (QRT) of the Institute .
- Reply of audit memo regarding the research project of the Institute.
- Material regarding results/innovation in the field of research, education and training during 1998-99
- Action taken report on the proceedings of the meeting of Directors of ICAR Institutes held on Oct 7-8, 1998 and agenda items for the proposed Directors' meeting held on Sep 7-8, 1999
- Material along with summary for presentation to Director General, ICAR regarding the contribution of the Institute towards the growth of National Agricultural Research System (NARS) during his visit to the Institute
- Follow-up action taken report of the proceedings of the Directors' Conference held at NBPGR, New Delhi on September 7-8, 1999.
- Paper entitled "Fifty years of Research in Agricultural Statistics and Computer Application at IASRI" for the publication of "50 years of Agricultural Engineering Research" brought out by the Agricultural Engineering Division of the Council.
- Monthly progress report on Presidents Address to Parliament
- Information on field Research Stations of the Institute
- Information about video film available at this Institute.
- List of Institutes/Organisations in India and abroad for availing sabbatical leave by scientists
- IX Plan EFC Memo of the Institute
- Information on introduction of Zero Base Budgeting in DARE/ICAR w.e.f. 2000-2001
- One time catch-up grant of the Institute

Information Supplied to other Organizations in India

INSDOC, New Delhi

- Updating the Directory of scientific research institution in India in 1994
- Questionnaire on National S&T translation requirements of the nation eliciting the views of various aspects related to translator
- Questionnaire for preparation of compendium on intramural R&D projects in the country

Department of Science & Technology, Ministry of Science and Technology, New Delhi

- Questionnaire on National Survey on resources devoted to scientific and technological (S&T) activities 1998-99 edition

Department of Statistics, Ministry of Planning and Programme Implementation, New Delhi

- List of resource persons with their field of specialisation for creation of a roaster of resource persons

Indian Association of Social Science Institutions (IASSI), New Delhi

- Questionnaire on the development of a register of member Institutions

Directorate of Extension, Ministry of Agriculture, New Delhi

- Information regarding procurement of video films on agriculture and related subject

Information supplied to Abroad

- Activities of the Institute to Prof DJ Finney, Emeritus Professor, UK
- International Research Centres Directory to the Gale Group Michigan, USA

Meetings organised

- Six meetings of Head of Divisions of the Institute were organised to discuss various items related to research, training, education, general matters etc. on May 03, July 21, Sept 02, Jan 01, 06, 2000, and Feb 24, 2000
- One meeting of HDs with Dr Mruthyunjaya, ADG (ES&M) was organised on May 13, 1999

Research Advisory Committee (RAC)

- Fourth Research Advisory Committee (RAC) meeting of the Institute was held on Aug 31, 1999 under the Chairmanship of Sh VR Rao, Former Director General, CSO, New Delhi.
- Preparation of agenda items for the fourth RAC meeting & supplying to all Members of the Committee.
- Preparation of Proceedings of the fourth RAC meeting of the Institute held on Aug 31, 1999.

Staff Research Council (SRC)

- Two meetings of the Staff Research Council (SRC) were held during July 28-30, 1999 and Feb. 18-19, 2000.

Consultancy Processing Cell (CPC)

- Three meetings were organised on Nov 24, 1999, Jan 22, 2000 and Feb 5, 2000.
- Information on all types of resource generation programme undertaken by the Institute during the period April 01, 1998 to March 31, 1999 prepared and sent to ICAR.
- Action taken report of the proceedings of the meeting of HDs with ADG (ES&M) held at IASRI on May 13, 1999 regarding difficulties being faced in implementing the guidelines given by the Council in the document on training, consultancy, contract research and contract service in ICAR system was prepared and sent to ICAR
- A brief note on the problems being faced during the implementation of Johl Committee Report on training, consultancy, contract research and contract service was prepared for discussion in the High Powered Advisory Committee Meeting held on March 1, 2000 with DG, ICAR

In addition to the above, the following items were also undertaken:

- Preparation of the proceedings of all the HDs/PS meetings
- Supplying the information about training programmes/research activities received from ICAR and various organisations from

time to time among the HDs and Principal Scientists of the Institute

- Proposals for deputation of scientists of the Institute for various conferences
- Material of Research Coordination Management Unit along with its slides for presentation during Director General's visit to the Institute
- Information for preparation of Organisational Chart of the Institute for displaying in the Committee Room
- Brief life sketch and contribution of Dr VG Panse in the field of Agricultural Statistics sent to Dr SP Deshpande, Mumbai

Art, Photography and Reprography

Assisted the scientists in preparing diagrams, charts, histograms and maps for research publications and also visual display of research findings in the exhibition room. It also assisted in transcribing the lectures write-ups on transparencies.

Photographic jobs including exposing, processing and printing of about 600 photographs taken on various important occasions of important research and extension activities of the Institute and some slides were prepared. In addition, enlargement of good number of photographs was also done.

The charts and graphs were up-dated in the light of recent research findings for display in the exhibition room. A number of new charts were also added to the existing ones depicting current research findings. Photographs taken at the special occasions were also displayed. Latest publications were also added.

On Gestetner Copy Printer 5327 machine installed at the unit lab about 4.5 lakh copies of 6339 pages for 194 jobs were multicopied and supplied to various users of the Institute.

GENERAL / MISCELLANEOUS

LIST OF PUBLICATIONS

(a) Papers Published

1. AGRAWAL, RANJANA *(1999).* कृषि अर्थव्यवस्था के उदारीकरण के संदर्भ में सांख्यिकी अनुसंधान एवं शिक्षा आयाम व दिशायें। *Proccedings of National seminar on कृषि अर्थव्यवस्था के उदारीकरण के संदर्भ में सांख्यिकी.*

2. BAJPAI, P.K.; PRABHAKARAN, V.T. ; KUMAR, RAJESH and SIKARWAR, H.S. (1999) Simultaneous selection of high yielding and stable crop genotypes, *Indian Journal of Sugarcane Technology 13(1):1-5, June 1998*

3. BHARDWAJ, S.P.(1999) Role of environmental statistics in the growth and development of agriculture. *Proceedings of National Symposium on agriculture environment and forest towards reconcilation held at CARI, Port Blair.*

4. BHARDWAJ, SP (1999). Marketing of poultry products: concepts and related issues, *Ind. J. of Agril. Marketing,* 13(2):113-121.

5. CHAWLA, G.C. and RAI, T. (2000). Use of basic inferantion statistical tools in animal experimantation . An abstract published in *J of Indian Society of Agricultural Statistics 53: 70.*

6. DAS, M.N. and LAHIRI, ALOKE (1999). Multivariate analysis of data from agricultural experiments, *Proceedings of 1st Annual Conference of Society of Statistics and Computer Application pp. 107-113*

7. DAS, M.N.; PARSAD, RAJENDER and MANOCHA, VP(1999). Response surface designs, symmetrical and asymmetrical rotatable and modified. *Statistics and Applications, 1(1):17-34.*

8. GUPTA, VK; DVV RAMANA and PARSAD, RAJENDER (1999). Weighted A-efficiency of block designs for making treatment – control and treatment – treatment comparisons *J. Statistical Planning and Inference,* 77 : 301-319.

9. HANDA D.P. and KUMAR ASHOK (1998). Crop-Weather modelling on Maize Fodder *Mausam: 401-402.*

10. JAGGI, SEEMA; PARSAD, RAJENDER and GUPTA, VK (1999). Construction of non-proper balanced bipertite block designs. *Cal. Statist. Assoc. Bull,* 49 (March-June): 55-63.

11. KIRESURE, V; PANDEY, RK and MRUTHYUNJAYA (1999). Determinants of adoption of modern sorghum production technology: Experience of Karnataka state, *Ind. J. of Agril. Economics*, 54(2):155-168.

12. KUMAR, ASHOK (1999). Role of micro-irrigation systems in food production and environment. *Proceedings of National Symposium on Agriculture, Environment and Forest Reconcilation : 99-101.*

13. LAHIRI, ALOKE (1999). Sampling schemes by combining two or more sample spaces. *Statistics and Applications, 1(1):63-71.*

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2. BAJPAI, P.K. and PRABHAKARAN, V.T. (2000) - A new procedure of simultaneous selection for high yielding and stable crop genotypes. *Ind.J.Genet.*

3. BATRA P.K..; PARSAD RAJENDER; GUPTA V.K. and KHANDURI O.P. A strategy for analysis of experiments involving split application of fertilizer. *Statistics and Applications vol.1(2).*

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(c) Research Project Reports

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1. Agricultural Research Data Book 1999 prepared *by Indian Agricultural Statistics Research Institute and Computer Centre, ICAR.*

2. A sampling study on utilisation of cross bred working animals vis-a-vis non-descripts, Kathua (J&K) (1999) by *JP Goyal, RS Khatri and KB Singh.*

3. An analysis of yield gap for buffaloe milk (1999) by *Satya Pal, R.M. Sood and T. Rai.*

4. A study of variance estimation in Complex Surveys (1999) by *V.P.N. Singh, Anil Rai and V.K. Jain.*

5. Survey methodology to study economics of keeping goats (1998) by *R.L. Rustogi and S.C. Agrawal.*

6. Study of designs for two or more sets of treatments applied at different periods of experimentation (1999) by *Seema Jaggi, R. Srivastava and V.K. Gupta.*

7. Yardsticks of additional production of oilseeds and pulses from the combined application of fertilizer (1999) by *C.H. Rao, Seema Jaggi and G.L. Khurana.*

8. Some statistical studies relating to design and analysis of experiments involving fixed quantity of inputs (1999) by *P.K. Batra, Rajender Parsad and O.P. Khanduri.*

9. Balanced Incomplete Block designs with nested rows and columns (1999) by *P.R. Sreenath.*

10. Construction of efficient plans for asymmetrical factorial experiments (1999) by *D.P. Handa and P.R. Sreenath.*

11. Methodological investigation in predicting fertilizer response using soil test values and other site variables (1999) by *Aloke Lahiri , D. K. Mahta, N.K. Sharma and S.M.G. Saran*

12. Cataloguing and constructions of variance balanced block designs (1998) by *Rajender Parsad, V.K. Gupta and O.P. Khanduri*

13. Studies on optimality of Block designs for making test-treatment-control comparisons (1999) by *R. Srivastava, V. K. Gupta and Rajender Parsad*

14. Study of contagious distributions and dynamical models for aphid population growth (1999) by *Prajneshu*

15. Yield forecast based on weather variables and agricultural inputs on agro-climatic zone basis (1999) *by Ranjana Agrawal; RC, Jain and SC, Mehta.*

16. Models for studying effects of flood on crop yield. (1999) by *Jagmohan Singh, B.H. Singh and Ranjana Agrawal*

17. कृषि अर्थव्यवस्था के उदारी करण के संदर्भ में सांख्यिकी Symposium proceedings (1999) by *R.K. Pandey, Ranjana Agrawal, V.K. Gupta and A.P. Singh.*

18. Estimation of Farm Level Technical Efficiency and its Related Parameters Under Error Decomposition Methodology of Stochastic Frontier Model in the Production of Wheat (1999) by *S.S. Kutaula and R.K. Pandey.*

19. A Study of Production Efficiency and Resource Use in Poultry Production (1999) by *S.P. Bhardwaj, V.K. Mahajan and R.K. Pandey.*

Finalised

1. Small area estimation of milk production by *D.K. Bhatia, S.N. Arya and H.C. Gupta*

2. Estimation of flow and change in dynamic population by *Jagbir Singh*

3. To study the effect of various input components on the yield of important vegetable crops by *A.K. Gupta*

4. Agricultural Experiments Information system for Animal Science by *G.C. Chawla*

Dissertations Approved

Ph.D. (Agricultural Statistics)

1. CINI VARGHESE - *A Study of Experimental Designs Involving Sequences of Treatments*

Designs in which each experimental unit receives some or all of the treatments, one at a time, over a period of time are called designs involving sequences of treatments or simply change-over designs(CODs). The distinguishing feature of these designs is that the treatments applied in a particular period influences the responses of the experimental unit not only in that period but also leaves residual effects in the succeeding periods. A critical review of the past work done in this area is provided. A method of construction along with analysis for a new series of totally balanced change-over designs which require v experimental units for 2v-1 periods if v treatments are to be tested, has been given. These designs are of immense value when the experimenter wants equal precision for all the treatment effects (direct and residual). The efficiency of the proposed designs has been compared with some of the existing designs which indicated that the proposed designs are more efficient than the existing ones especially for the estimation of the residual effects of the treatments. In this dissertation, It has been proved that a circular completely balanced COD, whenever it exists, is universally optimal for the estimation of direct, first order and second order residual effects of treatments. Using this result, a class of circular completely balanced CODs with parameters (v, p = 3v, n = v^2; v, p and n represent the number of treatments, the number of periods and number of units, respectively) obtained by adding two pre-periods in which the treatments in the first pre-period are exactly the same as those in the last but one period and the treatments in the second pre-period are the treatments of the last period, was shown to be universally optimal. Furthermore, another class of circular CODs satisfying a given set of conditions was proved to be universally optimal for the estimation of direct, first order and second order residual effects of treatments. A series of circular CODs obtained by adding two pre-periods as mentioned earlier to a complete set of mutually orthogonal latin squares with rows representing periods and columns, the experimental units, is found to be universally optimal in the class of designs with parameters [v, p = v, n = v(v-1)]. Some classes of CODs balanced for first order residual effects of the treatments have been

identified as universally optimal by making slight modifications to them. Using efficiency criterion, the robustness of a class of CODs against last missing observation on a unit has been studied. Further, the programs developed in C-language and SAS software package gives the harmonic mean of the eigen values of the original as well as the residual designs for any class of CODs with parameters (v, p, n), for α (α = 1,2,...,p-1) missing observations on a unit. Several modifications of William square design were made and it was observed that all these alterations are better than the original William square setup when there are some missing observations. All these designs remain connected even after the missing observations. Using this program, robustness of the totally balanced has also been investigated, and it is observed that these designs are highly robust for small number of missing observations and as the number of treatments increases these designs are robust even for p-1 missing observations on a unit. Again, robustness status of a large number of existing change-over designs has been studied using the program. These designs remain connected after the missing observations also. A catalogue of efficiencies of these designs along with their layouts has been prepared for the ready use of the experimenter. Some two-treatment designs were also considered for the robustness study and very few of them are observed to be robust against one missing observation.

(Guide: Dr. VK Sharma)

2. P.K. BAJPAI - ***Some contributions to improved estimation of Genotype X Environment Interaction and analysis of Genotypic Stability with Special Reference to Sugarcane Crop***

Multilocation trials play an important role in the testing of G.E. interaction and environmental adaptability of new varieties Genotypes are selected on the basis of trials. An accurate and efficient assessment of G.E. interaction is very essential for determining the yield potential and stability characteristics of the different genotypes more accurately and finally selecting suitable genotypes for large scale propagation.

Additive Main effects and Multiplicative Interaction Model (AMMI) and Best Linear Unbiased Prediction Model (BLUP) were used in the study of the GxE interaction in important sugarcane traits viz. Cane yield, commercial cane sugar (ccs) and Sucrose in the both plant and ratoon and the results compared models are evaluated based on the 'post-dictive' and predictive assessment criteria it is found that BLUP is at par with AMMI Assessment by joint regression analysis is clearly unsuitable for the case involving large non-linear interactions as it's performance in this case is poor as compared to AMMI or BLUP. The estimation efficiency of proposed IMAMMI, Fitcon, modified regression techniques as well as by using the latest technique of AMMI for incomplete GxE data are compared. It is concluded that proposed method is performing better than others Procedures for selecting genotypes simultaneously for high yield and stability have been examined and three new indices proposed. The proposed indices are performing very well in the sense that they are succeeding in identifying stable and high yielding genotypes higher than possible with Kang's index, stability analysis for several traits is accomplished through MANOVA.

(Guide : Dr VT Prabhakaran)

3. SOMY KURIAKOSE - ***A Study on Balanced and Partially Balanced Incomplete Block Designs***

Careful experimentation and making inferences are two essential components of any scientific investigation. An appropriate design of experiment serves as a device of collecting data on the items of interest of the experimenter and permits to carry out the analysis. In comparative experiments it is generally assumed that comparisons among all treatments are of equal importance. Bur there are many experimental situations, where the

experimenter is interested in only a subset of comparisons among them. Such problems mainly arises in many agricultural, biological and industrial experiments.

The concept of Group Divisible Treatment Designs for comparing two disjoint sets of treatments are given. These designs are balanced w.r.to test treatment control comparisons and partially balanced for test treatment comaprisons. The A-optimality of these designs are studied. Some necessary and sufficient condition for obtaining these designs for comparing v_1 test treatments with v_2 control treatments for block size two is given. A-optimal designs are obtained for this case. A - efficient designs are also obtained for $4 < v1 < 15$, $1 < v2 < 5$ and a catalogue of these designs are prepared. Plant and animal breeders often require information regarding the general combining ablities and specific combining abilities of various inbred lines . Diallel cross designs are mainly used for this purpose. The A- optimality of diallel cross designs , in which there are p+1 lines of which one is primary nature and remaining p lines are of secondary nature are studied. Such design are defined as Augmented Diallel cross (ADC) Designs and are balanced with respect to comparisons between primary line and secondary lines and within secondary lines. Some methods of construction of ADC designs are obtained. The A - efficiencies of these design are computed. The designs with A- efficiency equal to one are said to be A- optimal. A catalogue of these designs is prepared . It is observed that all the ADC designs constructed perform well under A- optimality criterion and have A-efficiencies greater than 0.90. Design for factorial experiments and incomplete block designs are two main branches in the field of design of experiments. Usually they are treated as different topics . But we can relate the combinatroics of factorial experiments and incomplete block designs . From a Main Effect Plan (MEP) of s^n factorial experiment, we can obtain Semi-Regular Group Divisible designs with two associate classes . Some new designs are also obtained which are not available in the literature .A catlouge of the designs obtained is also prepared . Using symmetrical and asymmetrical MEPs several design for compairing test treatments with control treatment (s) are also obtained .

(Guide: Dr.RC.Jain)

M.Sc. (Agricultural Statistics)

1. ABHISHEK RATHORE - *Nonlinear Modelling for Forecasting Fish Production from Ponds*

The need for forecasting a fish catch for formulating the fishery development program is well recognized. Forecast of pond fish is greatly needed for various reasons. It will be helpful for research purpose as well as or economic policies makers. Inland fish production constitutes 40% of total fish production in India. Hence, in view of its economic importance as well as setting up of World Trade Organisation (WTO), it is highly desirable to access the current status of fishery resources to know whether these have been actually under - exploited or over exploited. Previously research workders used Ordinary Least Squares technique to develop appropriate models for forecasting of fish growth from ponds. They have not considered presence of heteroscedasticity and autocorrelation in errors.

In the present research work we considered presence of heteroscedasticity and autocorrelation in data. We fitted model in three different ways i.e. considering autocorrelation, considering heteroscedasticity, and both together. We developed models for three species of fish each for two ponds. We first calculated parameters estimates for autocorrelated error structure and than for heteroscedastic error structure and finally for both. Results obtained from these fittings were very much satisfactory than those obtained from Ordinary Least Squares.

(Guide: Dr.RC Jain)

2. HEMANT KUMAR - *Design and Analysis of Experiments with Mixtures in Feeding Trials*

In this investigation an analogy has been established between the feeding trials were fixed dose of feed is prepared using various as a combinations of feeds obtained from the different sources and Experiments with Mixtures. Different sources of feed have been considered, as ingredients of mixture and proportion of feed from that particular source as mixture proportion, corresponding to that ingredients.

Data and Results of such feeding trials were extracted from compendia volumes of National Index of Animal Experiments (1980-85). A total of nine experiments have been extracted. Out of these, in six experiments feed or nutrients are based on two ingredients and in three experiments feed are based on three ingredients.

Data on these experiments have been analysed using the canonical polynomial of Scheffe (1958). The linear, restricted and / or full quadratic canonical polynomials have been fitted for feeding trials with two ingredients and three ingredients. The models were selected on the basis of adjusted multiple correlation coefficient (R^2_A), coefficient of determination (R^2) and smallest value of standard error of estimated response. Further this analysis gives relative importance of ingredients, synergistic and antagonistic behaviour of various sources of feeds, which was not possible with the analytical procedures of Complete Randomised Design (CRD), Randomised Block Design (RBD), also we can predict response at a combination which has not been included in the selected model.

Sometimes it is not possible to explore the total ranges for al the components. Also, in certain experimental situations there may be one or more factor(s) which is (are) not be the component of mixture but influence the response of mixture, these type of factor(s) is (are) called process variable(s).

A method of construction of Restricted Region Simplex Designs (RRSD) in the presence of process variables when upper bound is imposed on one of the components of mixtures have been given through Response Surface Designs with equispaced doses. The method of construction has been illustrated with the help of some examples.

(Guide: Dr. GC Chawla)

LIST OF APPROVED ON-GOING PROJECTS

S. No.	Project title	Project leader and associates
	Poultry meat production	
1.	Pilot sample survey to develop a sampling methodology for estimation of poultry meat production.	Mahender Singh
	Inland fish catch estimation	
2.	Sample survey to evolve methodology for estimation of fish catch from rivers or streams of the hilly areas	HVL Bathla KK Kher AK Gupta
	Production and area estimation	
3.	A study for estimation of area and production of important vegetable crops on the basis of partial harvest	AK Srivastava DL Ahuja DC Mathur K Chug
4.	Pilot sample survey for estimating the area and yield rates of ginger and potato in hilly areas.	SS Gupta MS Narang RC Gola
	Assessment and evaluation studies	
5.	Estimation of flow and change in dynamic populations	Jagbir Singh
6.	To study the effect of various input components on the yield of important vegetable crops	AK Gupta
	Remote sensing and Geographic Information System	
7.	Use of remote sensing technology in crop yield estimation surveys	Randhir Singh RC Goyal
8.	Use of remote sensing satellite data in crop surveys (Funded by ICAR AP Cess fund)	Randhir Singh RC Goyal
9.	Study of Land Use Statistics through integrated modelling using Geographic Information System (Funded by ICAR AP Cess fund)	Anil Rai AK Srivastava Randhir Singh HC Gupta VK Jain
	Cropping Systems Research	
10.	Planning, designing and analysis of experiments planned on stations under the Project Directorate of Cropping Systems Research	Rajinder Kaur Ajit Kaur Bhatia
11.	Planning, Designing and Analysis of 'On Farm Research Experiments' planned under Project Directorate of Cropping System Research	PK Batra NK Sharma Mahesh Kumar

S. No.	Project title	Project leader and associates
12.	Planning, designing and statistical analysis of data relating to experiments conducted under AICRP on long-Term Fertilizer Experiments	MR Vats DK Sehgal DK Mehta
Information system for Agricultural and Animal Experiments		
13.	Agricultural Field Experiments Information System (AFEIS)	PK Batra OP Khanduri DC Pant
14.	Agricultural Experiments Information System for Animal Sciences	GC Chawla
Experimental Designs for Agricultural, Animal, Agro-forestry and Fisheries Research		
15.	A statistical investigation on the long term effect of fertilizers on productivity of cereal crop sequences	VK Sharma Rajinder Kaur
16.	Designs for fitting response surfaces in agricultural experiments (Funded by ICAR AP Cess fund)	Rajender Parsad PK Batra
17.	Planning, designing and analysis of experiments relating to All India Coordinated Research Project on Soil Test Crop Response correlation	Aloke Lahiri, VK Sharma A Subbarao MR Vats DK Mehta Rajender Parsad
18.	Design and analysis of agroforestry experiments	DP Handa Seema Jaggi VK Sharma AS Gill
19.	A diagnostic study of design and analysis of field experiments	Rajender Parsad VK Gupta PK Batra R Srivastava Rajinder Kaur Ajit Kaur Bhatia Prawin Arya
Statistical investigations in Genetics and Bio-technology		
20	Studies on growth pattern and heritability of fitness traits in Indian breed of goats	Lal chand SD Wahi VK Bhatia

S. No.	Project title	Project leader and associates
	Forecasting techniques in Agricultural System	
21.	Use of discriminant function of weather parameters for developing forecast model of rice crop.	T Rai Chandrahas
22.	Pilot study for developing Bayesian probability forecast model based on farmers' appraisal data on wheat crop.	Chandrahas T Rai
23.	Development of forewarning system for aphids, myzus persicae (sulzer) on potato.	TP Trivedi (NCIPM, New Delhi) SM Paul Khurana (ACPIP, Shimla) RC Jain (Retired on 30.11.99) SC Mehta LM Bhar G Singh (GBPUAT, Pantnagar)
24.	Development of early warning and yield assessment models for rainfed crops based on agro-meteorological indices.	Ms. Asha Saksena RC Jain (Retired on 30.11.99) RL Yadav, (PDCSR, Modipuram)
25.	Forecasting of yield loss due to weeds.	Madan Mohan NT Yaduraju (IARI, New Delhi) T Rai Ranjana Agrawal
26.	Studies on bioecology and population dynamics of major pests of mango (hoppers, fruitfly, leaf webber and inflorescene midge) and guava (fruit borer).	RP Shukla (CISH, Lucknow) Shashi Sharma (CISH, Lucknow) SC Mehta
27.	To develop model of forewarning about infestation of the insects for paddy crop.	MK Sharma (NDUAT, Faizabad) V Pandey RS Singh Somy Kuriakose
28.	Epidemiology and forecasting of powdery mildew and Anthracnose.	AK Misra (CISH, Lucknow) Om Prakash (CISH, Lucknow) Ramasubramanian V.

S. No.	Project title	Project leader and associates
	Study of Technological change, Risk and Uncertainty in Agriculture	
29.	Economic study of micro-irrigation system on Farmers' field	Ashok Kumar UN Dixit Aswani Kumar Manoj Khanna Ant Ram
	Modelling for Agricultural Planning	
30.	Study of demand for agricultural products and its implications for food security in India	RK Pandey
	Revolving Fund Project	
31.	Short term training programmes in information technology	SD Sharma VK Mahajan

RAC, MANAGEMENT COMMITTEE, SRC ETC. MEETINGS WITH SIGNIFICANT DECISION

Research Advisory Committee

Research Advisory Committee of the Institute as approved by the Council is as follows:-

1.	Sh VR Rao	Chairman
2.	Dr SD Sharma	Member
3.	Dr MN Das	Member
4.	Prof Prem Narain,	Member
5.	Dr MM Pant	Member
6.	Dr S Mohanty	Member
7.	Dr VJ Shrikhande	Member
8.	Sh Syed Md. Altaf Bukhari	Member
		Member
9.	Sh HT Mohan Kumar	Member
10.	Dr Mruthyunjaya	Member
11.	Dr HVL Bathla	Member-Secretary

Research Advisory Committee Meeting of the Institute in progress

The fourth meeting of the Research Advisory Committee of the Institute was held on August 31, 1999. In the meeting the action taken on the recommendations made in the last meeting, all research programmes completed, ongoing, initiated, proposed, submitted for external funding, revolving fund scheme, NATP Project and also the training and teaching programmes organised and proposed were discussed. After detailed discussion, the following recommendations were made:-

1. Time frame and problems regarding basic research for development of applied research should be placed during the next Research Advisory Committee meeting.

2. Date of start, date of targeted completion and date of actual completion should be given for each project.

3. In the research proposals the quantum of basic and applied research should be indicated separately.

4. In case of ongoing research areas the date of start and date of termination should also be given in RAC agenda notes.

5. The progress of different projects should be indicated under the main 6 or 7 proposals as given in the EFC Memo of the IX Plan.

6. Utilisation of resources should also be placed before the RAC.

7. Minimum resources should be used for the routine work of continuing projects of Design of Experiments Division.

8. The details of GIS projects should be sent to the RAC members.

9. All future research proposals should be according to the 6 or 7 programmes as per EFC Memo.

10. The Institute should prioritise the research proposals and allocate the resources accordingly. Some of areas of importance are remote sensing, GIS, small area estimation and forecasting techniques.

11. The Institute should take up 2 or 3 representative districts for demonstration of techniques developed for forecasting. A simple and practicable methodology which could be applied in other areas also should be demonstrated. Multidisciplinary approach involving Agronomists, Statisticians, Meteorologists and Biometricians etc. should be followed.

12. The Institute should examine the forecasting techniques developed by the Institute where these are affordable and feasible to apply. The forecasting techniques should be reviewed on integrated basis.

13. The RAC members could be involved for the improvement of forecasting projects.

14. Progress in the NATP Projects of the Institute should also be placed before the RAC members. Software development should be a priority programme.

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 Management Committee of the Institute (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.

Management Committee of the Institute in progress

The Management Committee of the Institute consists as follows:

1.	Prof. SD Sharma, Director	Chairman
2.	Director of Agriculture, Delhi Administration	Member
3.	Director of Agriculture, Govt. of Punjab	Member
4.	The Professor and Head, Deptt. Of Mathematics & Statistics, CCSHAU, Hisar	Member
5.	Sh HT Mohan Kumar	Member
6.	Shri Sayed Mohd. Altaf Bukhari	Member
7.	Dr RK Pandey	Member
8.	Dr Pranheshu	Member
9.	Dr Randhir Singh	Member
10.	Dr PK Malhotra	Member
11.	Dr Mruthyunjaya, ADG (ESM), ICAR	Member
12.	Finance & Accounts Officers,NBPGR	Member
13.	Sh Chironji Lal, Chief Administrative Officer	Member-Secretary

The 41st meeting of the Management Committee was held on September 1, 1999

under the Chairmanship of Dr. SD Sharma, Director.

The following agenda items were discussed:

i) Presentation of the Divisional activities by the Head, Division of Design of Experiments and Head, Division of Biometrics

ii) Confirmation of the proceedings of the 40th meeting of the Management Committee held on 26.02.1999

iii) Review of Action Taken on the recommendations of the 40th meeting of the Management Committee

iv) Consideration of proceedings of the Staff Research Council meeting held on 29th and 30th July, 1999

v) Purchase of Computer related equipment and upgradation of software

vi) Annual Maintenance Contract (AMC) of Computer and related equipments

vii) Reappropriation of funds for purchase of note-book computers

viii) Upgradation and replacement of equipment including LAN under one time catch-up grant

ix) Consideration of progress report of revolving fund scheme for the year 1998-99

x) Position of revised estimates and actual expdenditure incurred under Non-Plan during the year 1998-99

xi) Budget estimates for the financial year 1999-2000 in respect of Non-Plan (approved by the Council) and Plan (Tentative)

xii) Approval of constitution of the Grievance Committee of the Institute

xiii) Approval to the revision of IASRI (House Allotment) Rules.

xiv) Prioritisation of Work items

xv) Participation of Institute personnel in training programs under Revolving Fund Scheme

xvi) Approval for the disposal of sulrplus obsolete and unserviceable.

Staff Research Council

The Staff Research Council (SRC) of the Institute 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) in respect of technical programmes of the Institute. Dr. SD Sharma, Director is the Chairman and Dr HVL Bathla, Principal Scientist & Head (RCM) is the Member-Secretary of the SRC. Dr. D.K. Agarwal Sr.Scientist & Scientist-in-charge (RCMU) has been nominated as the Member-Secretary of the SRC.

Two Meetings of the SRC were held during July 29-30, 1999 and February 18-19, 2000. In the first meeting 4 new research project proposals were considered and review of progress of 37 on-going research projects were discussed. In the second meeting 1 new research project proposal was considered and review of progress of 31 on-going research projects were discussed.

Staff Research Council Meeting of the Institute in progress

PARTICIPATION OF SCIENTISTS IN CONFERENCES, MEETINGS, WORKSHOPS, SYMPOSIA, ETC. IN INDIA AND ABROAD

(A) Participation of Scientists in Conference/Workshop/Symposia, etc.

Sr. No	Name of the Scientist	Programme	Venue	Period
1.	Dr. AR Rao	Symposium on recent trends of research in design of experiments	IASRI, New Delhi	Apr 05- 06, 1999
2.	Dr. RK Pandey	National Workshop on Net Working of Social Scientists in ICAR and SAUs	NCAP, New Delhi	Apr 06-07, 1999.
3.	Dr (Mrs.) Ranjana Agrawal Smt. Rajinder Kaur Smt. Ajit Kaur Bhatia Smt. Sushila Kaul Dr. Seema Jaggi Dr. Cini Varghese	National Seminar on the implications of the Beijing World Conference on Women in India jointly organised by IPWA, VARADANA and IARI	NBPGR, New Delhi	Apr 26-27, 1999
4.	Prof SD Sharma Dr. HVL Bathla Dr. KK Tyagi Dr. MS Narang	National workshop on "Improvement of agricultural statistics" organised by the Directorate of Economics & Statistics, Ministry of Agriculture, Government of India	Vigyan Bhawan, New Delhi	Jun 24-25, 1999
5.	Prof SD Sharma	Workshop on Stress Management organised by ICAR	IASRI, New Delhi	July 31, 1999
6.	Dr RK Pandey Dr. HVL Bathla	Workshop on "Prospects and Problems of Acquaculture Development in India.	NCAP, New Delhi	Sep 06-07, 1999
7.	Prof SD Sharma	Directors' Meet of the ICAR Research Institutes	NBPGR, New Delhi	Sep 7-8, 1999

Sr. No	Name of the Scientist	Programme	Venue	Period
8.	Dr. VK Gupta Dr. VK Sharma Dr. GC Chawla Dr. DP Handa Dr. R Srivastava Dr. PK Batra Sh. JK Kapoor Smt. Rajinder Kaur Dr. Aloke Lahiri Sh. GL Khurana Sh. MR Vats Sh. DK. Mehta Sh. DK Sehgal Smt. Ajit Kaur Bhatia Sh. N.K Sharma Dr. Seema Jaggi Dr. Rajendra Parsad Sh. Rajendra Kumar Dr. Cini Varghese	Symposium on recent trends of research in Design of Experiments	IASRI, New Delhi	Sep 07- 08, 1999
9.	Sh. SC Agrawal Sh. RM Sood Sh. VK Jain	Winter School on "Recent Developments in Survey Sampling in relation to Agricultural Research" sponsored by Indian Council of Agricultural Research.	IASRI, New Delhi	Sep.14-Oct 04, 1999
10.	Prof SD Sharma Dr RK Pandey Dr. HVL Bathla Dr Ashok Kumar	Sensitisation Workshop on "Project monitoring and management information system" in connection with NATP proposal on PME.	NCAP, New Delhi	Sep 27, 1999
11.	Dr (Mrs.) Ranjana Agrawal Mrs.Asha Saksena	VII Biennial Workshop of All India Coordinated Research Project on Agrometeorology	Ranichauri Campus of G.B. Pant Univ. of Agril. & Tech., Pantnagar	Oct 06-08, 1999
12.	Dr. RK Pandey	13th National Conference of Indian Society of Agricultural Marketing held at National Institute of Rural Development	NCAP, New Delhi	Oct 12-14, 1999

Sr. No	Name of the Scientist	Programme	Venue	Period
13.	Prof SD Sharma	The CABI Workshop on Publishing & Information System organised by DIPA, ICAR	IASRI, New Delhi	Oct 25-28, 1999
14.	Dr. AK Srivastava	Stake Holder Workshop for research proposal on raising livestock productivity in a mixed crop livestock system in South Asia	ICRISAT, Hyderabad	Nov. 15-17, 1999
15.	Prof SD Sharma	5th National Conference on Information Today and Tomorrow	Indian Institute of Chemical Technology, Hyderabad	Nov 16-19, 1999
16.	Ranjana Agrawal	Orientation Workshop for early warning system for monitoring Indian Agriculture organised by Consulting Engineering Service (India) Ltd	IASRI, New Delhi	Nov 19-20, 1999
17.	Prof SD Sharma Dr. AK Srivastava Dr. HVL Bathla Dr. VK Gupta Dr. VK Sharma Dr. Aloke Lahiri Sh. MR Vats Dr. Rajdender Parsad Dr. Cini Varghese Mrs. Somi Kuriakose	2nd Annual Conference of the Society of Statistics, Computer and Applications	St. Thomas College, Pala, Kerala	Nov 28 - Dec 01, 1999
18.	Prof SD Sharma Dr. AK Srivastava Dr. HVL Bathla Dr. Jagbir Singh Shri Satya Pal Dr. Anil Rai Dr.Tauqueer Ahmad Dr. GK Jha Dr. VK Gupta Dr. VK Sharma Dr. Aloke Lahiri Dr. Rajender Parsad Dr. Seema Jaggi Dr. RK Pandey Dr. SP Bhardwaj	53rd Annual Conference of Indian Society of Agricultural Statistics	St. Joseph's College, Tiruchira-palli, Tamil Nadu	Dec 02-04, 1999

Sr. No	Name of the Scientist	Programme	Venue	Period
19.	Prof SD Sharma	Workshop on Modernisation of Statistical System in India organised by the Ministry of Planning & Programme Implementation, Government of India	New Delhi	Dec 13, 1999
20.	Prof SD Sharma Dr. AK Srivastava Dr. RK Pandey Dr HVL Bathla Dr Randhir Singh Dr (Mrs) Ranjana Agrawal	Workshop on Agricultural Sector Data Base – Adequacies and Shortfalls for Measurement of National Accounts organised by the Indian Association of Research in National Income and Wealth	IASRI, New Delhi	Dec 17-19, 1999
21.	Prof SD Sharma Dr. AK Srivastava Dr. HVL Bathla Dr. BC Saxena Dr. KK Tyagi Dr. UC Sud Dr. Jagbir Singh Dr. MS Narang Sh. SC Agarwal Dr. Tauqueer Ahmed Dr. VK Gupta Dr. VK Sharma Dr. GC Chawla Dr. DP Handa Dr. R Srivastava Dr. PK Batra Dr. Ranjender Parsad Dr. Seema Jaggi Dr. Cini Varghese Dr. Prajneshu Sh. SD Wahi Dr. AK Paul Dr. AR Rao Ms. Mini KG Dr Chandrahas Sh Tribhuwan Rai Dr Lal Mohan Bhar Dr Ramasubramanian V.	International Conference on Teaching and Research in Statistics for the 21st century organized by University of Akron, U.S.A., University of Delhi and ISI	Department of Statistics, University of Delhi	**Jan 08-10, 2000**

Sr. No	Name of the Scientist	Programme	Venue	Period
22.	Dr. RK Pandey	27th World Marketing Congress organised by Institute of Marketing and Management	New Delhi	Jan 22-25, 2000.
23.	Dr. HVL Bathla Dr. KK Tyagi Dr. Jagbir Singh	Workshop on "Environmental contribution of milch and working animals in India organised by Society for Economic and Social Research.	Mandaoli, Delhi	Jan 28, 2000
24.	Prof SD Sharma Dr PK Malhotra	Seminar-cum-Exhibition on Electronics and Information Technology Exposition (ELITEX) inaugurated by Hon'ble Minister for Information Technology, Mr Pramod Mahajan	India Habitat Centre, New Delhi	Jan 31, 2000
25.	Dr. Randhir Singh	Seminar on Agricultural GIS 2000 organized by ESRI India and WTC, IARI, New Delhi.	WTC, IARI, New Delhi	Feb 03, 2000
26.	Prof SD Sharma Dr. RK Pandey	Seminar on "Facts of Trade Liberalisation of Agriculture in India" organised by CGPRI Centre, Escap, U.N., Bogor, Indonesia and NCAP	NCAP, New Delhi	Feb 10, 2000
27.	Prof SD Sharma	Inaugural function on International Conference on Managing Natural Resources for Sustainable Agricultural Production in the 21st Century	Hotel Ashok, New Delhi	Feb 14, 2000
28.	Prof SD Sharma	Workshop on Rural Artisans and Development Functionaries: Agenda for working together	NISTADS, New Delhi	Mar 8, 2000
29.	Dr. R.K. Pandey Mrs.Sushila Kaul Dr. Dharm Raj Singh	Launching Workshop on Jai Vigyan National Science and Technology Mission on Household Food and Nutrition Security	NBPGR, New Delhi	Mar 10, 2000

Sr. No	Name of the Scientist	Programme	Venue	Period
30.	Sh. AK Gupta	A UGC sponsored Work-shop on Reliability and Computer Application in Statistics and related Areas.	C.C.S. University, Meerut	Mar 11-12, 2000

(B) Participation of Scientists in Training Programmes

Sr. No	Name of the Scientist	Programme	Venue	Period
1.	Sh. SC Agrawal Sh. RM Sood Sh. VK Jain	Winter School on "Recent Developments in Survey Sampling in relation to Agricultural Research" sponsored by Indian Council of Agricultural Research.	IASRI, New Delhi	Sep.14-Oct.04, 1999
2.	Dr. HVL Bathla Dr. VK Sharma	Training on Management development programme in agricultural research.	NAARM, Hyderabad	Oct. 25-30, 1999
3.	Dr. PK Malhotra Dr. RC Goyal Sh. VH Gupta	Training programme on "Visual Basic 6.0, Active-X with MS-Access" conducted by ERDCI.	IASRI, New Delhi	Nov. 09-19, 1999
4.	Sh. Bhagwan Das Ms Mini KG	Training Programme on "Advanced Statistical Techniques in research for crop & Animal improvement.	IASRI, New Delhi	Jan. 3-17, 2000
5.	Sh. Satya Pal	Training Programme on "Computer Intensive Techniques in Agricultural Surveys" under the aegis of "Centre of Advanced Studies in Agricultural Statistics and Computer Applications"	IASRI, New Delhi	Jan. 20 – Feb. 04, 2000
6.	Dr. UC Sud Sh. DC Mathur	Training Programme on Manpower and Employment Planning at State & District level, conducted by Instt. of Applied Manpower Research	Institute of Applied and Manpower Research, New Delhi.	Jan. 31-Feb. 04, 2000
7.	Dr. VK Bhatia	Training programme on 'Web Page Designing and Information System on Internet'	IASRI, New Delhi	Feb. 07-26, 2000
8.	Dr. Tauqueer Ahmed Dr. AK Paul Sh. H Ghosh	Winter School on "Statistical Exploration of Patterns in Spatial and other types of Large data.	ISI, Calcutta	Feb. 08-25, 2000
9.	Smt. Ajit Kaur Bhatia Sh. DK Sehgal	Training programme on Efficient experimental designs for generation of agricultural technologies	IASRI , New Delhi	Mar. 16 - 30, 2000

(C) Participation of the Institute in various meetings

1. First Meeting of the Site Committee of Indian Agricultural Research Institute, New Delhi for Technology Assessment and Refinement through Institution Village Linkage Programme (TAR-IVLP) under NATP on Apr 12, 1999.

2. "A Date with Mathematicians" an annual meeting of Indian Mathematical Society held at the University of Delhi, Delhi on Apr 13, 1999. Prof. R.S. Paroda, Director General, ICAR was felicitated during this meeting.

3. XXXVII Convocation of the Post Graduate School, Indian Agricultural Research Institute on Apr 15, 1999.

4. Meeting of the NATP Task Force on Dizitization of Database under the chairmanship of Dr. N. Seshagiri, Director General, National Informatics Centre held at New Delhi on Apr 17, 1999.

5. Meeting of the High Level Co-ordination Committee on Crop Estimation Surveys of the Government of Haryana at Chandigarh on Apr 23, 1999

6. Review meeting of NATP in the Production Systems Research Programmes at NAARM, Hyderabad on 26.4.99 held under the Chairmanship of Director General, ICAR.

7. Meeting of the Executive Council of the Society of Statistics, Computer and Applications as its Vice President held at New Delhi on 28.4.99.

8. Special Interest Group Meeting on ARC/INFO organised by ESRI, India at New Delhi in April, 1999.

9. Meeting of the Standing Committee on Crop Forecasting in Improvement of Agricultural Statistics at the Directorate of Economics & Statistics, Ministry of Agriculture, Government of India, held at New Delhi on May 5, 1999.

10. Attended the meeting on Monitoring and Evaluation of Innovations & Technology Disseminations Component of NATP at the Indian Institute of Management, Lucknow on May 6, 1999

11. Meetings of the ICAR Scientific Panel on Agricultural Engineering held at IASRI during May 10-11, 1999.

12. Meeting of the Mission Mode programme on Assessment of Harvest and Post Harvest Losses under NATP held at IASRI with representatives of co-operating institutions on May 14, 1999. Director of the IASRI Chaired the meeting.

13. First meeting of the Advisory Committee of IISA 2000-2001 India at the Delhi Centre, Indian Statistical Institute on May 31, 1999 under the chairmanship of Dr. J.K. Ghosh.

14. Meetings regarding the conduct of Rapid Situation Assessment Survey for Farmers status in India: A Millenium Study, at the Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India, New Delhi on June 1 and 7, 1999 under the Chairmanship of Shri RCA Jain, Additional Secretary.

15. Meeting of the NATP Task Force on Priority Setting, Monitoring and Evaluation at National Centre for Agricultural Economics and Policy Research, New Delhi on June 5, 1999.

16. Meetings under the chairmanship of the Additional Secretary and Secretary,

Department of Agriculture & Cooperation, Ministry of Agriculture regarding formulation of the project proposal on the State of the Indian Farmer: a millenium study held at Krishi Bhavan, New Delhi on June 7 and August 30, 1999

17. Meeting of the Project Management Committee for discussion on Project Management and Information System for Production Systems Research under NATP held under the Chairmanship of Director General, ICAR at New Delhi on June 9, 1999.

18. Meetings of the Executive Council of the Indian Society of Agricultural Statistics at Krishi Bhavan, New Delhi on June 9, 1999 and Mar 30, 2000 under the Chairmanship of Dr. R.S. Paroda, Secretary, DARE & Director General, ICAR and President of the Society.

19. First meeting of the Expert Group on Reorientation of ICS Programme for Improvement of Agricultural Statistics (on the advice of National Advisory Board on Statistics) held at New Delhi on June 11, 1999.

20. RAC meeting of Cropping System Research held at PDCSR, Modipuram, Meerut during June 15-16, 1999.

21. Meeting with Director General, ICAR regarding contribution of scientists of IASRI towards National Agricultural Research System (NARS) held at the Institute on June 28, 1999.

22. Meetings of the Institute Rajbhasha Implementation Committee on June 22, 1999, Sep 18, 1999 and Dec 31, 1999.

23. First meeting of the Technical Advisory Committee of the Applied Statistics Division, Indian Statistical Institute held at Calcutta on June 24, 1999.

24. NATP meeting with the World Bank Supervision Mission to discuss O&M Reforms, Personnel Policy Review, Institutional Review, Public-private sector Interface, etc. held at NCIPM, New Delhi on June 30, 1999.

25. A meeting with Dr. Ercole Zerbini of ICRISAT regarding increasing livestock productivity held on Jul 8, 1999

26. NATP meeting with the World Bank Supervision Mission to discuss Production Systems Research held at New Delhi on Jul 9, 1999.

27. Meeting of the Sub-group on Horticulture Statistics under the chairmanship of Dr. GS Ram, Economic & Statistical Advisor, Govt. of India held at Krishi Bhavan on Jul 9, 1999

28. Meeting of the World Bank Supervision Mission with the Project Management Committee of the NATP held at NCIPM, New Delhi under the chairmanship of Director General, ICAR, on Jul 13, 1999.

Dr RS Paroda, DG, ICAR discussing with Heads of the Divisions during his visit to the Institute

29. Meeting of the Indian Council of Agricultural Research Society held at Vigyan Bhavan, New Delhi on Jul 16, 1999.

30. Meeting of the High Level Technical Coordination Committee (HLTCC) under the chairmanship of Agricultural Production Commissioner, U.P. held at Lucknow on Jul 16, 1999

31. A meeting of Sub-committee for improvement of Agricultural Statistics under the chairmanship of Deputy Director General (FOD), NSSO held at Pushp Bhavan, New Delhi on Jul 19, 1999

32. Meeting of PI's and Nodal Officers from participating centres on PME Task Force under NATP held at NCAP, New Delhi on Aug 3-4, 1999.

33. A meeting of the Sub-group on livestock statistics under the chairmanship of Dr. KR Satyamurthy, Advisor Statistics in the Department of Animal Husbandry and Dairying held at Krishi Bhavan, New Delhi on Aug 16, 1999

34. Meetings of Institute Boards of Studies in the disciplines of Agricultural Statistics and Computer Application in Agriculture on Aug 17, 1999.

35. Meeting to finalise the design, methodology and contents of the Study in connection with the state of farmer – A Millennium Study held at Krishi Bhavan, New Delhi on Aug 24, 1999 under the Chairmanship of Secretary, Department of Agriculture & Cooperation. The main objective of the study is to inquire into the economic conditions of the Indian farmers at the dawn of the new Millennium.

36. IX Plan EFC/SFC meeting for consideration of plan schemes of DARE/ICAR – under the Chairmanship of DG, ICAR held at Krishi Bhavan during Sep 6-7, 1999.

37. Group meeting of doubling the productivity of oilseed based production system held at G.A.U. Campus, Junagardh during Sep 9-11, 1999.

38. Meeting of the O&M Task Force of NATP under the Chairmanship of Director General, ICAR at Krishi Bhavan, New Delhi on Sep 28, 1999.

39. Meeting of RPC of NATP under the Chairmanship of Dr. H.K. Jain held at NCIPM, New Delhi on Sep 29-30, 1999 and presented PIMS presentation.

40. First meeting of the Committee constituted by ICAR on the Broad Subject Matter Areas (BSMA) of Statistical Sciences on Oct 4, 1999.

41. Meeting of the Executive Council of the Indian Society of Agricultural Statistics held on Oct 20, 1999.

42. Meeting of Farmers Status in India under the Chairmanship of Shri RCA Jain, Additional Secretary, Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India held at New Delhi on Oct 23, 1999.

43. Meeting with CPWD engineers under the Chairmanship of Director General, ICAR at Krishi Bhavan, New Delhi on Nov 2, 1999.

44. Meeting on Prospects for balancing cereal needs in India by 2020 organised under the auspices of ICAR held at IARI, New Delhi on Nov 2, 1999.

45. 2nd meeting regarding formulation of the project "Assessment of Post Harvest Losses" under Mission Mode Programme of NATP at IASRI on Dec 16, 1999.

46. Group meeting of Agronomists of AICRP for CSR held at PDCSR, Modipuram, Meerut during Dec 17-18, 1999.

47. Meeting of the committee to evaluate the technical proposal for consultancy services for Financial Management System for NATP at New Delhi on Dec 20, 1999. Director, IASRI chaired the meeting.

48. Group meeting of Scientists-in-charge of the Cooperating centres under AICRP on LTFE held at Regional Centre of NBSS & LUP, IARI, New Delhi on Dec 24, 1999.

49. Meeting of the Technical Committee of Direction for Improvement of Animal Husbandry and Dairying Statistics held at IASRI on Dec 27-28, 1999. The meeting was organized by the Department of Animal Husbandry & Dairying, Ministry of Agriculture, Government of India, New Delhi. Director, IASRI chaired the meeting.

50. Meeting of State Level Committee for upgradation, planning and review of programmes regarding genetic improvement in buffaloes and cows in the State of Punjab held at Punjab, Chandigarh during Dec 27-28, 1999.

51. Meetings of Core Group for conducting study and formulating a long term mechanisation strategies for each Agro-Climatic Zone of the country during the IX Five Year Plan held at DOAC, Ministry of Agriculture, Krishi Bhavan on Dec 28, 1999 and Feb 18, 2000.

52. Meeting in connection with crop cutting experiments under National Agricultural Insurance Scheme (NAIS) under the chairmanship of Joint Secretary(Credit), Department of Agriculture & Co-operation, Government of India held at Krishi Bhavan, New Delhi on Jan 11, 2000.

53. Meeting of the PMC of NATP held at NCIPM, New Delhi under the chairmanship of Director General, ICAR on Jan 12, 2000.

54. Meeting of the project on Assessment of Harvest and Post Harvest Losses under Mission Mode Programme of NATP held at IASRI on Jan 12-13, 2000. Director, IASRI chaired the meeting.

55. Meeting of the High Level Technical Coordination Committee (HLTCC) held at Rajasthan Bhavan on Jan 17, 2000

56. Meeting of the State High Level Committee at Bangalore on Jan 19, 2000

57. Meeting of the Sectional Committee MSD-3 of Bureau of Indian Standards held at Manak Bhavan, New Delhi on Jan 21, 2000.

58. Meeting to discuss the oilseeds production estimates in the Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India held at Krishi Bhavan, New Delhi on Jan 21, 2000.

59. Meeting of the O&M Task Force of NATP held at NCIPM, New Delhi on Jan 24, 2000.

60. Meeting of the NATP on Financial Management on Feb 3, 2000 at NATP-PIU Headquarter, New Delhi. Director of the Institute chaired the meeting.

61. Second meeting of the Group of Experts to draft the Syllabus for Official Statistics at Ministry of Statistics & Programme Implementation, Central Statistical Commission, New Delhi on Feb 4, 2000.

62. Meeting of the PME Task Force of the NATP held at NCAP, New Delhi on Feb 5, 2000.

63. Meeting to discuss the issues relating to crop cutting experiments and constitution of Technical Advisory Committee (TAC) of National level to decide the sample size of CCES and other technical matters for implementation of National Agricultural Insurance Scheme at the Ministry of Agriculture, Department of Agriculture & Cooperation, New Delhi on Feb 7, 2000.

64. Meetings of ICAR-Industry interface on Feb 8- 9, 2000 under the chairmanship of Director General, ICAR at New Delhi.

65. Meeting at Central Fertiliser Quality Control and Training Institute, Faridabad regarding drawal of representative samples of fertilisers from ships, constituted by Ministry of Fertilisers held at Faridabad on Feb 14, 2000.

66. Meeting pertaining to the scheme on Marketable surplus and post harvest losses of foodgrains held at Directorate of Marketing and Inspection, Nagpur on Feb 16, 2000.

67. Meeting in connection with the launching of Technology Mission on Cotton by the Ministry of Textiles, at Vigyan Bhavan, New Delhi on Feb 21, 2000.

68. Meeting to discuss and finalize the draft report on Agricultural Resources Information System (AgRIS) of the Core Group V constituted under NNRMS Standing Committee on Soil and Agriculture, Department of Agriculture & Cooperation, Government of India, held at Yojana Bhavan, New Delhi on Mar 1, 2000 under the chairmanship of Dr. A.K. Kundra, Principal Adviser (Agri), Planning Commission.

69. Meeting of the High Powered Advisory Committee to look into the problems being faced in the implementation of Johl Committee Recommendations, at Krishi Bhavan, New Delhi on Mar 1, 2000 under the chairmanship of Director General, ICAR.

70. Planning meeting of Economics programme of Jai Vigyan National Science and Technology Mission Project held at NCAP, New Delhi during March 1-2, 2000

71. XXXVIII Convocation of the Post Graduate School, IARI, New Delhi on Mar 3, 2000.

72. Meeting of the Core Group of the 88th Indian Science Congress at National Academy of Agricultural Sciences, New Delhi on Mar 4, 2000.

73. Meeting of the Delhi based Institutes to discuss various issues of civil and electrical works being undertaken by CPWD held at NBPGR, New Delhi on Mar 4, 2000 under the chairmanship of Dr. Mangla Rai, DDG(CS), ICAR.

74. Meeting of the Advisory Committee of the 88th Indian Science Congress, at NAAS, New Delhi on Mar 10, 2000.

75. Meeting to review the preparation of Agricultural Research Data Book 2000 under the chairmanship of DDG(Engg.).

76. First meeting of the Sub-Group on Agricultural Statistics of the National Statistical Commission of the Government of India, at Sardar Patel Bhavan, New Delhi on Mar 15, 2000.

77. Meeting of the ICAR Co-operative Stores on Mar 16, 2000. Director of the Institute chaired the meeting.

78. VIII meeting of the Research Programme Committee of the NATP for presenting the NATP mission mode project on "Assessment of harvest and post-harvest

losses" held at IARI, New Delhi on Mar 29, 2000

79. Meeting of the Faculty of Mathematical Sciences of the University of Delhi on Mar 31, 2000.

Lectures Delivered by the Scientist at other organisations

Prof. SD Sharma

- Delivered a lecture on 'Computing in Statistics' during Summer School/Refresher Course at the Department of Statistics, University of Delhi on April 28, 1999.
- Delivered two lectures on "Use of statistics in agricultural research" and "Role of computers in agricultural research" the participant of training course on "Use of Statistical Methods in Agriculture and Allied Fields", at AAREM, CCSHAU, Hissar on Jan 19, 2000

Dr. AK Srivastava

Lecture delivered on

- 'Sampling techniques in socio economic survey' to the participants of a training course on "Demand supply projections of agricultural commodities" at Division of Agricultural Economics, IARI during Sept, 1999
- 'Sampling & Non-sampling errors' to the participants of a training course at AAREM, CCSHAU, Hissar on Feb 7-8, 2000

Dr. HVL Bathla

Lectures delivered on

- 'Stratified systematic and cluster sampling' to the participants of a refresher course on "Use of statistical methods in agriculture and allied field on Feb. 07, 2000 at AAREM, HAU, Hissar
- 'Sources, Biases and Errors in Large Scale Sample Surveys' (two lectures) to the participants of 45th Senior Certificate Course in Statistics of CSO on Aug. 26, 1999 .

Dr. P.K.Malhotra

Lecture delivered on Introduction to Internet in Training Course on "Demand Supply Projections of Agricultural Commodities" organised during Sep 7-27, 1999 under Centre of Advanced Studies in Agricultural Economics at IARI, New Delhi.

Dr. V. K.Bhatia

Delivered

- A talk entitled "A computer intensive statistical look on the comparative performance of different crossbred in dairy cattle" in the Symposium on Statistics, Computer and Applications for Technological Research during the Second Annual Conference Conference of the Society of Statistics, Computers and Applications held at St. Thomas College, Pala (Kerala) during Nov. 28-Dec. 1, 1999.
- Lectures on MINITAB to the participants of the Refresher Course on 'The Use of Statistical Methods in Agriculture and Allied fields being organised by Academy of Agriculture Research and Education Management, CSS Haryana Agricultural University, Hisar on Feb. 11 2000.

Dr. BC Saxena

- Delivered three lectures entitled (i) Mathematics as a tool of Statistics, (ii) Optimisation technique in multiple frame surveys and (iii) Assessment studies in dairy development programmes and related livestock studies to the participants

of the Refresher Course in mathematics conducted by the centre for professional development in high education (CPDAE), University of Delhi on 14th, 15th and 17th May, 1999 respectively.

Dr. KK Tyagi

- Delivered a lecture on 'Cost and variance functions, determination of sample size' to the participants of 45th Senior Certificate Course in statistics of CSO on Aug. 26, 1999.

Dr. Prajneshu

- Delivered a lecture in refresher course 'The Use of Statistical Methods in Agriculture and Allied Fields' during Jan. 19-Feb. 15, 2000 at HAU, Hisar on "Nonlinear growth models in Agriculture".

Dr. V.K. Gupta

- Special invited talk on Design for making test treatments-control treatment(s) comparisons-An overview in the 2nd Annual Conference of the Society of Statistics , Computer and Application held at St. Thomas College , Pala , Kerala during 28th Nov. to 1st Dec., 1999
- Three lectures on "over review of Design of Experiments" at Academy of Agricultural Research and Education Management, CCS HAU, Hisar, to participants of the training programme on "The use of Statistical Methods on Agriculture and allied fields. (Jan 19-Feb. 15,2000)

Dr. V.K. Sharma

- Two lectures on use of non-linear models for studying technological change in Indian Agriculture to the participants of the training programme on measurement of technological change in Agriculture orgnised by the Division of Agricultural Economics IARI from 11.11.1999 to 1.12.1999
- Two lectures on measurement of adoption of technology by farmers to the participants of the training projgramme on inpact assessment of agricultural technology orgnised by the Division of Agricultural Economics IARI from 30.3.2000 to 2.4.2000

Dr. Aloke Lahiri

- A lecture on "Analysis of Experiments to the participants of a training course on "use of statistical methods in Agriculture and allied fields" at the Academy of Agricultural Research and Education Management, CCS, Haryana Agricultural University, Hisar on the 8th Feb., 2000.

Dr. Rajender Prasad

- Two lectures on "Covariance Analysis in Agricultural Research" at Academy of Agricultural Research and Education Management, CCS HAU, Hisar, during to participants of the training programme on "The use of Statistical Methods on Agriculture and allied fields. (Jan 19-Feb. 15,2000)
- Three Lectures on " 1. Block Designs with Nested Factors 2. Overview of SAS Software and its Applications" to the participants of the refresher course in Statistics for teachers associated with the teaching of B.Sc. (H) Course in Statistics in various college of Delhi University held at Department Of Statistics, University of Delhi, Delhi, during April 7-28, 1999. The lectures were delivered on April 21, 22 and 23, 1999.
- Three lectures on " 1. Use of resolvable designs in on-farm research 2. Sampling in field experiments" to the participants f the course On Statistical Methods for scientists of Remote Sensing Application

Centre, UP Govt. engaged in the World Bank aided project on Sodioc Land reclamation held at Institute of Applied Statistics and Development Studies, Lucknow during September, 1999. The lectures were delivered on September 23 and 24, 1999.

- One Lecture on " Optimal designs for diallel crosses" at Department of Statistics, University of Delhi, Delhi on October 20, 1999.
- Two lectures on "Applications of Statistical Techniques in tissue culture" to the post doctoral and Ph.D. students of Department of Botany at Department of Botany, University of Delhi, Delhi on November, 13, 1999.

Visit Abroad

Dr. HVL Bathla visited Temple University, Philadelphia from May 22 to June 9, 1999 as a Research Scholar in Statistics.

Radio Talk/TV Interview

Dr. Rajender Parsad was invited to participate in one TV programme on Agriculture (Krishi Kahavate) by Central Institute of Educational Technology, N.C.E.R.T., New Delhi on Sep 25, 1999.

PAPERS PRESENTED BY THE SCIENTISTS OF THE INSTITUTE AT THE CONFERENCES/ WORKSHOPS/SEMINARS, ETC.

Sl No	Author(s)	Title of the Paper	Programme	Venue	Period
1.	Batra, PK	Application of Experiments with mixture methodology to Agricultural Experiments	Symposium of Recent trends of research in design of experiments	IASRI., New Delhi	April 6, 1999
2	Gupta, VK	Weighted A-efficient designs for making treatment-treatment and treatment-control comparisons	-do-	-do-	-do-
3	Jaggi, Seema	Universally optimal block designs for two non-interrupting sets of treatments applied in succession	-do-	-do-	-do-
4	Rajender Parsad	Optimal designs for diallel corsses	-do-	-do-	-do-
5	Srivastava, R	Block designs for two interaction sets of treatments applied in succession	-do-	-do-	-do-
6	Sarkar, S Rana, PS	On mathematical formulation of lactation curves	National seminar on statistics and decision theory	ISI, Calcutta	May 20-21, 1999
7.	Bathla, HVL	Contemporary ethodological issues for improving agricultural statistics	National workshop on "Improvement of agricultural statistics"	Vigyan Bhawan, New Delhi	Jun 24-25, 1999
8	Sharma, SD Malhotra, PK	कंप्यूटर और राजभाषा	National Seminar on "Official Langu-age & Mana-gement"	Central Institute of Fisheries Technology, Matsaya-puram, Cochin	Aug. 18-20, 1999

Sl No	Author(s)	Title of the Paper	Programme	Venue	Period
9.	Rajinder Kaur Bhatia, Ajit Kaur	Performance of oilseeds in comparison to other crops in different crop sequences	Group meeting on strategic issues for doubling the productivity of oilseed, based production system	GAU, Janagadh Campus Junagadh	Sept., 9-11, 1999
10.	Agrawal, Ranjana	Models for crop yield forecasting based on weather parameters.	*Workshop on AICRP on Agrometeor-ology*	Hill Campus of G.B.Pant University of Agri-culture & Technology, Ranichauri.	Oct. 6-8, 1999
11.	Pandey, RK Sant Kumar	Economic Analysis of Demand Pattern for Perishable Products	13th National Conference of Indian Society of Agricultural Marketing jointly organised by NIRD and NIAEM, Hyderabad	NIRD, Hyderabad	Oct. 12-14, 1999
12.	Trivedi, TP Khurana, SM Paul Mehta, SC Bhar, LM Jain, RC Mohammad Mohsin Choudhary, SM	Model for forewarning of Aphid Myzus Persicae on Potato	National Symposium on Vectors of Plant Diseases	Narendra Dev Univer-sity of Agri-culture & Technology, Kumarganj, Faizabad, U.P.	Nov. 11-13, 1999
13.	Agrawal, Ranjana	Crop forecast models.	Orientation Workshop for early warning system for monitoring Indian Agri-culture by CES(India) Ltd.	IASRI, New Delhi	Nov. 19-20, 1999
14.	Bathla, HVL	Estimation of Fish Catch from a Lake	2nd Annual Conf. of Society of Statistics, Computer and Application	St. Thomas College, Pala, Kerala	Nov 28-Dec. 1, 1999

Sl No	Author(s)	Title of the Paper	Programme	Venue	Period
15.	Bhatia, VK	A computer intensive statistical look on the comparative performance of different crossbred in dairy cattle	-do-	-do-	-do-
16.	Ghosh, H	Estimation of variance components in partial diallel crossing plan based on PBIB Design	-do-	-do-	-do-
17.	Gupta, VK Rajender Parsad	Designs for making test treatments-control treatment(s) comparisons – An Overview	-do-	-do-	-do-
18.	Kuriakose, Somy Jain, RC	Construction of incomplete block designs for comparing two disjoint sets of treatments using main effect plans.	-do-	-do-	-do-
19.	Lahiri, Aloke	Method for Exact PPS. Sampling without replacement	-do-	-do-	-do-
20.	Paul, AK Bhatia, VK	Heritability and Stability by path coefficient approach when herdlife is influenced by unrelated auxiliary Characters	-do-	-do-	-do-
21.	Rajender Parsad Gupta, VK	A note on augmented designs	-do-	-do-	-do-
22.	Ramasubramanian, V Singh, Randhir Rai, Anil	Jackknife variance estimation under two phase sampling.	-do-	-do-	-do-
23.	Rao, AR Prabhakaran, VT	On use of bootstrap techniques for robust estimation of heritability	-do-	-do-	-do-
24.	Sharma, VK Varghese, Cini	On totally balanced change - over designs	-do-	-do-	-do-
25.	Varghese, Cini Sharma, VK	On Optimality of change-over designs balanced for first and second residual	-do-	-do-	-do-
26.	Varghese, Cini	Some series of universally optimal change-over designs in the presence of first residual effects	-do-	-do-	-do-

Sl No	Author(s)	Title of the Paper	Programme	Venue	Period
27.	Sharma, SD	Computer Applications in Statistics	Symposium on Statistics and Computer Application for Technological Research during above Conference	St. Thomas College, Pala, Kerala	Nov. 28 – Dec. 01, 1999
28.	Ahmed, Tauqueer Rai, Anil Singh, Randhir	Identification of Potential Zones for Agroforestry using GIS	53rd Annual Conference of ISAS	St. Joseph's College, Tiruchirap-alli, Tamil Nadu	Dec. 2-4, 1999
29.	Ahmed,. Tauqueer	A bootstrap technique for imputed survey data	-do-	-do-	-do-
30.	Bathla, HVL	Sampling over two Occasions- Least Square Method and Missing Observations	-do-	-do-	-do-
31.	Bhardwaj, SP Mahajan, VK	Economic Study of Human Resource Development -A Case Study	-do-	-do-	-do-
32.	Bhatia, VK	On some Aspects of Estimation of Heritability	-do-	-do-	-do-
33.	Bhatia, VK	Study of Heritability of Stayability	-do-	-do-	-do-
34.	Chawla, GC Rai, T	Use of basic inferential tools in animal experimentation.	-do-	-do-	-do-
35.	Handa, DP Sreenath, PR	Contraction of plans for $qx2^n$ and $qx3^n$ type of Asymmetrical Factorial Experiments	-do-	-do-	-do-
36.	Kuriakose, Somy Rajender Parsad Jain, RC	A-optimal Balanced Augmented Designs For Diallel Crosses	-do-	-do-	-do-
37.	Lahiri, Aloke	A General Method for Estimation of variance for any sampling scheme including PPS sampling with and without replacement	-do-	-do-	-do-
38.	Pandey, RK	Acreage Response Functions for Rice Crop in Uttar Pradesh	-do-	-do-	-do-
39.	Paul, AK Bhatia, VK	Study of heritability of staybility: a threshold characters	-do-	-do-	-do-

Sl No	Author(s)	Title of the Paper	Programme	Venue	Period
40.	Rai, T Chandrahas	Quadratic discriminanted weather score - A regressor for forecast of rice yield	-do-	-do-	-do-
41.	Rajender Parrsad Gupta, VK	Structurally incomplete row-column designs	-do-	-do-	-do-
42.	Rajendra Kumar Sreenath, PR Jain, SP	Study of the effect of co-efficient of variation on the heterogeneity of error variance in agricultural field experiments	-do-	-do-	-do-
43.	Ramasubramanian, V Singh, Randhir Rai, Anil.	Some resampling procedures under two-phase sampling	-do-	-do-	-do-
44.	Satya Pal Sood, RM	Yield gap analysis using regression technique	-do-	-do-	-do-
45.	Satyander Kumar Das, DK Satya Pal	A linear regression model for estimating the available water storage capacity of fine textured soil	-do-	-do-	-do-
46.	Singh, Jagbir	Estimation of charge of doman parameters	-do-	-do-	-do-
47.	Sreenath, PR Handa, DP	Construction of qxs^2 design	-do-	-do-	-do-
48.	Srivastava, AK	Data needs and requirements for applications of GIS in rural development	Symposium on Application of GIS for Agricultural and Rural Development held during 53rd Annual Conference of ISAS	-do-	-do-
49.	Rai, Anil Mishra, P. Srivastava, A.K.	Spatial sampling procedures with varying size using GIS	-do-	-do-	-do-
50.	Jaggi, Seema Gupta, VK Sharma, VK	Design and analysis of agroforestry experiemnts	Symmposium on statistical methodology for agroforestry research held in the 53rd annual conference of ISAS	-do-	-do-
51.	Rai, Anil Srivastava, AK Singh, Man	Diognostic surveys in Agro forestry research	-do	-do	-do-

Sl No	Author(s)	Title of the Paper	Programme	Venue	Period
52.	Prajneshu	Box - Cox trans-formations for tackling heterogeneity of error variances in a nonlinear statistical model	Joint conference of Indian Society Medical Statistics & International Bio-Metric Society	Bangalore University	Dec. 2-4, 1999
53.	Trivedi, TP Khurana, SM Paul Bhar, LM Mehta, SC Jain, RC Mohammad Mohsin Choudhary, SM	Non-linear models for forewarning aphid myzus persicae on potato	Global Conference on Potato	CPRI Shimla and Indian Potato Association at IARI, New Delhi	Dec. 6-11, 1999
54.	Das, Sonali	International Conference on Cognitive Systems-99	Artificial Neural Networks for Prediction in Agriculture	Hamdard University	Dec. 15-18, 1999
55.	Srivastava, AK	Role of Sample Surveys in future development of Agricultural Statistics in India	Seminar on 'Agricultural Sector Data Base' organised by Indian Association for Research in National Income and Wealth	IASRI, New Delhi	Dec. 17-19, 1999
56.	Vats, MR	Statistical Methodology for Mid-Course modifications in Long-Term Fertilizer Experiments	Group meeting of Scientists – incharge Co-operating centres of AICRP on LTFE	Regional centre of NBSS and LUP, IARI, New Delhi	Dec. 24, 1999
57.	Kher, KK	Demonstrated "A software package to work-out the estimates of milk production for the data pertaining to Integrated Sample Survey"	A meeting on Technical Committee of Direction for improvement of Animal Husbandry and Dairying Statistics	I.A.S.R.I., New Delhi	Dec. 27-28, 1999

Sl No	Author(s)	Title of the Paper	Programme	Venue	Period
58.	Batra, PK Rajender Parsad	Robustness of Standard Rainforced Balanced Block Designs against interchange of treatments	International Conference on teaching and Research in Statistics for the 21st century organized by University of Akron, USA, University of Delhi and ISI	Department of Statistics, University of Delhi	Jan 08-10, 2000
59.	Panda, DK Rajender Parsad Sharma, VK	Robustness of Block Designs for Dialled Cross against Exchange of one cross	-do-	-do-	-do-
60.	Singh, Jagbir	Interclassificatory cross moments in a dynamic population	-do-	-do-	-do-
61.	Srivastava, R Rajender Parsad Gupta, VK	Structure Resistant Factorial designs	-do-	-do-	-do-
62.	Sud, UC	A biased estimator in repeat surveys	-do-	-do-	-do-
63.	Tyagi, KK	On the use of Different Methods of Estimation at Various Stages of Sampling	-do-	-do-	-do-
64.	Ashok Kumar Handa, DP Bajpai. SK Sharma, AK	Impact of distribution of rainfall on yield of maize fodder	International Conference on managing National Resources for sustainable agricultural Production on the 21st century IARI,	New Delhi	Feb. 14-18, 2000
65.	Rajindra Kumar Kapoor, JK	Study of Response Surface for cultural Cum Manurial Agricultural field experiments	-do-	-do-	-do-

WORKSHOPS, SEMINARS, SUMMER INSTITUTES, FARMERS' DAY ETC. ORGANISED AT THE INSTITUTE

A Winter School on "Recent Developments in Survey Sampling in Relation to Agricultural Research"

A winter school was organised at the Institute during Sept.14 - Oct.04, 1999, for Scientists working in ICAR Institutes/project directorates / National Research Centres and Asstt./Asso. Professors in State Agricultural Universities working in the field of Agricultural Statistics. A total of 19 participants belonging to different Government organizations, spread all over the country attended the course. The programme was sponsored by Indian Council of Agricultural Research. The participants were exposed to recent developments in the field of sampling techniques such as Inferential aspect in survey sampling, Analysis of complex surveys, Computer intensive techniques in agricultural surveys, Qualitative aspects in survey sampling, Analysis of complex surveys, Computer intensive techniques in agricultural surveys, Applied aspects of agricultural surveys etc. The main aim of the programme was the applications of these recent developments in collection and analysis of survey data in relation to agriculture. The participants are also given exposure to survey data analysis package PC CARP, the GIS package PC ARC/INFO and Remote Sensing software ERDAS etc. The Recent technologies of the data collection like use of palm top computer in the field was explained in detail.

The Annual Day

The Annual Day of the Institute was celebrated on 2nd July, 1999. As a part of the celebrations, a debate contest for Technical and Administrative Staff was held on 1st July, 1999 in the afternoon session. The topic of the contest was "Revelance of resource generation in educational and research organisations". Shri D.C Pant Technical Officer convened this contest. On 2nd July, 1999 in the forenoon session, Declamation Contest for students and Scientists was held. The topic of the contest was " Role of Agricultural Statistics/ Computer application in the next millennium" . Dr. D.K Agarwal , Sr. Scientist and Scientist Incharge (TAC) was the Convenor.

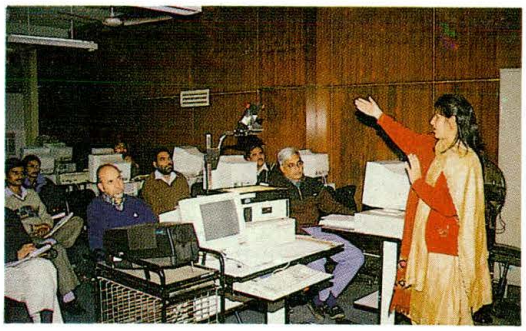
Dr. N. Vijayaditya, DDG, NIC lightening the lamp on the occasion of Nehru Memorial Lecture during Annual Day Function of the Institute

Dr. Anwar Alam, DDG (Engg.), ICAR releasing the Annual Report of the Institute during Annual Day Function of the Institute

In the afternoon session, the main Annual Day function was celebrated in which Professor Anwar Alam , DDG (Engg), ICAR was the Chief Guest. Dr. N. Vijayaditya, DDG, NIC delivered the ninth Nehru Memorial Lecture entitled 'A tool for rural community development'. The late Shri V.V.R Murthy Award was awarded to Miss Subhra Sarker M.Sc (Ag. Stat) student during the year 1996-98. The Nehru Memorial Gold Medals were awarded to Shri Saurabh Prakash, M.Sc. (C.A) student and Miss Subhra Sarker, M.Sc (Ag. Stat) student during the years 1996-98.The prizes were also given to the winners and runners for the Debate and the Declamation contests.

The result of research projects and field trials undertaken in different aspects of Agricultural Statistics and Computer Applications were presented in the seminars organised regularly in the Institute.

During the period under report in all sixty-nine Seminars were organised, out of which thirty- three seminars were delivered by the students of PG School, IARI, thirty by the Scientists of the Institute and six were delivered by eminent guest speakers. Name(s) and topics of the research seminars delivered by eminent scientists are as follows:



A scientist of the Institute delivering a lecture to the participants of a training programme

Seminars by Guest Speakers

S.No.	Speaker	Topics	Date
1.	Dr KM Jagdish, ESRI (India), New Delhi	i.) FIS and its development ii.) GIS and Remote Sensing Techniques in agriculture	08.04.1999
2.	Dr BD Tikkiwal, Retired Professor, Institute of Development Research & Statistics, Jodhpur	Some aspects of small area statistics for crop acreage	03.07.1999

S.No.	Speaker	Topics	Date
3.	Dr GC Tikkiwal, Professor, University of Jodhpur, Jodhpur	Some aspects of small area statistics for yield acreage	03.07.1999
4.	Mr Amit Nagpal, CMC Ltd., New Delhi	Data Warehousing	22.07.1999
5.	Mr Subraminam, CMC Ltd., New Delhi	Data Warehousing	22.07.1999
6.	Prof S Kageyama, Department of Mathematics, Faculty of School Education, Hiroshima University, Shinonome, Hiroshima- 734, JAPAN	Optimality and Construction of Split Block Designs	20.12.1999
7.	Sh SD Chopra, Deputy Commissioner (Credit), Ministry of Agriculture, New Delhi	Crop Insurance as a Measure of Risk Management in Agriculture	16.02.2000

DISTINGUISHED VISITORS

INDIAN

Dr. R.S. Paroda,
Director General, ICAR & Secretary, DARE,
Government of India,
Krishi Bhavan,
New Delhi – 110 001.

Prof. A. Alam,
Deputy Director General (Engg.),
I.C.A.R., Krishi Bhavan,
New Delhi – 110 001

Dr. Mruthyunjaya,
Asstt. Director General (ES&M),
I.C.A.R., Krishi Bhavan,
New Delhi – 110 001

Dr. M.N. Das,
Former Director IASRI,
New Delhi – 110 012.

Dr S Ray,
Additional Director General,
Central Statistical Organisation,
Ministry of Planning and Programme
Implementation,
Department of Statistics,
Government of India, New Delhi

Dr Padam Singh,
Addition Director General,
Indian Council of Medical Research,
New Delhi

Sh VR Rao,
Ex-Director General
Central Statistical Organisation,
New Delhi

Dr MC Agarwal
Delhi University,
Delhi

Dr N Vijayaditya,
Deputy Director General,
National Informatic Center (NIC),
New Delhi

Sh KM Jagdish,
ESRI (India),
New Delhi

Sh SD Chopra,
Deputy Commissioner (Credit),
Ministry of Agriculture,
New Delhi

Dr Anand Swarup,
Project Coordinator (LTFE),
Bhopal

Dr Ercoe Zerbini,
ICRISAT,
Patancheru,
Andhra Pradesh

Dr A Vaidyanathan,
Prof. Emeritus,
Madras Institute of Development Studies,
(President, Indian Society of Agricultural
Economics),
Chennai

Dr BD Tikkiwal,
Retired Professor
Institute of Development Research & Statistics,
Jodhpur

Sh HT Mohan Kumar,
Dimbada Estate,
Hurudi Post-577119,
Sakaleshpur Taluk,
Hasan Distt. (Karnataka)

Prof LS Kaushik,
Prof. & Head,
Department of Mathematics & Statistics,
CCSHAU,
Hisar

Sh Fateh Jang Singh,
Statistician,
Directorate of Agriculture,
Government of Punjab, Chandigarh

Dr S Mohanty,
Professor,
Department of Statistics,
Orissa University of Agriculture &
Technology, Bhubaneswar

FOREIGN

Dr Prem Goel,
Chairman,
Department of Statistics,
Ohio State University, Columbus,
Ohio, USA

Ms Jetty Bruggeman,
Management Information System,
IAC, Netherlands

Prof S Kageyama,
Department of Mathematics,
Faculty of School Education,
Hiroshima University,
Shinonome, Hiroshima 734, JAPAN

IASRI PERSONNEL
(As on 31.03.2000)

Prof. SD Sharma, **Director**
Dr AK Srivastava, **Joint Director**

Division of Sample Survey

Dr HVL Bathla, *Principal Scientist and Head*

Principal Scientist

Dr Randhir Singh

Sr. Scientists

Dr BC Saxena
Shri SRS Arya
Dr DL Ahuja
Dr KK Tyagi
Dr UC Sud
Shri RS Khatri
Dr Jagbir Singh
Shri AS Gupta
Dr MS Narang

Scientists (SG)

Sh. DC Mathur
Sh. HC Gupta
Sh. JP Goyal

Scientists (Sr. Scale)

Shri SC Agarwal
Shri Satya Pal
Shri SC Sethi
Shri DK Bhatia
Shri Bhagwan Dass
Shri RC Gola
Shri VK Jain
Shri RM Sood
Shri KK Kher

Scientists

Sh. AK Gupta
Dr. Tauqueer Ahmad
Dr. GK Jha

Expl. Scientists

Shri RM Bhasin

Division of Design of Experiments

Dr VK Gupta, *Head*

Principal Scientist

Dr VK Sharma

Sr. Scientists

Shri JK Kapoor
Dr Ravindra Srivastava
Dr GC Chawla
Dr PK Batra
Dr DP Handa
Dr Aloke Lahiri

Scientists (SG)

Smt. Rajinder Kaur
Sh. OP Khanduri

Scientists (Sr. Scale)

Shri DK Mehta
Shri DK Sehgal
Shri MR Vats
Shri NK Sharma

Shri GL Khurana
Smt Ajit Kaur Bhatia
Dr (Mrs) Seema Jaggi
Dr Rajender Parsad

Scientists

Sh Rajendra Kumar Singh
Dr. Cini Varghese

Division of Biometrics

Dr Prajneshu, *Principal Scientist and Head*

Principal Scientist

Dr VT Prabhakaran

Sr. Scientists

Dr PS Rana
Shri Lal Chand
Sh SD Wahi

Scientist (Sr. Scale)

Shri Indra Singh

Scientists

Dr. AK Paul
Dr. AR Rao
Sh. Himadri Ghosh
Ms Mini KG

Division of Forecasting Techniques

Dr. (Smt.)Ranjana Agarwal, *Principal Scientist & Head*

Sr. Scientists

Dr Chandrahas
Smt Asha Saksena

Scientists (Sr. Scale)

Shri SC Mehta
Shri SS Walia
Shri Madan Mohan
Shri T Rai

Scientists

Dr Lal Mohan Bhar
Dr Ramasubramanian V
Sh. Amrender Kumar

Division of Econometrics

Dr RK Pandey, *Principal Scientist and Head*

Sr. Scientists

Dr. Ashok Kumar
Dr SP Bhardwaj
Dr SS Kutaula

Scientists (Sr. Scale)

Shri Ant Ram
Smt Sushila Kaul
Shri Mahinder Singh

Scientists

Dr. Dharam Raj Singh
Shri Sanjeev Panwar
Shri Prawin Arya
Md. Wasi Alam

Division of Computing Science

Dr PK Malhotra, *Principal Scientist and Head*

Principal Scientist

Dr RC Goyal

Sr. Scientists

Dr VK Bhatia
Dr IC Sethi
Dr VK Mahajan
Shri Mahesh Kumar
Shri KC Gupta
Dr DK Agarwal
Dr. Anil Rai

Scientist (SG)

Dr RK Jain

Scientists (Sr. Scale)

Shri HO Aggarwal
Shri Balbir Singh
Shri HS Sikarwar

Scientists

Shri Ravi Kumar Badge
Ms Alka Arora
Ms Sonali Das
Dr (Ms) Somy Kurikose
Shri Sanjeev Kumar
Ms Shashi Dahiya
Shri Mohmmad Samir Faroqqui
Ms Sangeeta Ahuja
Shri Sudeep Kumar
Shri Sauravh Parkash
Shri Pal Singh
Shri Krishan Kumar Chaturvedi
Shri Vipin Kumar Dubey
Ms Anshu Dixit
Shri Shahnawazul Islam
Shri VH Gupta

Training Administration Cell

Dr. AK Srivastava, Joint Director
Dr VK Sharma, Professor (Ag. Stat.)
Dr. PK Malhotra, Professor (CA)
Dr. DK Agarwal, Scientist-in-charge

Research Coordination and Management Unit

Dr. AK Srivastava, Joint Director
Dr. DK Agarwal, Scientist-in-Charge

Administration

Shri Chironji Lal, Chief Administrative Officer
Shri VR Srinivasan, Finance & Accounts Officer

ANY OTHER RELEVANT INFORMATION SUCH AS SPECIAL INFRASTRUCTURAL/ DEVELOPMENT

Joint Staff Council

The Institute has a Joint Staff Council (JSC) 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 Joint Staff Council of the Institute is as follows:

Prof. SD Sharma	Director	Chairman
Official-side Representatives		
Dr. AK Srivastava	Joint Director	Member
Sh. RS Khatri	Sr. Scientist	Member
Dr. VK Mahajan	Sr. Scientist	Member
Dr. Rajender Parsad	Scientist	Member
Sh. Chironji Lal	C.A.O.	Member
Sh. VR Srinivasan	F&AO	Member
Staff-side Representatives		
Sh DPS Mann	Sr. Clerk	Secretary
Sh Prem Prakash	Sr. Steno-grapher	Member
Dr Ved Prakash	Tech. Officer	Member
Sh AR Sharma	Tech. Officer	Member
Sh Ghasi Ram	Tech. Asstt.	Member
Sh Jarnail Singh	Field In-vestigator	Member
Sh Gabbar Singh Rana	S.S. Gr.II	Member
Sh Raj Pal Singh	S.S. Gr.II	Member

Two meetings of Institute Joint Staff Council were held on June 8 and November 20, 1999 under the Chairmanship of Prof. SD Sharma, Director of the Institute to resolve various matters for the benefit of IASRI staff.

Institute's Joint Staff Council Meeting in progress

IASRI Employees Co-operative Thrift and Credit Society

The society which is registered with the Registrar Co-operative Societies, Delhi Administration, Delhi continued its activities in the similar manner as during the past years by advancing loans to its members and looking after their welfare. The source of funds of the society are share money, compulsory deposits and fixed deposits from the members of the society. At present the number of members on the roll of the society is 482.

The election of the new management committee was held on Mar 26, 1999 and office bearers are as follows:

1.	Sh. VK Mishra	President
2.	Dr. VK Mahajan	Vice President
3.	Sh. VK Jain	Secretary
4.	Sh. UC Bandhooni	Treasurer
5.	Sh. Mahesh Kimar	Internal Auditor
6.	Mrs Usha Jain	Member
7.	Mrs Pushpa Marvaha	Member
8.	Sh. GM Pathak	Member
9.	Sh. Arvind Kumar	Member
10.	Sh. Naresh Kumar	Member
11.	Sh. Mukesh Kumar	Member
12.	Sh. Ashok Kumar	Member
13.	Sh. NP Singh	Member
14.	Sh. Pal Singh	Member

Main achievements of the Society

1. The society advanced Rs.47,66,900/- to the members as loan

2. An amount of Rs.251/- was given as gift to the each five members and Rs. 501/- to 12 members on their retirement from the Institute

3. The financial help was extended from the member welfare fund to the tune of Rs. 4,000/- to the bereaved family of two members and also Rs. 4000/- to Shri Jawahar as per decision taken in the G.B. Meeting.

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 of the Institute was reconstituted with the approval of the Management Committee of the Institute for a period of two years w.e.f. July 28, 1999 as follows:

Official-side Representative		
1.	Prof. SD Sharma	Chairman
2.	Dr. AK Srivastava	Member
3.	Sh. Chironji Lal	Member
4.	Sh. VR Srinivasan	Member
5.	Sh. DN Bhatia	Member-Secretary
Staff-side Representative		
6.	Sh. Mahendar Singh	Member
7.	Sh. RK Singh	Member
8.	Sh. Sudershan Sharma	Member
9.	Sh. Purshotam Sharma	Member

Four meetings of the Grievance Committee of the Institute were held on May 4, June 26, October 5 and December 31, 1999 under the chairmanship of the Director.

Hostel Activities

There are two well furnished hostels viz. Panse Hostel and Sukhatme Hostel to cater the residential requirements of the trainees and students of M.Sc., Ph.D. courses and Senior Certificate Courses (SCC) at the Institute within its premises. Officers and other trainees to the various other refresher, short-term and ad-hoc courses organised at the Institute are also provided residential accommodation at the Panse Hostel. Ample facilities exist for the cultural activities and sports for the hostel inmates. Hostel mess is run by the students on co-operative basis. The general management of the hostels is vested with the Warden, who is assisted by the Prefect and the other students. The main activities included are as follows:

A General Body meeting of IASRI hostel inmates was held under the Chairmanship of Shri RS Khatri, Warden. For smooth functioning of the hostel activities, the following executive committee members were elected for the session 1999-2000.

1.	Prefect	Sh. BMK Raju
2.	Assistant Prefect/Mess Secretary	Sh. Naveen Chona
3.	Sports Secretary	Sh. Hemant Kumar
4.	Computer Secretary	Sh. Abhishek Rathore
5.	Chief Auditor	Sh. Prakhar Prashant
6.	Maintenance Secretary	Sh. Basant Kumar
7.	Health & Sanitation Secretary	Md. Zubair Ahmed

In July 1999, SCC (Senior Certificate Course) Students also joined the Sukhatme Hostel and stayed there till April, 2000.

On the eve of annual day on July 2, 1999, a sports week was organised by IASRI in Sukhatme Hostel where students at IASRI including girls participated in various sports like table tennis, badminton etc. Several other sport events like table tennis and Tug-of-war were also organised between faculty members and students. A cricket match was also organised between faculty members and students including SCC students on March 8, 2000.

Boarding and lodging arrangements were made in Panse Hostel (Guest House) for the participants of various training programmes organised at the Institute. Similar arrangements were made for the guests who stayed in guest house from different departments/organisations.

Benevolent Fund

The employees of the Institute have constituted a Benevolent Fund from their own contributions to provide relief to the families of the employees who die in harness and are left in an indigent condition and a gift of Rs.500/- is being given to the retiring exployees of the Institute. A meeting of the Benevolent funds was held on February 23, 2000.

Co-operative Store

The cooperative store registered with the Registrar, Cooperative Societies, Delhi Administration, Delhi continued to be run for the benefit of the staff members of the Institute. Cold drinks, coffee, snacks provisions and general merchandise etc. were made available at reasonable rates to the staff members of the Institute.

Member's Children Education Welfare Scheme was introduced by the Managing Committee during the year 1997-98 for the promotion of educational improvement for the children of the members of the cooperative store. Under the scheme 12 children of the members of the cooperative store were benefited during 1999-2000. The total membership of the cooperative store as on 31st March, 2000 was 443

Sports Activities

A contingent comprising of about 30 (officers and staff) participated in the ICAR-Zone IV Inter-Institutional Tournaments at Central Soil Salinity Research Institute, Karnal from November 29 to December 2, 1999.

The Institute team participated in various games and brought laurels to the Institute by way of achieving the prestigious positions as:

1. Champion Trophy in Table Tennis (Men) by out closing teams from 21 Institutes and even the finals were won by a comfortable margin of 3-0 against CPRI, Shimla. The team was represented by Sh OP Khaunduri (Captain), Dr KK Tyagi, Sh GM Pathak, Sh SK Upadhayay and Sh Ram Bhool.

2. Runner up Trophy in Table Tennis (Women) by securing second position. Our team was represented by Dr (Mrs) Ranjana Agrawal (Captain), Mrs Vijaya

Laxmi Murthy, Ms Sonali Das and Mrs Bachint Kaur.

3. Third position in Discus Throw (Women) achieved by Smt Vijaya Laxmi Murthy.

Recreation and Welfare Club

The Institute has a Recreation and Welfare Club which provides facilities for indoor and outdoor games, promotes 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 e.g. Table Tennis, Carrom, Volleyball, Card games etc. The sport tournaments for the year 1999 were organised during 1999-2000. Following is the Executive Committee of R&W Club:

1. Prof. SD Sharma	President
2. Dr. KK Tyagi	Vice-President
3. Sh. Santosh Kumar	Secretary
4. Sh. Ram Bhool	Sports Secretary
5. Sh. KK Hans	Hony. Secretary
6. Sh. Mohan Lal	Member
7. Sh. Naresh Kumar	Member
8. Sh. Pradeep Kumar	Member
9. Sh. Diwan Singh	Member

संस्थान में राजभाषा के बढ़ते चरण

प्रतिवेदनाधीन अवधि के दौरान दिनांक ४.६.९६ को परिषद की निरीक्षण समिति ने संस्थान का दौरा किया और उन्होंने डॉ. ए.के. श्रीवास्तव की अध्यक्षता में समस्त प्रभाग प्रधानों/अनुभागाध्यक्षों के साथ संस्थान में हिन्दी के प्रगामी प्रयोग पर चर्चा की। चर्चा के दौरान निरीक्षण समिति के सदस्यों ने संस्थान के गुण–दोषों का वर्णन करते हुए अनेक बहुमूल्य सुझाव दिये। जिन पर संस्थान में तत्काल अमल किया गया। संस्थान में राजभाषा हिन्दी के प्रगामी प्रयोग में हो रही अभिवृद्धि का जायजा लेने के लिए निदेशक महोदय द्वारा गठित संस्थान राजभाषा निरीक्षण समिति द्वारा प्रत्येक प्रभाग/अनुभाग से हर तिमाही की निरीक्षणप्रश्नावली भरवाकर मंगवाई गई। जिसके आधार पर संस्थान निरीक्षण समिति ने दिनांक २७.१०.९६ को समस्त अनुभागों का निरीक्षण किया और दिनांक ७.१.२००० को समस्त प्रभाग प्रधानों के साथ निरीक्षण – बैठक की। समिति सदस्यों ने प्रभाग प्रधानों को सुझाव दिये कि वे किस प्रकार अपने दैनिक काम–काज में हिन्दी का प्रयोग बढ़ा सकते है। संस्थान के विभिन्न अनुभागों एवं प्रभागों में हो रहे हिंदी के कम प्रयोग को देखते हुए समिति ने निदेशक महोदय के समक्ष अपनी सिफारिशें प्रस्तुत कीं, जिन्हें निदेशक महोदय ने स्वीकार किया और उन पर अमल करने के लिए निदेशक महोदय की ओरसे आदेश भी जारी किये गये ।

डा. दरोगा सिंह स्मारक व्याख्यान के व्याख्यानदाता प्रो. एस. के. सिन्हा को स्मारिका भेट करते हुए संस्थान निदेशक डा. एस.डी. शर्मा

प्रतिवेदनाधीन अवधि के दौरान संस्थान में दिनांक १.६.१९९६ से १.०.१९९६ के दौरान हिन्दी चेतनामस का आयोजन किया गया । जिसका उद्घाटन निदेशक महोदय द्वारा किया गया । निदेशक महोदय ने अपने उद्घाटन भाषण में समस्त अधिकारियों/ कर्मचारियों को अपना दैनिक कार्य हिन्दी में करने के लिए प्रेरित किया । चेतनामास के दौरान निम्न कार्यकम आयोजित किये गये :

१. काव्य पाठ
२. वाद–विवाद प्रतियोगिता
३. अन्ताक्षरी प्रतियोगिता
४. डॉ. दरोगा सिंह स्मारक व्याख्यान
५. प्रश्न–मंच प्रतियोगिता

उपरोक्त काव्य पाठ में डॉ. श्रीमती रंजना अग्रवाल, श्री राजेन्द्र सिंह, श्री वी.के. मिश्र, श्री संतोष कुमार उपाध्याय, श्रीमती हर्ष कपूर, श्री अनिल कुमार अग्रवाल, श्रीमती बचिंत कौर, श्री उमेश चन्द बन्दूनी ने हिस्सा लिया। वाद विवाद प्रतियोगिता विषय था – ष्दैनिक काम काज में राजभाषा हिन्दी का स्वैच्छिक प्रयोग नियम अथवा नीति के मुकाबले अधिक कारगर होगा – इसमें सहभागियों ने अपने सार्थक विचार प्रस्तुत किये। विषय के पक्ष में सर्वश्री दिनेश प्रसाद सेमुआल, ज्ञान चन्द तथा विपक्ष में सर्वश्री अनिल कुमार अग्रवाल, संतोष कुमार उपााध्याय, श्रीमती हर्ष कपूर और उमेश चन्द बन्दूनी ने अपने विचार प्रस्तुत किये। वाद–विवाद प्रतियोगिता में प्रथम स्थान श्री उमेश चन्द बन्दूनी, दूसरे स्थान पर श्री अनिल कुमार अग्रवाल तथा तीसरे स्थान पर श्री सन्तोष कुमार उपाध्याय रहे।

अन्ताक्षरी में चार टीमों, वैज्ञानिक, तकनीकी, प्रशासनिक एवं छात्र ने हिस्सा लिया। वैज्ञानिक वर्ग में डॉ. श्रीमती रंजना अग्रवाल, , डॉ. श्रीमती अलका अरोड़ा, डॉ. गिरीश कुमार झा **तकनीकी वर्ग** में सर्वश्री रमेश चन्द त्रिपाठी, संतोष कुमार उपाध्याय, जी.एम. पाठक, **प्रशासनिक टीम** में श्री कृपा शंकर मिश्र, श्रीमती हर्ष कपूर, श्री कृष्ण कुमार, **छात्र टीम** में श्री नवीन चोन्ना, श्री प्रखर प्रशान्त, श्री दिलीप कुमार पाण्डा ने हिस्सा लिया। जिसमें प्रशासनिक टीम प्रथम स्थान पर तकनीकी टीम द्वितीय स्थान पर रही। प्रश्न–मंच में भी चार टीमों ने हिस्सा लिया। वैज्ञानिक टीम में डॉ. बी.सी. सक्सेना, डॉ. के.के. त्यागी, व डॉ. यू.सी. सूद, तकनीकी टीम से श्री अलोक, श्री सुनील, श्री सन्दीप, प्रशासनकि टीम में श्री संदीप दराल, श्री प्रदीप कुमार, श्री कृष्ण कुमार तथा छात्र टीम में श्री अभिषेक, श्री प्रखर प्रशान्त, मो. जुबेर अहमद ने हिस्सा लिया। इसमें प्रशासनिक टीम ५५ अंक लेकर प्रथम, तकनीकी वर्ग की टीम ४५ अंक लेकर द्वितीय तथा वैज्ञानिक टीम ३५ अंक लेकर तृतीय स्थान पर रहीं। इसके अतिरिक्त सदन का पुरस्कार श्री अमर सिंह ने प्राप्त किया।

चेतनामास के दौरान १४ सितम्बर, १९९९ को हिन्दी दिवस मनाया गया। इस अवसर पर ष्डॉ. दरोगा सिंह स्मारक व्याख्यानष् का आयोजन किया गया। इसके वक्ता भारतीय कृषि अनुसंधान संस्थान के पूर्व निदेशक तथा राष्ट्रीय प्रोफेसर, प्रो.एस. के. सिन्हा ने वर्तमान सन्दर्भ में कृषि अर्थव्यवस्था पर एक सारगर्भित व्याख्यान प्रस्तुत किया। चेतना मास का समापन समारोह दिनांक १ अक्टूबर, १९९९ को हुआ। इस अवसर पर दिल्ली विश्वविद्यालय के पूर्व विभागाध्यक्ष {हिन्दी} प्रो. नित्यानन्द तिवारी, मुख्य अतिथि थे। समापन समारोह का शुभारम्भ श्री अखिलेन्द्र पाल सिंह द्वारा लिखित एवं निर्देशित एकांकी ष्हर शाख पर उल्लू बैठा हैष् के मंचन से हुआ। एकांकी में संस्थान के अधिकारियों/कर्मचारियों ने अभिनय किया। श्री एस.के. सबलानिया, श्री अनिल कुमार अग्रवाल, श्री डी.सी. पन्त, श्री उमेश चन्द बन्दूनी, श्रीमती सुमन पोपली, श्रीमती पुष्पा बरेजा, श्री हयात सिंह, श्री

विजय, श्री चरण सिंह का अभिनय सराहा गया।

प्रो. नित्यानन्द तिवारी ने अपने भाषण में मंचित एकांकी की भूरि–भूरि प्रशंसा की। प्रो. तिवारी इस बात से क्षुब्ध अवश्य थे कि देश में हिंदी दिवस मनाया जाता है परन्तु संस्थान में हो रहे हिन्दी के प्रगामी प्रयोग की वृद्धि से संतुष्ट थे। उन्होंने अपने भाषण में इस बात पर जोर दिया कि संस्थान के सभी कर्मचारी देश प्रेम की भावना हृदय में रखकर अपने दैनिक काम–काज में हिंदी का प्रयोग करें। तदोपरान्त, मुख्य अतिथि महोदय ने चेतनामास के दौरान आयोजित विभिन्न प्रतियोगिताओं में सफल प्रतियोगियों को पुरस्कृत किया ।

वर्ष १९९८ में राजस्थान कृषि विश्वविद्यालय, उदयपुर में आयोजित कृषि अनुसंधान सांख्यिकी के १२वें राष्ट्रीय सम्मेलन में हुई हिन्दी की एक राष्ट्रीय संगोष्ठी में विभिन्न वैज्ञानिकों द्वारा प्रस्तुत लेखों को संकलित कर वर्ष १९९९ में एक स्मारिका के रूप में प्रकाशित किया गया। यह प्रकाशन संदर्भ साहित्य के रूप में अत्यन्त ही महत्वपूर्ण है।

वर्ष १९९९ के दौरान हिन्दी शिक्षण योजना के अन्तर्गत संस्थान के तीन आशुलिपिकों, श्रीमती सुषमा बनाती, श्रीमती कमलेश विज और श्री सूरत राम को हिन्दी आशुलिपि का तथा चार कनिष्ठ लिपिकों, श्रीमती चन्द्र कला, श्री त्रिलोक सैनी, श्री सुनील, कुमारी राखी को हिन्दी टंकण का प्रशिक्षण दिलवाया गया। हिन्दी आशुलिपि परीक्षा में श्रीमती सुषमा बनाती तथा श्रीमती कमलेश विज ने रू. ४००/– का तथा हिन्दी टंकण की परीक्षा में कुमारी राखी ने रू.२००/– का नकद पुरस्कार प्राप्त किया।

संस्थान में राजभाषा कार्यान्वयन समिति की बैठक प्रत्येक तिमाही में नियमित रूप से आयोजित की गईं। इन बैठकों में राजभाषा के प्रयोग में अभिवृद्धि हेतु अनेक निर्णय लिये गये, जिनपर आववश्यक कार्रवाई की गई।

विशिष्ट सारांश

भारतीय कृषि सांख्यिकी अनुसंधान संस्थान भा.कृ.अ.प. की स्थापना सन १९५९ में हुई थी तभी से यह संस्थान कृषि सांख्यिकी में अनुसंधान को बढावा दे रहा है और शिक्षा/प्रशिक्षण प्रदान करने का महति दायित्व निभा रहा है। सूचना प्रौद्योगिकी में हो रही उन्नति के साथ–साथ इस संस्थान ने स्वयं को कृषि अनुसंधान की वर्तमान जरूरतों के अनुकूल बनाया है। बदलते हुए परिवेश में संस्थान को सौपे गए कार्य हैं– कृषि सांख्यिकी में मौलिक, व्यावहारिक और अनुकूल अनुसंधान करना, राष्ट्रीय कृषि सांख्यिकीय प्रणाली को विकसित करने एवं सुदृढ बनाने में सहायता करना, कृषि सांख्यिकी एवं कम्प्यूटर उपयोग में स्नातकोत्तर और सेवाकालीन पाठयक्रम चलाना, परामर्श सेवाएं प्रदान करना, कृषि सांख्यिकी में सूचना भण्डार के रूप में कार्य करना, कृषि सांख्यिकी और कंप्यूटर उपयोग में एक उन्नत श्रेष्ठ शिक्षा एवं प्रशिक्षण केन्द्र के रूप में संस्थान को विकसित करना और इन विषयों में राष्ट्रीय एवं अन्तर्राष्ट्रीय संगठनों के प्रायोजित अनुसंधान कार्य करना।

संस्थान के विभिन्न प्रभागों जैसे प्रतिदर्श सर्वेक्षण, परीक्षण डिजाइन जैव–सांख्यिकी, पूर्वानुमान तकनीक, अर्थमिति और कंप्यूटर उपयोग में अनेक अनुसंधान परियोजनाएं चलाई जाती हैं। प्रतिवेदनाधीन वर्ष के दौरान ३० अनुसंधान परियोजनाएं और एक रिवाल्विंग फंड परियोजना चलाई गई । संस्थान में चलाई गई परियोजनाएं थीं– मुर्गियों के मांस का उत्पादन, अन्तर्देशी मत्स्य झोल आकलन, उत्पादन एवं क्षेत्रा आकलन, मूल्यांकन एवं मूल्य निर्धारण अध्ययन, सूदुर संवेदी और भौगोलिक सूचना प्रणाली, आंकडों के आधारों के विकास, फसल प्रणाली अनुसंधान, कृषि एवं पशु परीक्षणों के लिए सूचना प्रणाली, पशु कृषि वानिकी और मत्स्य अनुसंधान के लिए परीक्षण डिजाइन, कृषि प्रणाली में पूर्वानुमान तकनीक कृषि में प्रौद्योगिकी संबंधी बदलाव, कृषि में जोखिम और अनिश्चितता तथा कृषि नियोजन की मॉडलिंग। इनमें से कुछ अध्ययनों में संस्थान, विभिन्न प्रोयोक्ता संगठनों के साथ सहयोग कर रहा है। अनुसंधान समन्वय एवं प्रबंध एकक, समन्वय एवं प्रबंध कार्य के अलावा संस्थान की वार्षिक रिपोर्ट, तिमाही भा.कृ.सां.अ.सं. समाचार का प्रकाशन करने के साथ–साथ प्रगति रिपोर्ट पर नजर रखता है और साथ ही नौवीं योजना के लिए ई.एफ.सी. ज्ञापन और उसकी मध्यावधि समीक्षा भी करता है।

प्रतिदर्श सर्वेक्षण प्रभाग, फसल, पशुधन मात्स्यिकी और दूसरे क्षेत्रों से संबंधित विकास संबंधी कार्य करता है। इस प्रभाग में नौ अनुसंधान परियोजनाओं का काम शुरू किया गया, जिसमें कुक्कुट पालन, मांस उत्पादन अन्तर्देशीय मत्स्यझोल आकलन, उत्पादन एवं क्षेत्रा आकलन, मूल्यांकन एवं मूल्य निर्धारण अध्ययन और सुदूर संवेदी तथा भौगोलिक सूचना प्रणाली पर विशेष जोर दिया गया। कृषि अनुसंधान का कार्य देश में कृषि की नियोजित और टिकाउ विकास का एक महत्वपूर्ण निवेश है। प्रभाग द्वारा १९९६ से ही कृषि अनुसंधान डाटा पुस्तिका का प्रकाशन किया जा रहा है। इस श्रृंखला की चौथी पुस्तिका, **कृषि अनुसंधान डाटा बुक** १९९९ के रूप में प्रकाशित हुई है। इस पुस्तिका में, कृषि अनुसंधान शिक्षा और प्रकाशित और अप्रकाशित रिपोर्टों में भिन्न–भिन्न स्त्रोतों से संबंधित पहलूओं के मुख्य घटकों / सूचकों को एक साथ संकलित करने का प्रयास किया गया है। प्रभाग द्वारा अनेक प्रायोजित प्रशिक्षण कार्यक्रम आयोजित किए गए, जिन्हें भा.कृ.अ.प. प्रणाली से बाहर के संगठनों द्वारा वित्तीय सहायता मिल रही है। संस्थान द्वारा संसाधन उत्पादन में किए जा रहे प्रयासों के प्रति प्रभाग का यह एक सकारात्मक कदम दिखाई पडता है। परामर्श प्रयासों के रूप में भी अनेक परियोजनाएं तैयार की गई हैं। जिन्हें अन्य एजेंसियों द्वारा वित्तीय सहायता प्राप्त होगी। इन अनुसंधान परियोजनाओं के प्रशिक्षण कार्यक्रमों के साथ–साथ परामर्श सेवाओं का लाभ, राष्ट्रीय कृषि अनुसंधान प्रणाली, राज्य कृषि विभाग, आर्थिक एवं सांख्यिकी निदेशालय, कृषि मंत्रालय के पशुपालन एवं डेयरी विभाग, केन्द्रीय सांख्यिकी संगठन एवं राष्ट्रीय प्रतिदर्श सर्वेक्षण संगठन इत्यादि के अनेक संस्थानों को मिलेगा। संस्थान के इस प्रभाग में उपयुक्त हार्डवेयर/डिजिटल आकृति संसाधन एवं जी आई एस सॉफटवेयर जैसे साजो–सामान से सुसज्जित एक **प्रयोगशाला** स्थापित की गई है।

परीक्षण अभिकल्पना प्रभाग द्वारा परीक्षणों की विभिन्न अवधियों में किए गए उपचारों के दो या उससे अधिक समुच्चयों के लिए तैयार डिजाइनों के अध्ययन का कार्य शुरू किया गया है, जिसे भा.कृ.अ.प. के ए पी सैस फण्ड द्वारा वित्तीय सहायता दी जा रही है। यह अध्ययन मूल रूप से ऐसी परीक्षण डिजाइनों का विकास करने से संबंधित है जिनमें उपचार के भिन्न–भिन्न समुच्चय, अनुक्रमण में ब्लॉक डिजाइन सैटिंग अथवा पंक्ति–कॉलम सैटिंग में लगाए जाते हैं। अनुक्रमण में लगाए उपचारों के गैर अनुक्रियात्मक समुच्चयों के लिए अभिलक्षणन एवं अनुकूल गुणों का अध्ययन किया गया है। उस स्थिति का भी अध्ययन करने का प्रयास किया गया है जिसमें ब्लॉक डिजाइन में अनुक्रमण में लगाए गए उपचार अनुक्रियात्मक होते हैं। डिजाइन तैयार करने की कुछ विधियां भी कुशल डिजाइनों के केटेलागों के साथ दी गई हैं। इस प्रकार की स्थितियों से संबंधित अनुसंधान में लगे वैज्ञानिकों, छात्रों और अन्य

अनुसंधानकर्ताओं के लिए यह अध्ययन अत्यन्त ही उपयोगी सिद्ध होगा।

वर्ष के दौरान अखिल भारतीय समन्वित अनुसंधान परियोजना के तहत विभिन्न सहयोगी परियोजनाओं से प्राप्त आंकडों का विश्लेषण उपयुक्त सांख्यिकीय तकनीकों की सहायता से किया गया। भारतीय वानिकी एवं शिक्षा परिषद में कार्यरत वरिष्ठ स्तर के वैज्ञानिकों के लिए दो प्रशिक्षण कार्यक्रम आयोजित किए गए जो अनुसंधान पद्धति पर थे और जिनमें सांख्यिकी पर खास जोर दिया गया।

कृषि प्रणाली में माडलिंग एवं कम्प्यूटर अनुकार तकनीकों, आनुवंशिकी एवं जैव प्रौद्योगिकी में सांख्यिकी अन्वेषण, और कृषि सांख्यिकी पर कम्प्यूटर उपयोग में अध्यापन एवं प्रशिक्षण में अनुसंधान संबंधी कार्य करने का उत्तरदायित्व जैव सांख्यिकी प्रभाग का है। वर्ष के दौरान भारतीय नस्ल की बकरियो में वृद्धि प्रतिमान {ग्रोथ पैटर्न} और स्वस्थता विशेषकों की वंशागतिष पर एक परियोजना का काम चला और परियोजना के दो नए प्रस्तावों को शुरू किया गया, जिन्हें फरवरी २००० में हुई एस आर सी की बैठक में अनुमोदित किया गया था। ये प्रस्ताव हैं– वंशागति के आकलनों पर नियत प्रभावों के प्रभाव पर आनुभाविक अन्वेषण और उपज एवं स्थिरता के लिए एक साथ जीनप्ररूपों {जीनोटाईप} का चयन करने के लिए सांख्यिकी पद्धति का विकास।

फसल रोग एवं नाशी पीडकों के लिए पूर्वानुमान तकनीक प्रभाग का नाम जनवरी २००० में बदलकर पूर्वानुमान तकनीक रख दिया गया। इस प्रभाग को सौपे गए कार्य हैं–सस्य मौसमविज्ञानीय फसल उपज का पूर्वानुमान और पूर्व–चेतावनी प्रणाली का विकास, उपज पूर्वानुमान में सुदूर संवेदित आकडों का उपयोग, मवेशियों की संख्या का पूर्वानुमान दूध उत्पादन, मत्स्य उत्पादन और कुक्कुट उत्पादन, बाढ, सूखा, इत्यादि के कारण हुई क्षति का मूल्यांकन करना।

फसल उपज पुर्वानुमान के क्षेत्रा में सांख्यिकीय तकनीकों का विकास करने और फसल, नाशीकीटों और रोगों के आसन्न प्रकोप के लिए पुर्वानुमान तकनीक पर प्रयोग किए गए। आलू और चैंपा के प्रकोप की पुर्व–चेतावनी प्रणाली के विकास पर अध्ययन से पता चलता है कि दो प्रकार के अर्थात {।} अरैखिक माडल जिनमें भिन्न–भिन्न कोटिज्या फलनों {कोसाईन फंक्शन्स} का उपयोग किया गया {।।} जी. एम.डी.एच. तकनीक की सहायता से उच्च श्रेणी के समिश्र बहुपद, मॉडल विकसित किए गए। इन माडलों के पूर्वानुमानित मान, प्रेक्षित माडल के काफी करीब थे। मौसम संबंधी चरों के आधर पर दो सप्ताह पूर्व चैंपा की पूर्व चेतावनी संभव है।

एक अध्ययन में गेहूं के पूर्वानुमान माडल का विकास करने के लिए बेज़ियन प्रायियिकता माडल का इस्तेमाल किया गया है। किसानों के साथ दो चकों की पूछताछ

से प्राप्त अनुक्रिया के आधार पर विभिन्न वर्गो में उपज प्राप्त करने की औसत पूर्व प्रायिकताओं की संगणना की गई। इन किसानों की वास्तविक कटी हुई उपज को ध्यान में रखते हुए पश्च प्रायिकताएं प्राप्त की गईं। इन पश्च प्रायिकताओं की सहायता से आने वाले वर्ष के लिए बेजियन पूर्वानुमान की संगणना की गई। पूर्वानुमान में १.८३ क्विंटल प्रति हैक्टयर की मानक त्रुटि रहती है।

सांख्यिकी अर्थशास्त्रा प्रभाग का नाम भी जनवरी २००० में बदल कर अर्थमिति प्रभाग रख दिया गया। प्रभाग को सौंपे गए कार्य हैं–कृषि के मॉडल से संबंधित कार्य, अरैखिक आर्थिक माडलों का कार्य, प्रौद्योगिकीय संबंधी बदलाव और इसके विसरणों का अध्ययन करना। कृषि में जोखिम और अनिश्चितता तथा कृषि विकास एवं गरीबी उन्मुलन संबंधी अध्ययन। वर्ष के दौरान प्रभाग के वैज्ञानिक हरियाणा में कुक्कुट उत्पादन में कुशलता पूर्वक संसाधनों के उपयोग एवं फसल उत्पादन पर सूक्ष्म सिचांई प्रणाली, संसाधनों की बचत महेन्द्रगढ और गुडगांव जिले में आय और रोजगार के अध्ययन पर चल रही परियोजनाओं में कार्यरत रहे।

रिवालविंग फण्ड योजना के तहत कम्प्यूटर उपयोग प्रभाग द्वारा सूचना प्रौधोगिकी में प्रशिक्षण दिया जाता है। प्रभाग द्वारा एन ए आर एस में अनुसंधानकर्ताओं को चुनिन्दा सूचना सेवाएं प्रसारित की है। प्रभाग कृषि शिक्षा पर एक राष्ट्रीय सूचना प्रणाली का विकास कर रहा है । कृषि शिक्षा पर राष्ट्रीय सूचना प्रणाली के विकास का कार्य प्रगति पर है। एन ए टी पी का एक महत्वपूर्ण घटक है–एन ए टी पी एवं एन ए आर एस में समुन्नत अनुसंधान प्राथमिकताओं के संयोजन एवं परियोजना मानीटरन एवं मूल्यांकन प्रकिया का संस्थानीकरण। एन ए टी पी के पी एम ई के तहत मानीटरन एवं समकालिक मूल्यांकन के अपने उत्तरदायित्व को प्रभाग ने निभाना शुरू कर दिया है और एक सूचना एवं प्रबन्ध प्रणाली परियोजना का विकास हो रहा है। प्रभाग द्वारा कृषि वैज्ञानिक नियुक्ति मण्डल की ए.आर.एस. / एन ई टी/ एस आर एस–९६ और वित्त एवं लेखा अधिकारी परीक्षा–९६ के आकडों के कम्प्यूटरिकरण एवं संसाधन संबंधी कार्य में सलाहकारी और परामर्श सेवाएं की उपलब्ध की गईं। प्रभाग द्वारा संस्थान से सतत रूप से कम्प्यूटर सेवाएं प्रदान की जा रही हैं और साथ ही प्रभाग ने संस्थान की संगणक सेवा को भी सुदृढ बनाया है। संसाधन उत्पन्न करने की दिशा में प्रभाग ने ४.८६ लाख रूपये भी कमाए हैं।

अनुसंधान समन्वय एवं प्रबंध एकक, संस्थान की वैज्ञानिक उपलब्धियों के दस्तावेज तैयार करने के साथ साथ उनका प्रसार भी करता है। इस एकक द्वारा तीन वर्ष में एक बार कृषि अनुसंधान सांख्यिकीविदों का एक राष्ट्रीय सम्मेलन तो करता है ही साथ ही संस्थान की एस आर सी, आर ए सी , क्यू.आर.टी. तथा प्रधान प्रभागों एवं वरिष्ठ वैज्ञानिकों की बैठकें भी

आयोजित करवाता है। समय–समय पर भा.कृ.अ.प. और उसके विभिन्न संस्थानों तथा राज्य कृषि विश्वविद्यालयों एवं भारत में स्थित अन्य संगठनों के साथ पत्राचार करने का उत्तरदायित्व भी इसी एकक का है। आर.सी.एम.यू. द्वारा नई अनुसंधान परियोजना प्रस्तावों की, उन्हें एस.आर.सी. के समक्ष इसकी समस्याओं की महत्ता के अलावा इसकी डिजाइन और जरूरतों के संदर्भ में विचारार्थ प्रस्तुत करने से पहले, जांच की जाती है । इसके अतिरक्ति इस एकक द्वारा संस्थान में चल रही परियोजनाओं की प्रगति पर नजर रखी जाती है और छमाही निगरानी प्रगति रिपोर्ट निकाली जाती है। वार्षिक कार्य योजना, गतिविधि संबंधी उपलब्धियां, ई.एफ.सी. ज्ञापन तैयार करने के साथ–साथ इस एकक में अनुसंधान परियोजना संबंधी फाइलों का रखरखाव भी किया जाता है और उन्हें ए.आर.आई.सी. {भा.कृ.अ.प.} एकक द्वारा कला, छायाचित्रा एवं रिप्रोग्राफिक की सहायता भी प्रदान की जाती है।

अनंसंधान सलाहकार समिति, प्रबंध समिति और स्टाफ अनुसंधान परिषद की बैठकें हुईं और लिए गए निर्णयों को लागू किया गया।

प्रशिक्षण प्रशासन कक्ष, पी.जी. स्कूल, भा.कृ.अ.सं. के सहयोग से संस्थान में समस्त स्नातकोत्तर अध्यापन एवं प्रशिक्षण कार्यक्रमों के लिए, कृषि सांख्यिकी एवं संगणक उपयोग के विशिष्ट विषयों में तदर्थ पाठ्यक्रम और कृषि सांख्यिकी एवं संगणक उपयोग में उच्च अध्ययन केन्द्र के तत्वावधान में प्रशिक्षण पाठ्यक्रम के नियोजन, आयोजन एवं समन्व्य के लिए उत्तरदायी है।

संस्थान के वैज्ञानिकों द्वारा कृषि सांख्यिकी और कंप्यूटर उपयोग के विषय से संबंधित अनेक कार्यशालाओं, सेमीनारों, ग्रीष्म संस्थानों में सहभागिता की गई। संस्थानों के वैज्ञानिकों ने विभिन्न अध्ययनों से प्राप्त परिणामों का विशेष उल्लेख करते हुए अनेक शोध–पत्रा प्रकाशित करवाए हैं। भिन्न–भिन्न संगठनों को परामर्श सेवाएं प्रदान की हैं।

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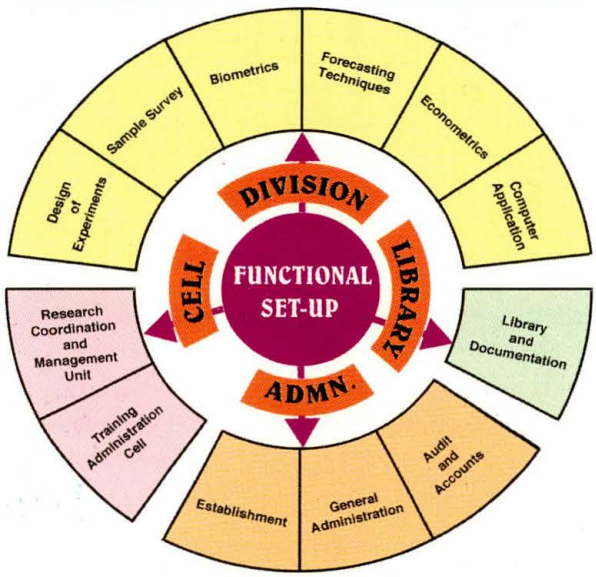

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