

कृषि सांख्यिकीय अनुसंधान संस्थान  
सांख्यिकीय सूचना-पत्र  
I. A. R. S.  
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कृषि सांख्यिकीय अनुसंधान संस्थान  
(भा० कृ० अ० प०)

लाइब्रेरी एवेन्यू, नई दिल्ली-११००१२

INSTITUTE OF AGRICULTURAL RESEARCH STATISTICS

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## पत्रकथन

कृषि सांख्यिकीय अनुसंधान संस्थान के सांख्यिकीय सूचना-पत्र का यह चारहवां अंक है और इसमें इस संस्थान से सम्बन्धित जुनाई-सितम्बर, 1977 की तिमाही की गतिविधियाँ तथा सम्बन्धित जानकारी का विवरण है।

मुख्य भाग है कि यह सूचना-पत्र कृषि सांख्यिकीविदों तथा अन्य प्रयोजकों के लिए लाभदायक सिद्ध हो रहा है। इसके अलावे अंकों में सुधार लाने हेतु मैं किसी भी प्रकार की टिप्पणी और सुझावों का आभार सहित स्वागत करता हूँ।

संस्थान के उन सब अधिकारियों तथा अन्य सदस्यों का आभारी हूँ जिन्होंने कृषि सांख्यिकीय अनुसंधान संस्थान सूचना-पत्र के इस अंक के लिए अर्पित सामग्री प्रदान की है। मैं अपने सहकर्मियों वरिष्ठ प्राध्यापक, डा० प्रमोदरायण का भी कृतज्ञ हूँ जिन्होंने सामग्री के निर्माण में सहयोग दिया है।

दरमोसिंह  
निदेशक,  
कृषि सांख्यिकीय अनुसंधान संस्थान,  
नई दिल्ली, 110012

## PREFACE

This is the eleventh issue of the *I.A.R.S. Statistical Newsletter* and covers the activities and allied information in respect of this Institute during the quarter July-Sept., 1977.

I hope this Newsletter has been proving useful for the Agricultural Research Statisticians and other users. I would welcome and appreciate any comments and suggestions for its improvement in the subsequent issues.

I am thankful to all the officers and other members of the staff of the Institute who supplied the requisite material for this issue of the *IARS Statistical Newsletter*. I am also thankful to my colleague, Dr. Prem Narain, Senior Professor for going through the final material.

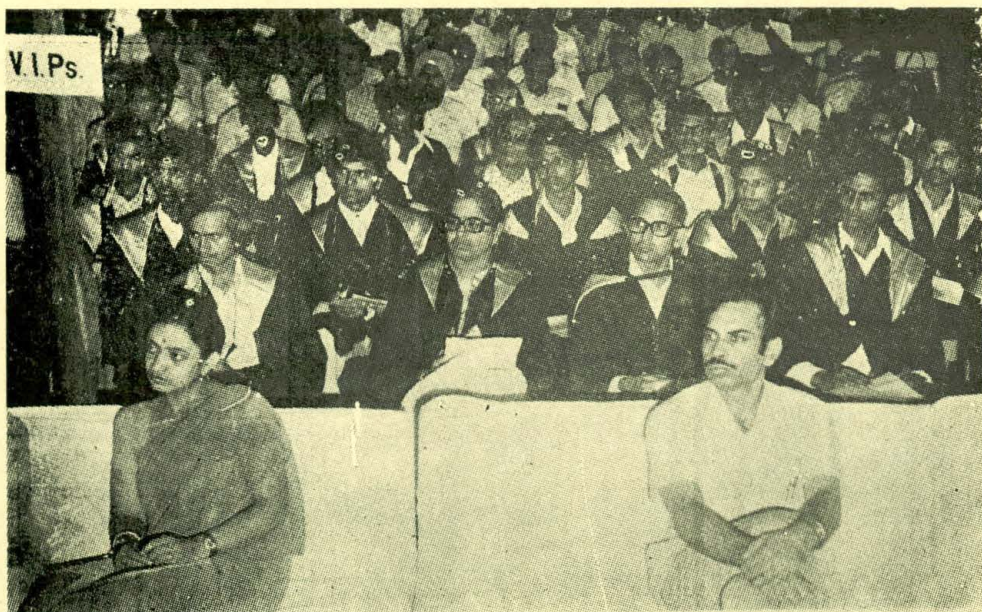
DAROGA SINGH  
DIRECTOR,  
INSTITUTE OF AGRICULTURAL  
RESEARCH STATISTICS,  
NEW DELHI-110012.



Chief Guest, Professor Satish Chandra, Chairman, U.G.C. delivering the Convocation Address.



Dr. Daroga Singh, Director, IARS, welcoming the guests.



Successful Candidates, in gowns, who received the certificates/diplomas and medals/prizes.

Shri K.N. Kurup

Award of Rs. 50/- in the form of books for standing first in Paper I of the Professional Statisticians' Course in the year 1976.

Shri Gulab Singh

Award of Rs. 50/- each in the form of books for standing first in Papers I, III and IV in the Professional Statisticians' Course in the year 1977.

In his Presidential remarks, Dr. M.S. Swaminathan, Director-General, I.C.A.R. stressed the importance of statistical techniques in improving the quality of research in the field of Agricultural and Animal Sciences. He commended the role that this Institute has been playing in the national context and advised that the expansion of the activities of the Institute should be more from the qualitative point of view rather than quantitative.

In his convocation address, the Chief Guest, Professor Satish Chandra Chairman, University Grants Commission stressed the importance of reliable and up-to-date statistical data in the context of providing with a base for a meaningful strategy of planned development aimed at improving the conditions of the rural masses, especially the backward ones. A full text of his speech is reproduced below:

"I am grateful to the Director, Institute of Agricultural Research Statistics for inviting me to deliver the XV Convocation Address of the Institute. Convocations serve many purposes. One purpose is to bring together students who have successfully completed their work at the Institute. I would like to congratulate all those students of Institute of Agricultural Research Statistics who have come here today to receive the Certificates and Diplomas. I am sure that their training at this well established Institute will serve them well in their future careers. Another purpose of Convocations is to take stock of the work done in the institutions concerned and to provide an opportunity to the outside community to acquaint itself with its work and achievements. Although I have heard much about the work of the IARS, this is the first time I have had an opportunity of visiting the Institute. I am aware that there is probably no other institution in the country where application of statistics to practical problems in the field of agriculture and animal sciences is dealt with from all angles. Except for some agricultural universities facilities for training of statisticians in the field of agriculture are nowhere as proficient as at this Institute. This Institute has, therefore, a great promise and also great responsibilities.

Since agriculture provides employment to 80% of our population, development in the field of agriculture must obviously be a national concern. The Janta Government headed by Shri Morarji Desai has rightly emphasized the importance

of agriculture in national development. A society in which the primary producer who provides sustenance for everybody but himself remain in hunger and want, and is deprived of basic amenities such as health, clothing and shelter, cannot obviously be regarded as just a society. Yet such has been the fate of the vast masses of our population, particularly the under-privileged section in village society—the landless labourers, the artisans and those cultivating dwarf holdings who together constitute about 30% of the rural population or more. In order to create a greater awareness of the life conditions of the rural masses especially the backward ones, and to provide a base for a meaningful strategy of planned development aimed at improving the conditions of these sections, reliable and up-to-date statistical data is vital. In recent years, there has been a great increase in the number of professional statisticians in universities, research institutes, Government departments and industries. However, it is unfortunate that the quality of data has hardly improved. In particular the unreliability of our agricultural data is well-known. There are many reasons for this situation. Some of them are related to structure of society and our institutions. However, at the scientific level, one reason for the lack of reliability of agricultural data is perhaps the fact that very often statisticians are not made familiar with the subject matter in which they are required to collect data. As an historian I have had to deal with agricultural data dealing with eastern Rajasthan during the 17th and 18th centuries. I have found on more than one occasion that a statistician is not able to marshal the data in a meaningful manner much less interpret it because of his lack of basic grounding in the subject. I am happy to know that at the IARS a professional agricultural statistician is required to have a fairly good knowledge of agriculture including animal sciences. I am quite sure that this will enable the statisticians to apply their theoretical training in a meaningful manner to analyse the complex problems of agriculture and agricultural animal sciences in our country.

With increasing emphasis on rural development the demand for trained agricultural statisticians is bound to increase rapidly. This would place an increasing responsibility on institutions specialising in this field. The IARS has already been able to develop a strong infra-structure in this field. It has excellent computer facilities. I am informed that the computer centre is catering to the needs of the data analysis of the entire agricultural community of the country. I am also informed that this Institute has been able to play an important role in developing methodology for conducting sample survey for the estimation of crop yields, livestock numbers and products, marine fish catch, etc. Perhaps I am not revealing any secret when I say that in the newly constituted National Committee on Science and Technology, which met recently, the need for having adequate statistical information regarding the research work being carried out by various institutions in the field of rural development was felt acutely. The work of the IARS in the preparation of National Index of Agricultural Field Experiments



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## 1. THE XV CONVOCATION OF I.A.R.S. TRAINING COURSES

The XV Convocation of the Training Courses of the Institute of Agricultural Research Statistics for the award of Diploma/Certificates to students completing successfully various courses of training in agriculture and animal husbandry statistics was held on the 4th October, 1977 in the morning in the Institute's premises. On this occasion, for the first time, the convocation was preceded by a two-day programme involving an elocution contest on 1st October, 1977 and a Session on "Presentation of Significant Students' Research" on the 1st October, 1977.

The elocution contest on 1st October was presided over by Dr. D. Singh, Director, I.A.R.S. The topic chosen for the contest was "Role of Agricultural Statistics in National Development". Dr. P.N. Saxena, Assistant Director General (Statistics) of the I.C.A.R., Dr. A.S. Sirohi, Head of the Division of Agricultural Economics of the I.A.R.I. and Dr. S.N. Singh, Head of the Division of Agricultural Extension, I.A.R.I. adjudged the speakers for the award of three prizes which were instituted on this occasion. As many as 11 students participated in this contest. The following three students were judged as the best speakers and were awarded respectively the 1st, 2nd and 3rd prize consisting of books on Statistics:

- (i) Shri S.C. Gupta—M.Sc. (Departmental)
- (ii) Shri L.B.S. Somayazulu—Ph.D. (Departmental)
- (iii) Shri R.L. Sapra—Ph.D. (Regular)

The Session on "Presentation of Significant Student's Research" was held on the 1st October, 1977 in the afternoon under the Chairmanship of Dr. O.P. Srivastava, Professor and Head of the Department of Mathematics and Statistics, Haryana Agricultural University, Hissar. Two students from the Diploma Course and 2 from the M.Sc. Course participated in this programme and gave talks on the topics shown below:

<i>Name of the Student</i>	<i>Topic</i>
1. Shri A. Vasisht, M.Sc. student (Regular)	Adoption of new agricultural technologies by cultivators in Delhi State and its impact on crop production, its disposal, storage, etc.
2. G. Balachandran, Diploma student (Regular)	Design and analysis of experiments involving sequences of treatments.

3. Shri P.P. Rao, Diploma student (Departmental) An investigation into the causes of heterogeneity of error variances in groups of similar experiments.
4. Mr. M.R. Zurmati, M.Sc. student (Regular) On the sampling design for estimation of price spread.

The Convocation of the I.A.R.S. Training Courses held on the 4th October, 1977 was presided over by Dr. M.S. Swaminathan, Director-General of the I.C.A.R. The Chief Guest on this occasion was Professor Satish Chandra, Chairman, University Grants Commission who gave away the Diploma/Certificates and the various prizes and medals. The guests were welcomed by Dr. D. Singh, Director of the Institute, and a detailed report on the training activities of the Institute was presented by Dr. Prem Narain, Senior Professor and Head of the Division of Training and Basic Research. In all, 64 candidates were given certificates including 10 for Junior Certificate Course, 24 for Senior Certificate Course, 22 for Professional Statisticians' Certificate Course and 8 for Diploma Course. The following candidates received the various medals and prizes:

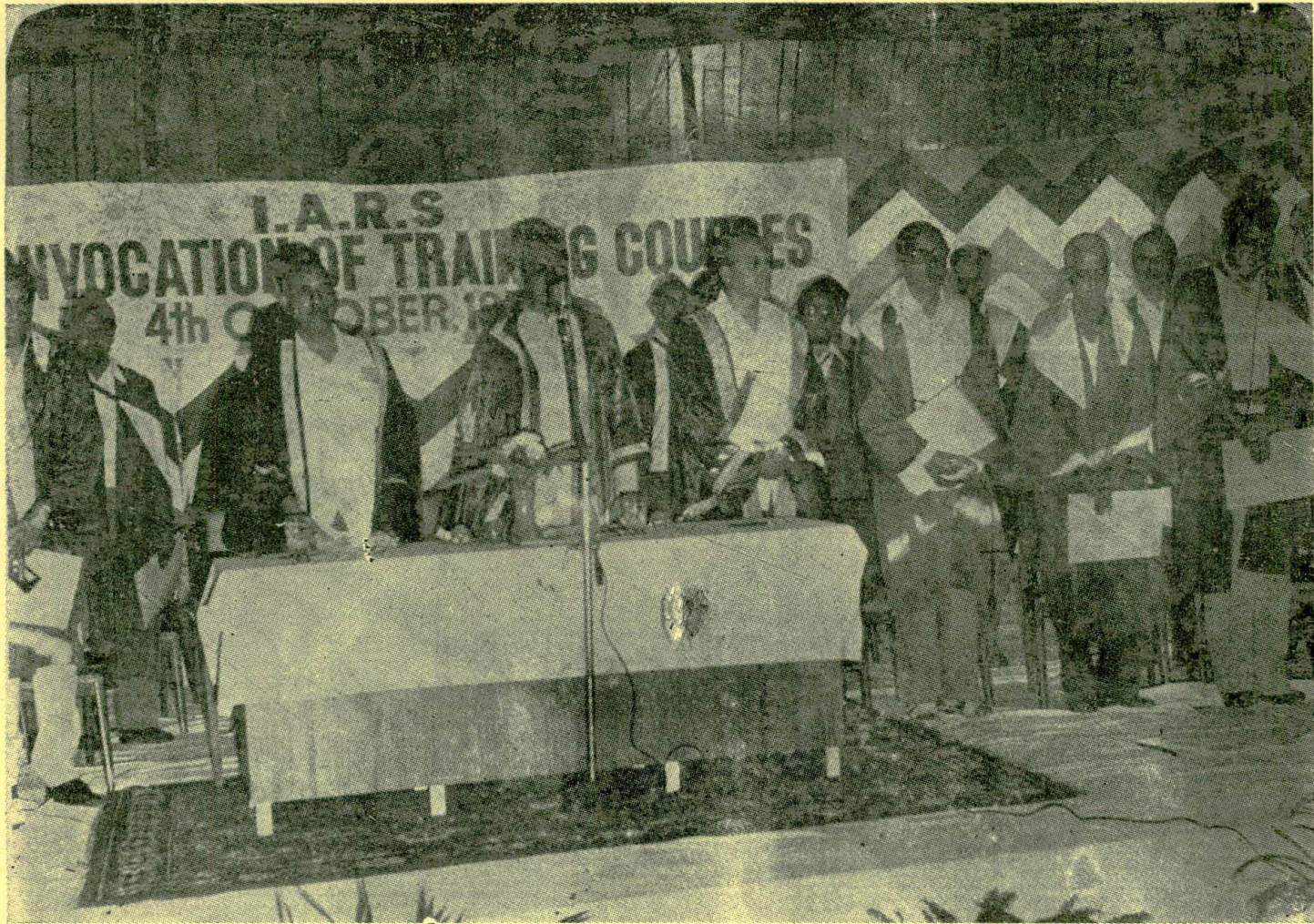
<i>Name of the Student</i>	<i>Prizes Awarded</i>
Shri G. Balachandran	Gold medal for being the best Diploma student for the year 1976.
Shri Vijay Kumar	Gold medal and also Shri V.V.R. Murthy memorial award of Rs. 100/- in the form of books for being the best student in Professional Statisticians' Certificate Course in 1976.
Shri U.M. Bhaskara Rao	Gold medal and also Sh. V.V.R. Murthy memorial award of Rs. 100/- in the form of books for being the best student in Professional Statisticians' Certificate Course in 1977 and also award of Rs. 50/- each in the form of books for being stood first in Papers V and practical papers.
Shri G.N. Rao	Gold medal for being the best student in Senior Certificate Course for the year 1976.
Shri V.V. Mahajan	Gold medal for being the best student in Senior Certificate Course for the year 1977.
Shri R.C. Gola	M.K. Bose memorial award of Rs. 100/- in the form of books for being the best student among Departmental candidates in the Senior Certificate Course for the year 1976.



Dr. M.S. Swaminathan, D.G., I.C.A.R.  
giving the presidential remarks.



Dr. Prem Narain, Sr. Professor, IARS presenting the  
Report on Activities of IARS Training Courses.



National Anthem.

and National Index of Animal Experiments will certainly be helpful in filling this lacuna. Perhaps the Institute could also take a lead in indexing on-going research projects in the field of Agricultural Sciences at various research centres.

A great deal has been said in recent days regarding programmes of non-formal education and extension work by institutions of higher learning. It is clear that no institution of higher learning can or should remain in an ivory tower atmosphere. It should not only try to link up its research work with the developmental needs of the country. It should also be prepared to make available its expertise to developmental agencies and to those who need additional training. Programmes of Continuing Education have an important role here. I am glad to know that the Institute arranges from time to time ad-hoc training programmes for various outside agencies and that it has organised several international training programmes in collaboration with U.N. Agencies. Linkages between various research agencies and the development of collaborative research programmes by different agencies needs considerable emphasis. The Faculty members of the Institute have already been recognised as Ph.D. guides by many universities and collaborate with other institutions in degree courses leading to M.Sc. and Ph.D. programmes. This is to be commended and I hope that it would further strengthen the academic programmes and the research work of the Institute.

Statistics is essentially an applied Science. No Statistical method can be of any worth unless its utility is demonstrated in the actual field. Theoretical problems in statistics have their own interest and challenges. However, the developments in theoretical Statistics have to have some relevance to its application also, and only when the theorist understand the consequences of the complexities of the practical field, the method can be applied safely and widely. To this end, I think the efforts of this Institute have been commendable for here the training is a careful blend of theory and practice. The teaching of Statistics in the universities also has to be made more practical oriented. There is a need for having more and more active collaboration between the universities and research institutions, like this Institute which specialise in problem oriented research. In my opinion, such collaboration efforts will help in a better development of the subject of statistics, which is so vital for proper planning for economic development of the nation.

The role that the faculty and students of this Institute have to play is going to be more and more important, and challenging in the coming years. More and more research workers all over the country, engaged in the fields of agriculture, animal sciences, fishery and forestry will have to seek the help of this Institute and wants to share its facilities in planning their experiments and interpretation of their results. Since computer facilities, which are essential for deeper analysis are adequate here, I am sure that this Institute can serve as a nucleus

for the statistical and computing needs of the agricultural community.

The Institute has had a glorious past. I am quite sure that it could have an equally glorious future. For this end, I am confident that both Faculty members and students will pool their efforts and set an example of cooperative endeavour."

The Convocation was declared closed after a Vote of Thanks to all concerned by Dr. A. Dey, Associate Professor at the Institute.

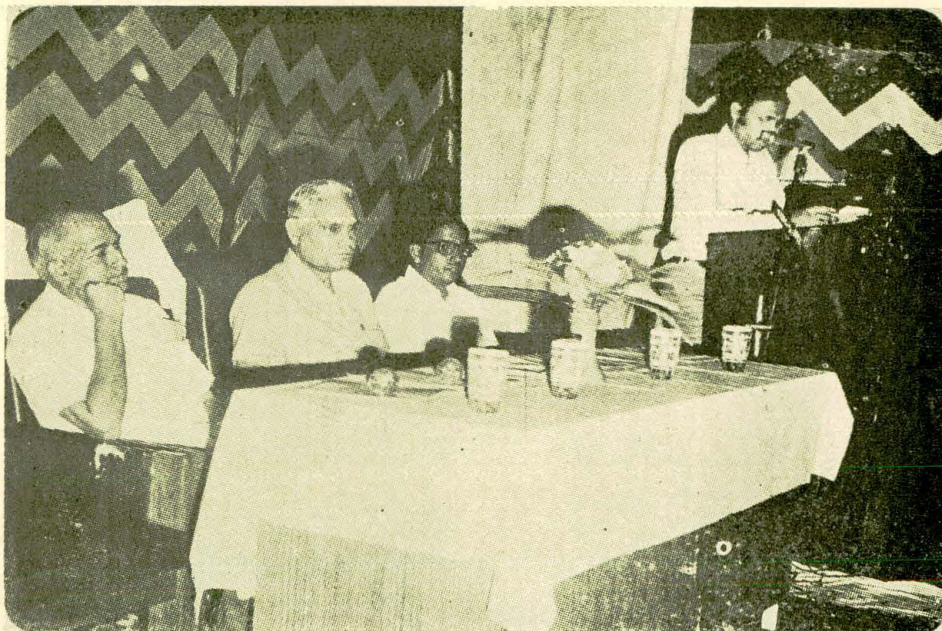
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## **2. IARS STUDENTS' ANNUAL DAY FUNCTION (1976-1977).**

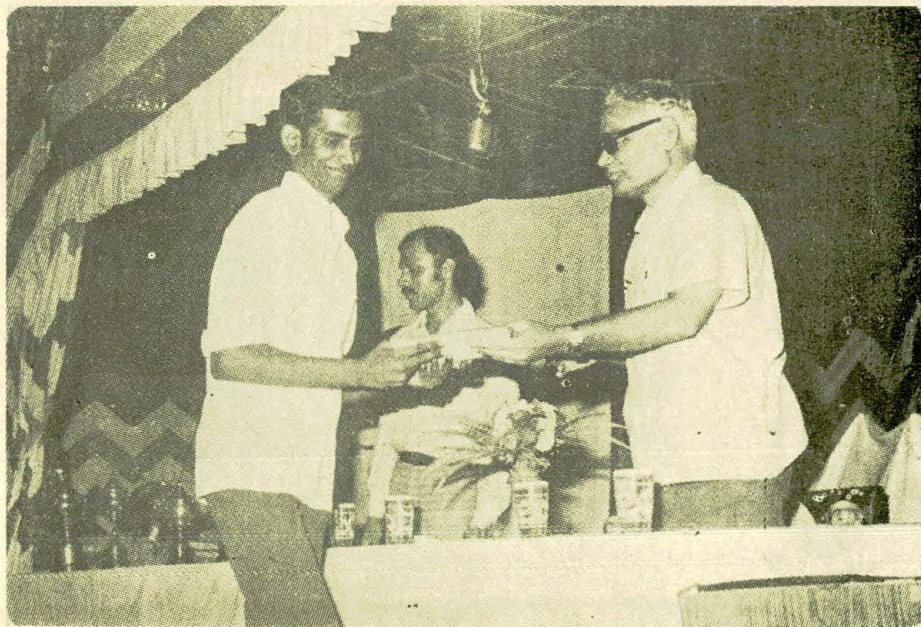
The students of the IARS Training Courses celebrate every year an 'Annual Day Function' in which prizes are given away to the students winning various tournaments as well as other extra-curricular activities in which they participate during the year. This year also such a function was held on the 4th October, 1977 in the evening. Shri Bhanu Pratap Singh, Minister of State for Agriculture and Irrigation, Government of India, was the Chief Guest who gave away the various prizes. A Souvenir on this occasion was also brought out by the students with the assistance of Warden of the I.A.R.S. Hostels. The function started with few items of sports where the students and staff members of the Institute participated in an enthusiastic manner. The main attraction of the sports was a tug-of-war between the students and staff members. The staff members won the match.

The guests at the Function were welcomed by Dr. D. Singh, Director of the Institute, who briefed them about the activities of the Institute. The Prefect of the Hostel, Shri A.C. Bora, presented an Annual Report on the activities of the IARS Hostels. He mentioned in particular the extra-curricular activities in which the students participated during their stay in the Hostels as well as the spirit of harmony in maintaining a healthy milieu of living together and sharing a common mess. After the presentation of the reports, the Chief Guest distributed the various prizes to the winners of the various tournaments conducted during the year. The Chief Guest in his address appreciated the activities of the scientists and the students of the Institute. He also reminded them of the noble onus on their shoulders which they owe to the





The Prefect, Sh. R.C. Bora, presenting the Annual Report on the Activities of the IARS Hostels.



Shri Bhanu Pratap Singh, Minister of State for Agriculture & Irrigation, Govt. of India distributing the prizes to the students.

Tug-of-War between  
Staff and Students.



An emotional scene from the One-Act play entitled CASE LAO VERNA BANAQ,  
presented by the students.



society and advised them to accomplish it in the best of spirits. Dr. Prem Narain, Warden of the Hostels, proposed vote of thanks to the guests and appreciated their presence in large numbers to encourage the students in their modest Function.

The prize distribution was followed by a lovely cultural programme in which a good number of students, artists from I.A.R.I. and some other institutions took part. The programme provided with a delightful evening which was enjoyed by a house-packed audience including distinguished invitees. The highlight of the programme was One-Act play entitled "CASE LAO VARNA BANAQ" presented by the students.

### 3. TRAINING ACTIVITIES

- (a) The final examination of Professional Statisticians Certificate and Senior Certificate Courses were held during the period under review. The details of students who appeared and passed the examination, are given below:

<i>Course</i>	<i>No. of students</i>	
	<i>Appeared</i>	<i>Passed</i>
P.S.C.C.	22	12
S.C.C.	7	6

- (b) The academic session 1977-78 of P.G. School started on 12th September, 1977. 5 students of Ph.D. (3 Regular and 2 Departmental) and 4 students of M.Sc. (3 Regular and 1 Departmental) were admitted in Agricultural Statistics. The final examination for the III trimester of the session 1976-77 was held during the week ending 17th September, 1977. Registration for I trimester for the session 1977-78 for the continuing M.Sc. and Ph.D. students was done on 19th September, 1977.

- (c) The training for the A.R.S. Probationers continued during the period under review. 3 Probationers went to Central Staff College, Hyderabad in the month of July, 1977 for 3 months training. The other probationers were undergoing training and working on the O.R.P. Projects during the quarter under review.
- (d) The following distinguished visitors delivered the seminar talks on the topics shown against them:

<i>Name of Speaker</i>	<i>Title</i>
(i) Dr. K. Subrahmaniam, Professor of Statistics, University of Manitoba, Canada.	"Robustness of Linear Discriminant Function to Non-normality"
(ii) Dr. Ummed Singh, Assoc. Prof., Haryana Agricultural University, Hissar.	"Analysis of data using Response Curves".

- (e) A programme of specialised lectures for a period of one week was arranged for the benefit of students of P.S.C.C. and S.C.C. for acquainting them with the various research projects of the Institute. In order to acquaint the students of these Courses with the research programmes of various departments, they were taken to the offices of Central Statistical Organisation, Directorate of Economics and Statistics and Agronomy Division, I.A.R.I.
- (f) "A survey on the "Impact of Tube-Well Irrigation on Agriculture" was organised in which the students of P.S.C.C. and S.C.C. carried out the field work under the technical guidance and supervision of the officers of the Training Unit. The students visited Bharatpur District, Rajasthan for the survey. Specialised training courses on Agricultural Statistics were arranged during the period under report for the benefit of trainees deputed from other organisations. The details of such programmes are given below:

<i>Sl. No.</i>	<i>Category of Trainees</i>	<i>Number of Trainees</i>	<i>Sponsoring Organisation</i>	<i>Duration</i>
1.	Statistical Officers	2	Indo-German Agricultural Project, Palampur (H.P)	22nd July, 77 to 31st Aug., 77.
2.	I.S.S. Probationers	10	C.S.O., New Delhi.	11th Aug., 1977.

#### 4. BASIC RESEARCH

A new method of analysis of non-orthogonal designs eliminating heterogeneity in two directions was developed.

A new class of designs called "Efficiency Balanced 3-way Designs" was introduced.

Some further results on fractional factorial plans for asymmetrical factorials were also obtained.

A class of "Supplemented Block Designs" which are partially efficiency balanced, was constructed. It was shown that the orthogonally supplemented balanced designs are a particular case of such designs and these designs are useful for plant breeding trials.

Estimation procedure utilising incomplete auxiliary information in sample surveys was established. New estimation procedure was suggested while large units are included in the sample with certainty.

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#### 5. ADVISORY SERVICE

During the quarter under review, technical advice and guidance was rendered to research workers and students of Research Institutes, Agricultural Universities and other research organisations in planning of experimental investigations and statistical analysis/computerisation of research data.

Some details of the technical advice and guidance given by the Institute during the quarter under review, are given below in brief :—

##### **Crop Sciences**

- (a) Dr. C.T. Abichandani, Emeritus Scientist, Central Arid Zone Research Institute, Jodhpur (Rajasthan) was rendered technical advice on the "Relationship between soil characters and rainfall variability with grassland productivity."

- (b) Five students from Faculty of Agriculture, B.H.U., Varanasi were given technical advice in regard to their Ph. D. theses.

### **Animal Sciences**

- (a) Dr. Ogra, a scientist from B.R. College, Agra (U.P.) was rendered technical advice on the analysis of data pertaining to nutrition and physiology.
- (b) I.C.A.R. was rendered advice in regard to various schemes in the field of animal breeding.

### **Statistical Genetics**

- (a) Dr. M.N. Narasimhanna, Director, Central Tasar Research Station, Central Silk Board, Ranchi (Bihar) was rendered technical advice on the "Statistical analysis of  $14 \times 14$  diallel on Bomby  $\times$  Mori (Silkwork)".
- (b) One Ph. D. Scholar of Dr. Khanna from National Botanical Garden, Lucknow (U. P.) was rendered technical advice on the statistical analysis of a "Diallel cross in sunflower with heterogeneous parents."
- (c) Dr. K.G.Lal, Assistant Commissioner (A.G.), Ministry of Agriculture and Irrigation, Govt. of India, New Delhi was rendered technical advice on "Progeny testing of cross-bred bulls under field conditions".

### **Sample Survey Investigations**

- (a) Directorate of Economics and Statistics, Ministry of Agriculture and Irrigation, Govt. of India, New Delhi was rendered technical advice on the planning of "Cost of cultivation survey on Apple in Himachal Pradesh."
- (b) Three Ph. D. students, Sh. A.K. Khazanchi, from R.B.S. College, Agra; Sh. Lahiri and Sh. Srivastava from B.H.U., Varanasi, were given technical guidance regarding the statistical and econometric analysis and interpretation of results.

### **Computer Science**

- (a) Directorate of marketing and Inspection, Ministry of Agriculture, Faridabad was advised in regard to computer programming and analysis of the data.

- (b) Dr. M.N. Kapur and Dr. N.S. Shastri from C.S.O., New Delhi were given technical guidance in development of computer programming for analysis of time series data using Box and Jenkin's method.
- (c) Sh. V.N. Mittal and Sh. Satish Chandra from Indo-German Agricultural project, Palampur (H.P.) were advised in regard to the statistical methods, sampling techniques and computer programming.

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## 6. FIELD WORK

### (a) Field Training

During the quarter under review, field training was imparted in connection with the projects mentioned below at the places shown against them.

- (i) All India Co-ordinated Agronomic Research Project—New Delhi.
- (ii) Pilot sample survey to estimate the incidence of pests and diseases on high yielding varieties of paddy—Cuddalore (Tamil Nadu).
- (iii) Index of cost of rearing calves and study of changes in rearing practices of bovines in rural areas of Haryana—New Delhi.
- (iv) Survey for study of economics of raising cattle and buffaloes in rural areas of West Bengal—Kalyani (W. Bengal).
- (v) Cost of cultivation survey on Orange—Nagpur (Maharashtra).
- (vi) Survey for estimating the yield of cotton in Hissar district—Hissar (Haryana).
- (vii) Pilot survey to evolve a suitable sampling methodology for estimation of price spread and losses in transit of vegetables at different stages of marketing—Ahmedabad (Gujarat) and Delhi.
- (viii) Sample survey for methodological investigations into High Yielding Varieties Programme—Lucknow (U.P.), Akola (Maharashtra) and Bangalore (Karnataka).

**(b) Field work Inspection/Supervision**

During the quarter under review, inspection/supervision of the field work of the following projects was carried out in the areas/places shown against them.

- (i) Pilot sample survey to estimate the incidence of pests and diseases on high yielding varieties of paddy—Panruti & Kurinjipadi (Tamil Nadu).
- (ii) Pilot sample survey to evolve a suitable sampling methodology for estimation of price spread and losses in transit of vegetables at different stages of marketing—Delhi.
- (iii) Pilot sample survey for estimation of birth and death rates in bovines in the districts of Panch Mahal and Kaira of Gujarat State—Kaira and Panch Mahal (Gujarat).
- (iv) Sample survey for methodological investigations into H.Y.V.P. in Delhi—Delhi.
- (v) Index of cost of raising calves and study of changes in rearing practices of bovines in rural area of Hissar district—Hissar (Haryana).
- (vi) Preharvest forecasting of yield of sugarcane in Meerut district—Meerut (U.P.)

**(c) Other work**

- (i) A visit was made to Chandigarh for discussion, with Dy. Director (Statistics), Haryana and other officers about planning a "Repeat survey for estimating the yield of cotton in Hissar district of Haryana State".
- (ii) The students of the P.S.C. and S.C. Courses were taken for field training as a part of the training programme to Bharatpur (Rajasthan) during September, 1977 in respect of a survey on "Tubewell irrigation in agriculture at Bharatpur (Rajasthan)".
- (iii) The field work in respect of the Operational Research Project on "Composite Fish Culture, Krishnagar, West Benegal," was done.

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## 7. ABSTRACTS OF PAPERS PUBLISHED

1. ABRAHAM, T.P., NARAIN, P. and GARG, R.L. Application of discriminant function technique for making fertilizer recommendations with the help of soil test value. *Ind. Jour. Agri. Sci.*, Vol. 45, No. 9, September, 1975, pp. 430-433.



The technique of linear discriminant function has been used to analyse the data on sample fertilizer trials in cultivator's fields on irrigated wheat conducted in Punjab during 1962-63 to determine the relative importance of soil and other factors in discriminating between the high and low responses of the crop to N. The pH, organic carbon percentage, texture, control yield, irrigation and early sowing, were found to be of considerable value in discriminating areas showing high and low responses to N.

2. BATHLA, H.V.L., JAISWAL, S.P. and KANWAR, R.S. Sampling Techniques of Sugarcane for Juice analysis. *Cane Growers' Bulletin*, 1977.

Coefficients of variation of 1 to 6 clump cane samples both for sucrose and purity (sucrose per cent total solids) were worked out. Four clump samples gave the minimum coefficient of variation both per sucrose and purity. For evaluation of cane samples for quality in field experiments, use of 4 clump samples is recommended.

3. JAIN, J.P., ANEJA, K.G. and NIRMAN, K.P.S. Role of Delhi Milk Scheme in generating employment and income in its milk-shed areas. *Indian Journal of Dairy Sci.* 30 (2), 1977, pp. 141-149.

The impact of DMS in creating employment and income as a result of the impetus it is likely to provide to the farmers to take to dairying as a commercial enterprise was studied on the basis of data collected under the bench-mark and repeat surveys carried out by Institute of Agricultural Research Statistics in 1966-67 and 1972-73. There was a marginal decrease in the number of milk producer households but among them there was an increase in the proportion of commercial households.

The overall proportion of workers per family which was 1/3 on the first occasion increased slightly on the second occasion. Likewise, there was also an increase in the proportion of workers engaged in commercial milk production. Further, among commercial producer families there occurred a slight shift in the working force having crop-production as their main occupation on the first occasion to milk production and agricultural work on the second occasion. Regarding income also there was only a marginal increase between the two occasions in the overall annual earnings of the commercial milk producer households. The DMS, thus, failed to make any tangible dent on the economic status of the commercial milk producing families who constitute its main direct beneficiaries.

4. KHOSLA, R.K. Techniques for assessment of losses due to pests and diseases of rice. *Indian J. Agri. Sci.*, 47 (4), April, 1977, pp. 171-174.

Three methods have been suggested for the assesment of crop losses caused by pests and diseases, (i) using the multiple regression study involving the actual

incidences of major pests and diseases on rice as independent variables, (ii) forming an index based on the incidences of major pests and diseases on rice crop, and (iii) adopting chemical plant protection measures to control the incidences of pests and diseases in one of the paired selected fields. The formulae were simplified as far as possible and applied to the data of the pilot sample survey carried out in the West Godavari district of Andhra Pradesh on rice crop during the rainy season 1964-65.

The estimated percentage losses by the methods of regression study and index formation were 19.21 and 20.35 respectively, with standard errors of 9.58 and 5.36. The percentage of avoidable loss in yield by adopting plant-protection measures was 4.68 with standard error of 1.17.

5. NARAIN, P. and POLLAK, E. On the fixation probability of a gene under random fluctuations in selection intensities in small populations. *Genetical Research*, Vol. 29, February-March., 1977, pp. 113-122.

A population with  $N$  Monoecious individuals, and having two alleles, is considered. The problem of calculating the fixation probability of a particular allele under random fluctuations of selection intensities is re-examined, employing finite Markov-Chain methods. An approximate but general expression for this probability is obtained and the results obtained by previous workers are shown to be special cases of this result.

6. NIGAM, A.K. Nearly Balanced Incomplete Block Designs. *Sankhya B.* (38), 1976, pp. 195-198.

In this note, nearly balanced incomplete designs have been proposed for situations where no suitable BIB design available for given number of treatments. These designs allow blocks of two sizes and have two types of replications. These can be analysed as variance balanced designs if high degree of accuracy is not required.

7. PURI, P.D. and NIGAM, A.K. Partially Efficiency Balanced Designs. *Communications in Statistics, A* 6 (8), 1977, pp. 753-771.

A new class of incomplete block designs, termed as partially efficiency balanced (PEB) designs was developed. These designs may be particularly useful for bio-assays and factorial experiments. Kronecker's product (PEB) designs were constructed and a simplified analysis of these designs was given. All Kronecker product partially balanced incomplete block (PBIB) designs, like extended group divisible, hyper cubic, extended right-angular, etc. can be obtained as particular cases of Kronecker product (PEB) designs. As a consequence, the analysis of all Kronecker product (PBIB) designs can be simplified.

8. SINGH, D. JAIN, J.P., GUPTA, K.C. and ARYA, S.R.S. Relative costs and returns of fodder crops in Meerut and Bullandshahr districts. *Agri. Situ. in India*, April, 1977, pp. 3-5.

This paper summarises results on costs and returns of six principal fodder crops grow in Meerut and Bullandshahr districts of Uttar Pradesh during 1966-67. Kharif crops were seen more remunerative as compared to rabi crops. Jowar among kharif crops and berseem among rabi crops gave the highest net returns per hectare in both the districts and also produced the largest quantity of total digestible nutrients at the lowest cost. From the considerations of both net returns and cost of producing feed nutrients, the optimum cropping systems in the two districts would be jowar and guar in kharif season and berseem and metha in rabi season.

9. SINGH, D. and RAUT K.C. Some indicators of regional imbalance in livestock development. *Indian Farming*, September, 1977.

There are different indicators to show the imbalance in livestock development in different regions and also over time in a region. The extent of imbalance considering some of the indicators has been discussed in the paper. Such a study would be useful in formulating livestock improvement plans on efficient lines in different regions. There is considerable change in composition of bovine population but a drastic change in this direction is unexpected. The rate of increase in cattle population is substantially less as compared to that in buffalo population in different regions. There was an increase of 13.1 per cent in buffalo population from 1961 to 1972 as compared to only 1.9 per cent increase in cattle population. On an average one pair of draught animals was being utilised for 4 hectare of cropped area. It varied from 1.8 ha. to 10.2 ha. per pair in different States. About 5.5 ha. of grazing area are available per 100 bovines in the country as a whole. The extent of grazing area varies from less than 1 ha. per 100 bovines to more than 8 ha. in different States. There is considerable disparity in the level of milk production of cows and buffaloes in different regions. The average daily milk yield of a cow in milk was estimated to be 2.5 kg. in Punjab and Haryana as compared to only 0.5 kg in Madhya Pradesh. For a buffalo in milk the average yield was more than 4 kg per day in Punjab and Haryana and only 1 kg. in Orissa. Whereas the per capita per day availability of milk in 1972 was estimated to be 464 gms. in Punjab, 386 gms. in Haryana, 330 gms. in Rajasthan, it was only about 150 gms. in U.P., 94 gms. in Maharashtra and Madhya Pradesh, 62 gms. in Tamil Nadu and 48 gms. in Orissa.

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**8. PAPERS ACCEPTED FOR PUBLICATION**

1. AGARWAL, S.K. and GOEL, B.B.P.S. A note on unequal probability sampling. *Jour. Ind. Soci. Agri. Stat.*
  2. BHARGAVA, P.N., BATRA, P.K. and SAKSENA, ASHA. Size and shape of plots for field trials on Banana. *Indian Journal of Horticulture.*
  3. GAUTAM, K.C. and SINGH, PADAM. A note on prediction from finite populations. *Jour. Ind. Soci. Agri. Stat.*
  4. GUPTA, V.K. and PRANESH KUMAR. Study of Agricultural Efficiency in Haryana. *Journal of Research, Haryana Agricultural University, Hissar.*
  5. JACOB, T. Use of an extraneous information in the estimation of feed-milk relationship subject to collinearity. *Jour. Ind. Soci. Agri. Stat.*
  6. NARAIN, P. Theoretical studies and improvements of plant and animals. *Proceedings of Indian National Science Academy.*
  7. NARAIN, P. Average time until fixation of mutants at a tri-allelic locus in a finite population. *Indian Journal of Genetics and Plant Breeding, Vol. 38, No. 1*
  8. NIGAM, A.K. Four and six level second order Rotatable Designs. *Jour. Ind. Soc. Agri. Stat.*
  9. PURI, P.D., NIGAM, A.K. and NARAIN, P. Supplemented Block Designs. *Sankhya.*
  10. SINGH, D. and BHARGAVA, P.N. Conservation of water and its utilisation. *Jour. Ind. Soc. Agri. Stat.*
  11. SINGH, D. and SINGH, RANDHIR. On inclusion of large units in the sample. *Jour. Ind. Soc. Agri. Stat.*
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## 9. I.A.R.S. PUBLICATIONS

1. BOKIL, S.D. and ANAND PRAKASH. Estimation of production of cultivated fodder crops.

The present methodological survey to develop the sampling survey technique for the estimation of production of cultivated fodder crops was undertaken in Meerut district of Uttar Pradesh during 1972-73 and 1973-74. For the main crops in kharif and rabi, viz. jowar and berseem, fairly precise estimates of yield were obtained in both the years. The survey was planned on three-stage stratified random sampling design with villages as primary units, fields within village as second-stage units and plots within fields the third and ultimate stage units.

The yield of jowar was estimated to be 183.5 q/ha (S.E. 3.2%) and that of berseem 457.39 q/ha (S.E. 2.2%) in 1962-63. It was also estimated that the total output of fodder crops in the district in that year was about 1,809 thousand tonnes; corresponding figures for 1973-74 were 222.2 q/ha for jowar with a S.E. of 2.6% and 363.1q/ha for berseem with a S.E. of 3.4%. The total production of fodder crops was estimated to be 1,607 thousand tonnes during the year. The survey thus demonstrated the feasibility of estimating output of fodder crops by means of crop cutting surveys and also provided guidance for the conduct of such surveys in future. It also provided some information on the cultivation practices followed.

2. KHOSLA, R.K., SINGH, D.P., KHATRI, R.S., BAL, S.D. and ANEJA, D.S. I.A.R.S. Statistical Newsletter, Vol. III; Number 2, April-June, 1977.
3. SINGH, D., PANDEY, R.K., MITTAL, M.G. and DIXIT, U.N. A study on the impact of new agricultural strategy on employment and income in Aligarh District.

The programme for the modernisation of agriculture in the study area was started in the year 1960-61 in the form of 'package' programme. This programme witnessed the expansion of high yielding varieties to a great extent in the area under study. The programme of agricultural modernisation was expected to create impacts of various magnitudes on the farmers owning various sizes of farms and other resources. This technology influenced various categories of farmers differently. Besides providing enough foodgrains to the society, it was expected to generate substantial income and employment in rural areas. With a view to see the impact of new technology on income and employment in Aligarh district, this scheme was taken up in July 1973, and data was collected for one year i.e. upto June, 1974. The study was planned on three stage stratified random sampling design with Development Blocks as first stage units, Clusters of villages within a block as second stage units and Households within a cluster as third stage units.

Structure of inputs and outputs was studied for individual crops in the selected block. The results did not show any consistent pattern. The same was true for dairy enterprise. However, overall net income and employment in aggregate, showed a marked tendency in favour of the adoption of technology. Application of modern technology helped in reducing inequality of income in the farming community. The application of modern farm technology was positively correlated with the farm size. Analysis indicated that labour employment increased considerably with the use of modern technology. The adoption of new strategy had reduced inequality in income distribution.

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## 10. ABSTRACTS OF DISSERTATIONS APPROVED

### M. Sc. Degree

#### I. PATIL, A.S. An Economic study of fertiliser demand in Indian Agriculture.

Fertiliser consumption pattern and growth show a wide range of variation over the period not only within the states but also between the states of the country. In this study an attempt has been made to study the effects of different factors on consumption of fertilizers at macro level, and to explore the relative contributions of such factors in enhancing the fertilizer use in various states.

The time-series data for thirteen states for the period 1955-56 to 1974-75 were obtained from various published sources. Both static and dynamic approaches with linear and log-linear forms were tried. The selection of double logarithmic functional form has been made for discussion and interpretation of results on the basis of its fit, nature of relationships and results obtained in the analysis.

The real, rather than absolute price of nitrogenous fertilizer was found to be influencing its use in most of the states, with the exception of Karnataka, Andhra Pradesh, Maharashtra and Bihar. But in the case of phosphatic fertilizers both prices did not show any significant influence.

Irrigation appeared to be the main force in explaining the growth in use of both nitrogenous and phosphatic fertilizers. Inclusion of time variable indicated

that, improvement and change in technology and other factors in agriculture will increase fertilizer demand more rapidly in future. In some states the average gross return was also one of the important variables to affect the use of nitrogenous fertilizers. The states in which there is rapid expansion of area under high-yielding varieties, the use of both the nutrients has drastically increased.

From methodological point of view, use of distributed lag models gave better results.

(Guide: Dr. R.K. Pandey)

2. VASISHT, AMIT KUMAR. Adoption of new agricultural technologies by cultivators in Delhi State, its impact on crop production, storage and disposal of the produce, employment in agriculture, etc.

With the adoption of new technology in Agriculture, apart from increase in yield and production of crops, the employment opportunities have also improved to a greater extent. To study the various aspects like extent of cultivation of hybrid bajra, the extent and intensity of adoption of improved practices like irrigation, fertilizers, plant protection chemicals, etc., the amount of loan taken by cultivators, etc., investigations were undertaken with the help of data collected under the project "Pilot sample surveys to study the impact of new technology on crop production, its disposal and employment in agriculture in Delhi" during Kharif 1976-77.

For area estimation, a simple ratio estimate was used. However, since the area under bajra at the block level was not available, only the proportion of area under bajra was worked out.

The average number of family members per holding decreased with the increase in the size of the holding. However, the average number of mandays of casual labour employed per hectare did not differ significantly in different size classes.

The percentage of cultivators using chemical fertilizers was higher in the medium and large holdings. None of the cultivators had used ppc. About 27 per cent of the cultivators growing hybrid bajra took loan for agricultural purposes. The average amount borrowed from government agencies were much higher than from non-government sources.

For studying the relationship between production and marketable surplus of bajra, regression analysis technique was adopted. The study revealed that for a given additional production of the crop, the marketable surplus was higher for small holdings compared to the large holdings.

(Guide: Sh. S.K. Raheja)

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## 11. PAPERS PRESENTED AT INTER-ORGANISATIONAL SEMINARS, WORKSHOPS, ETC.

During the quarter under review, papers by the officers of the Institute were presented in one inter-organisational symposium and one workshop. The particulars of the papers presented in the symposium and workshop, in which these were presented are given below:

### 1. *All India Workshop on Assessment of Crop Losses due to Pests & Diseases held at U.A.S. Hebbal, Bangalore from 19th to 30th September, 1977.*

- (i) KHOSLA, R.K. The design of field experiments and survey technique for estimation of crop losses.
- (ii) KHOSLA, R.K. Regression analysis, their application in crop loss appraisal programme.
- (iii) KHOSLA, R.K. Sampling survey designs.
- (iv) KHOSLA, R.K. Methodology of assessing losses due to Pests and Diseases of Rice in India.

### 2. *Symposium on Potash for increased Agricultural Production held at Lucknow (U.P.) on 26th Sept, 1977.*

SINGH, D. and KRISHNAN, K. S. Regional variations in respect of crop responses to Potassium.

## 12. PARTICIPATION IN INTER-ORGANISATIONAL SEMINARS, WORKSHOPS, ETC.

During the quarter under review, officers of the Institute participated in one inter-organisational symposium and two workshops. The names of the officers who participated and the particulars of the symposium and workshops are as follows:



1. *Annual Workshop of the Wheat Research Workers held at I.A.R.I., New Delhi from 23rd-27th Aug. 1977.*

Sh. K. S. Krishnan and Sh. P.N. Soni.

2. *All India Workshop on Assessment of Crop Losses due to Pests and Diseases held at U.A.S. Hebbal, Bangalore from 19th to 30th September, 1977.*

Sh. R.K. Khosla.

3. *Symposium on Potash for increased Agricultural Production held at Lucknow (U.P.) on 26th September, 1977.*

Dr. D. Singh and Sh. K.S. Krishnan.

### 13. COMPUTER CENTRE

#### (a) Computer Utilization

During the quarter under report, the two systems B-4700 and IBM-1620 worked during normal working hours. About 1350 jobs were processed on the Burroughs system and 580 on the IBM system.

#### (b) Programming Facilities

About 50 Ph.D., 10 M.Sc. and 10 Research Scientists from various Institutes under ICAR, and Agricultural Universities were given help in computer programming and processing of their research data. During the quarter, about 20 new programmes were developed.

#### (c) Training Courses organised

(i) Lectures were organised by Tata Consultancy Services to acquaint the staff of Computer Centre with the various software packages supplied for the new system. The topics and number of lectures in parenthesis are as follows:

Operators class training (Two batches) (6), Problem oriented language generator-(1), REPORTER-(1), ASSISTANT-(2), TEMPO (Linear programming package)-(2) and Optimal system utilization-(1).

(ii) A team of six scientists of the computer centre received training in developing various computer programmes for implementation and maintaining of data bases. They were then working for establishing an "Agricultural Research Scientists personal Data Base".

**(d) M.T. Unit**

During the quarter under review, work relating to punching, sorting and tabulation, etc. of data of various schemes/projects of IARS was under taken. Facilities for data preparation continued to be extended to the students, research scholars/scientists of IARI, various Agricultural Universities and other Institutes under ICAR.

During the period, approx. 3.5 lakh cards were punched, 35 sorting jobs were done and 17 tabulations and 355 listings were prepared.

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#### 14. LIBRARY

- (a) During the quarter under report, 80 new books on various subjects of the Institute were added to the Library.
- (b) During the quarter under report, the following reprints were procured for distribution by the Library.

<i>S No.</i>	<i>Author</i>	<i>Title</i>	<i>Source</i>
1.	ABRAHAM, T.P. <i>et. al.</i>	Application of discriminant function technique for making fertilizer recommendations with the help of soil test values.	Ind. Jour. Agri. Sci., 45(9), 433, Sept., 1975.
2.	AMBLE, V.N. and JACOB, T.	Development of statistics in animal sciences research in India.	Ind., Jour. Anim. Prod., 5, (1-4) : 1-9, March-Dec., 1974.
3.	DEY, A. and CHAKRAVARTY, RUPAK.	On the construction of some classes of neighbour designs.	Jour. Ind. Socy. of Agri. Stat., 29(1), June, 1977.

4. DEY, A. and GUPTA, S.C. Singular weighing design and estimation of total weight. *Commu. Stat. Theo. Meth.*, A6(3), 289-295, 1977.
  5. GOEL, B.B.P.S. and SINGH, D. On the formation of clusters. *Jour. Ind. Socy. Agri. Stat.*, 29(1), 1977.
  6. JAIN, J.P. *et.al.* Role of Delhi Milk Scheme in generating employment and income in its milkshed areas. *Ind. Jour., Dairy Sci.*, 30(2); 1977, pp. 141-149.
  7. PRAKASH BABU, M. *et. al.* Effect of non-genetic sources of variation of some performance trials in white leghorn. *Ind. Jour., Anim. Sci.* 45(10), 762-766, Oct., 75.
  8. NIGAM, A.K. On some balanced row and column designs. *Sankhya, Ind. Jour. of Stat. SR. B.* 38(1), 76.
  9. NIGAM, A.K. *et. al.* Balanced and nearly balanced n-ary desings with varying block sizes and replications. *Jour. Ind. Socy. Agri. Stat.*, 29(1), June, 1977.
  10. NARAIN, P. *et. al.* Effect of including individuals egg weight in a selection index for rate of lay in chickens. *Ind. Poultry Rev.* 8(18), May, 1977.
  11. RAUT, K.C. *et. al.* Some factors influencing the production of buffalo milk. *Ind. Jour. Anim. Sci.* 44, (10); 713-716, Oct. 1974.
  12. SUBBARAO, C. and NARAIN, P. Effect of sampling the diallel crops on the estimation of some genetic parameters. *Ind. Jour. of Gene. and Plant Breed.*, 36(2), July 1976, pp. 278-288.
- (c) During the quarter under report, 2825 users visited the library for consultation and reference.
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## 15. MISCELLANEOUS

## (a) Appointments, Promotions, Transfers, etc.

- (i) Shri M.R. Garg, retired as Chief Administrative Officer, w.e.f. 31-7-77 (A.N.) and Shri R.N. Bakshi, Under Secretary to the Government of India, Ministry of Agriculture & Irrigation (Deptt. of Agriculture) joined as Chief Administrative Officer, on deputation w.e.f. 9-9-77 (A.N.).
- (ii) Shri S.D. Sharma, Inspector was appointed to the post of Assistant Field Officer on ad-hoc basis w.e.f. 1-7-77 (F.N.).
- (iii) The following Scientists have been appointed to the next higher grade of Agricultural Research Service mentioned against each w.e.f. 1-7-76.

<i>Name</i>	<i>Present Grade</i>	<i>Next higher grade</i>
1. Sh. K.B. Singh	S	S-I
2. Sh. L.B.S. Somayazulu	S	S-I
3. Dr. Basant Lal	S	S-I
4. Smt. Asha Saxena	S	S-I
5. Sh. Ram Kumar	S	S-I
6. Sh. Shanti Saroop	S	S-I
7. Sh. K.P.S. Nirman	S	S-I
8. Dr. G.V.S.R. Krishna	S	S-I
9. Sh. O.P. Dutta	S	S-I
10. Sh. Mahesh Kumar	S	S-I
11. Sh. S.L. Garg	S	S-I
12. Sh. M.L. Sahani	S	S-I
13. Sh. G.N. Bahuguna	S	S-I
14. Sh. R.K. Ghai	S	S-I
15. Sh. Satyendra Kumar	S	S-I
16. Sh. J.K. Kapoor	S	S-I
17. Miss N.K. Choudhary	S	S-I
18. Sh. R.P. Singh	S	S-I
19. Sh. J.P. Goyal	S	S-I
20. Sh. A.S. Gupta	S	S-I
21. Sh. S.P. Doshi	S	S-I
22. Sh. S.S. Shastri	S-I	S-2
23. Sh. U.G. Nadkarni	S-I	S-2
24. Miss C.R. Leelavathi	S-I	S-2
25. Dr. K.G. Aneja	S-I	S-2

26.	Sh. R. Gopalan	S-I	S-2
27.	Sh. A.K. Banerjee	S-I	S-2
28.	Sh. J.N. Garg	S-I	S-2
29.	Sh. S.R. Bapat	S-I	S-2
30.	Sh. J.S. Maini	S-I	S-2
31.	Sh. J.C. Malhotra	S-I	S-2
32.	Sh. P.C. Mahotra	S-I	S-2
33.	Sh. R.K. Khosla	S-I	S-2
34.	Sh. S.D. Bokil	S-2	S-3
35.	Dr. K.C. Raut	S-2	S-3
36.	Dr. M. Rajagopalan	S-2	S-3
37.	Dr. A.H. Manwani	S-2	S-3

**(b) Exhibition Room**

During the quarter under report, the Exhibition Room of the Institute was converted into Exhibition-cum-Committee Room. A big table along with the Chairs were put in the middle of the room and all the charts and graphs displayed on the panels were kept on the side of the walls. The monthly Senior Officers' meetings for the quarter were held in the Exhibition-cum-Committee Room.

**(c) Management Committee**

A meeting of the management Committee of the Institute was held on 24th September 1977. Dr. D. Singh, Director, presided over the meeting.

**(d) Distinguished Visitor**

Dr. John. F. Jenkyn, Pathologist, Rothamstead Experimental Research Station, U.K., working as F.A.O. Consultant, visited the Institute on 5th August, 1977 in connection with the All-India Workshop on Assessment of Crop Losses due to Pests and Diseases, held at University of Agricultural Sciences (U.A.S.), Bangalore during 19th to 30th September, 1977 under the auspices of UNDP, F.A.O., I.C.A.R. and U.A.S.

**(e) Other Information**

- (i) Dr. D. Singh, Director, attended the meeting of the Scientific Advisory Committee for Delhi and Madras Chapters of the Institute of Medical Statistics organised by Indian Council of Medical Research (ICMR), New Delhi on 18th July, 1977.

He attended the meeting of the Committee on Improvement of Agricultural Statistics to consider the recommendations of the National Commission on Agriculture in regard to Agricultural Statistics organised by the Deptt. of Economics & Statistics, Ministry of Agriculture & Irrigation, on 9th Sept. 1977 at New Delhi.

He attended the conference of Directors of I.C.A.R. Research Institutes held at Indian Grassland and Fodder Research Institute, Jhansi (U.P.) from 12th to 15th Sept. 1977.

He delivered a lecture entitled "Role of Statistics in Agriculture and Animal Husbandry Research" for benefit of trainees of senior certificate course of Statistics (previously called as Senior Statistical Officers' Training Course) at C.S.O., New Delhi.

He also delivered a talk on Design of Experiments at the Defence Science Laboratory, New Delhi to the participants of the 10th Course on "Computer oriented Scientific Techniques in Management" on 27th Sept., 1977.

- (ii) Dr. Prem Narain, Sr. Professor, attended a meeting of the sub-committee in Planning Commission for finalising the plan for evolving a new cattle breed with the help of animals available at Military Dairy Farm.

He chaired a meeting of the Task Force appointed by the Director for re-delegation of Director's Powers to heads of Division at the I.A.R.S.

He attended a meeting of the Academic Council of the P.G. School of I.A.R.I. He presided over as Chairman of the Interview Board for selection of candidates for the posts of Telephone-Operator-cum-Receptionis at the I.A.R.S.

He also attended the first Meeting of the Achievement and Audit Committee of the Central Marine Fisheries Research Institute, Cochin from 22nd September, to 30th of September, 1977 and visited a number of Marine Fisheries Research Centres at Cochin, Tuticoren, Mandapam and Madras.

- (iii) Sh.M.P.Jha, Sr. Scientist, worked as Member Secretary of the Committee Constituted by ICAR to evaluate the working of Emeritus Scientist Scheme.

He worked as Convener of the Symposium on Model Building in Agriculture being organised by ISAS to be held at IARS New Delhi on 17th Dec., 1977. He also drafted the proceedings of the Seminar on Crop Forecasting Methodology held on 18th April, 1977 at I.A.R.S.

- (iv) Dr. K.C. Raut, Sr. Scientist took over as Head of the Division of Statistical Research in Animal Sciences w.e.f.28th Sept., 1977
- (v) Dr. B.B.P.S. Goel Scientist (S2), was a member of the selection committee for promotion of statistical personnel under the scheme of 5 yearly assessment at National Physical Laboratory (N.P.L.), New Delhi.
- (vi) Dr. Padam Singh Scientist (S2), attended the Summer Institutes on the Methodology of Effective Communication of Scientific Results organised by Agri. Extension Division of I.A.R.I., New Delhi during Aug-Sept., 1977.
- (vii) Shri S.N. Mathur, Scientist (Programming) attended the training courses on Operators class training, POLGEN, REPORTER, ASSIST and TEMPO, organised by Tata Consultancy Services for B-4700 System during August, 1977.
- (viii) Shri K.V. Sathe, Scientist (Programming) visited the I.I.T. Computer Centre, Madras (Tamil Nadu) to acquaint himself with the system of charging for Computer users.
- (ix) The following officers of the Institute delivered lectures during the quarter under review to the ISS Trainees/Senior Statistical officers at C.S.O., New Delhi on the topics given against their names :—

<i>Name of the officer</i>	<i>Topic</i>
Dr. P. Narain	Statistical research in the field of Animal Sciences.
Sh. S.K. Raheja	Survey on H.Y.V.P.
Sh. K.S. Krishnan	Statistical Research in Crop Sciences.
Sh. M.P. Jha	Techniques of Pre-harvest forecasting of yield of Crops.
Dr. K.C. Raut	Cost of production of Livestock products.
Dr. B.B.P.S. Goel	1. Survey on estimation of livestock products. 2. Sample Survey for the estimation of livestock numbers and products.
Sh. P.N. Bhargava	Crop weather relationship studies.
Sh. A.K. Srivastava	Surveys on fruits and vegetables.



# PERIODICAL PUBLICATIONS

## ANNUAL REPORT

The Annual Reports issued by the Institute cover all the aspects of its functions and activities and provide useful information to research workers in the field of agricultural statistics.

### NATIONAL INDEX OF AGRICULTURAL FIELD EXPERIMENTS

The results of statistical analysis of the data pertaining to agricultural field experiments (other than varietal trials) conducted at the various research stations all over the country are published in the forms of compendia series. Three such series in respect of the various States pertaining to the periods 1948-53, 1954-59 and 1960-65 have already been completed and the fourth for the period 1966-71 have been collected and are under process.

The prices of the different volumes are given below :—

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