Compiled and Prepared

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प्राक्कथन

यह भा॰ कृ॰ सं॰ अ॰ सं॰ सांख्यिकीय सूचना-पत्र का आठवां खण्ड, संख्या-२ है । इसमें इस संस्थान की अप्रेल-जून, 1982 की तिमाही गतिविधियों से सम्बन्धित जानकारी का विवरण दिया गया है ।

मुझे आशा है कि यह सूचना-पत्र कृषि अनुसंधान सांख्यिकीविदों तथा अन्य प्रयोक्ताओं के लिए लाभदायक सिद्ध हो रहा है । इसके अगले अंकों में सुधार लाने हेतु मैं किसी भी प्रकार की टिप्पणी और सुझावों का आभार सहित स्वागत करूंगा ।

मैं संस्थान के उन सभी अधिकारियों तथा सदस्यों का आभारी हूं, जिन्होंने भा॰ कृ॰ सं॰ अ॰ सं॰ सांख्यिकीय सूचना-पत्र के इस अंक के लिए आवश्यक सामग्री प्रदान की है ।

मैं सर्वश्री सोमदत्त, महाराजसिंह काकरान, सुरेन्द्रकुमार शर्मा, महेशचन्द्र एवं रघुवर दत्त का भी आभारी हूं, जिन्होंने इस सूचना-पत्र के संकलन एवं मुद्रण में अपना भरपूर सहयोग दिया है ।

प्रेमनारायण
निदेशक

भारतीय कृषि सांख्यिकीय अनुसन्धान संस्थान
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PREFACE

This is Vol. VIII, No. 2 of 'IASRI Statistical Newsletter' and covers the activities and allied information in respect of this Institute during the quarter April-June, 1982.

I hope this Newsletter has been proving useful to 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 the staff of the Institute who supplied the requisite material for this issue of the "IASRI Statistical Newsletter".

I am also thankful to S/Shri Som Dutt, M.S. Kakran, S.K. Sharma, Mahesh Chander and Raghuwar Dutt for the help rendered in compilation and printing of this Newsletter.

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CONTENTS

1. PILOT SAMPLE SURVEY FOR STUDYING THE RELATIVE MERITS OF DATA OBTAINED BY ACTUAL WEIGHMENT AND THOSE THROUGH ENQUIRY FOR ESTIMATION OF MILK PRODUCTION

The available sampling techniques for estimation of milk production involves collection of data on milk yield of a random sample of animals in milk by actual weighment on the spot in the morning and evening for which whole time enumerators are required for the field work. This method of collection of data besides being costly is also somewhat inconvenient. Suggestions have been made to examine the feasibility of replacing the method of recording data by actual weighment by that of enquiry without foregoing the reliability of data. The advantage of recording data by enquiry is that the investigator need not necessarily be present at the stable at the time of milking and can record the necessary data before or after milking according to his convenience in a much shorter time. However, the accuracy of the data so recorded depends upon the judgement and honesty of the householder. For studying the extent of utility of the data on milk yield collected by enquiry the Institute conducted a "Pilot sample survey for studying the relative merits of data obtained by actual weightment and those through enquiry for estimation of milk production" in the districts of Rohtak (Haryana) and Barabanki (U.P.) during the year 1979 80. The objectives of the survey were :

(i) To study the relative merits of the data obtained by actual weighment and those through enquiry for estimation of milk production and

(ii) To obtain estimates of annual milk production at district level with a reasonable precision.

The sampling design adopted under the survey was one of stratified multi-stage random sampling In both the districts the tehsils were adopted as strata, the primary sampling units (p.s. u's) were clusters of two villages each. The clusters of villages were formed by first selecting a village at random with equal probability and without replacement and than clubbing with it one more adjoining village. The second stage sampling unit (s.s.u.) was a cluster of two contiguous households for collection of data on milk yield by both weighment and enquiry and a household for collection of data on milk

yield by enquiry alone. The ultimate unit of sampling was an animal in milk in the households which were observed for collection of data by weighment and enquiry both whereas there was no further sub-sampling in the households which were observed for collection of data by enquiry only.

In each of the districts 20 p.s.u's were allocated to the different strata in proportion to the number of villages in them. The survey was spread over the entire year covering all the three important seasons and in each season a fresh sample of p.s.u's was selected. The collection of primary data in each district was entrusted to 4 field investigators, with 5 p.s.u's allotted to each of the field investigators, the first three p.s.u's (henceforth called sub-group I) were observed for collection of data on milk yield by actual weighment and enquiry both whereas the remaining two p.s.u's (henceforth called sub-group II) were observed for collection of data on milk yield by enquiry only. In each of the p.s.u's of sub-group I on every working day, a cluster of 2 contiguous households was observed for collection of data on milk yield by weighment and enquiry both in addition to a sample of 5 randomly selected households for recording milk yield by enquiry also. In each of the p.s.u's of sub-group II, on every working day a sample of 10 randomly selected households was observed for recording milk yield by enquiry only. From the sample of households selected for collection of data on milk yield by, both weighment and enquiry the milk yield of only 2 animals, selected randomly, was recorded by actual weighment on the spot and of all the animals by enquiry for the day prior to the day of actual weighment. From these households the information on feed fed to all the animals was also recorded by actual weighment.

The salient findings of the survey were as follows :

It was found that in the case of both cows and buffaloes the milk yield recorded by actual weighment was highly positively correlated with that recorded by enquiry. The correlation co-efficients in the case of cows were 0 93 and 0.96 in the districts of Rohtak and Barabanki respectively whereas in the case of buffaloes the corresponding values were 0.95 and 0.89 respectively.

From the matched sample it was observed, by the application of paired 't' test, that in Rohtak district the difference between the reported and the actual weight of milk was significant neither for cows nor for buffaloes whereas in Barabanki district it was so for both. So it may be infered that the method of recording milk yield by enquiry cannot substitute the method of actual weighment in all cases.

The average milk yield per day per animal in milk, varied considerably from season to season in both the districts. The average yield in the year (per day) was estimated to be 2.84 and 0.88 kg. per cow with a percentage standard error of 5.7 and 8.0 in the districts of Rohtak and Barabanki respectively whereas the corresponding estimates for buffaloes were 4.84 kg. and 2.02 kg. with percentage standard error of 3.0 and 2.9 in the districts of Rohtak and Barabanki respectively.

The improved (double sampling) estimate of average milk yield per day per animal in milk worked out by using the data collected by both actual weighment and enquiry helped in reducing the standard error of the estimates considerably over those obtained on the basis of actual weighment alone, Thus, although the method of collection of data by enquiry cannot be substituted for that of weighment yet the two types of data can be suitably combined for increasing the precision of the estimates of average milk yield per day per animal in milk. This will help in devising a suitable methodology for obtaining district-wise estimates of milk production and studies in this direction are being undertaken.

The number of milch cows and milch buffaloes in Rohtak district was estimated to be 43.4 and 127.1 thousand with a percentage standard error of 7 0 and 6.4 respectively whereas in the Barabanki district these were 93.8 and 107.8 thousand with a percentage standard error of 5.5 and 5.6 respectively. The proportion of milch animals in milk in Rohtak district was 57 and 75 for cows and buffaloes respectively whereas in Barabanki district the corresponding estimates were 43 and 53 for cows and buffaloes respectively.

The annual milk production in Rohtak district was 200.4 thousand tonnes with the contribution from cows being 1/8th only whereas in the Barabanki district it was 55.8 thousand tonnes with the contribution from cows being nearly 1/4th. The per capita per day availability of milk in Rohtak district was 500 gms. whereas it was 93 gms. in Barabanki district.

2. LABOUR UTILIZATION IN MAINTENANCE OF BOVINES AND ANIMAL PRODUCTION
(I.C.D. Area, Bhopal, Madhya Pradesh)

A detailed study on labour utilization for keeping cattle and buffaloes was made utilizing secondary data collected in the survey for estimation of availability and cost of production of milk in I.C.D. area, Bhopal (Madhya Pradesh). The study provided extent of involvement of the rural population in maintaining bovines and also norms on the input of labour for various stall

operations per animal so that the labour available in the household could be properly channelised. Some of the salient findings of the study are as follows.

Of the 192 households studied about 23 per cent possessed only cattle (type I), 11 per cent had only buffaloes (type II) and the remaining 66 per cent maintained both cattle and buffaloes (type III). None of the households was employing only paid labour. About 60 per cent of the households were utilising only family labour for maintenance of bovines and 40 per cent had paid labour in addition to family labour.

The extent of labour put in by man/woman/ child was converted to standard man-hours on the basis of their wage rates. The ratio of wage rates of man, woman and child labour was 1.0 : 0.7 : 0.6. This means one woman-hour is equivalent to 0.7 man-hours and one child-hour is equivalent to 0.6 man-hours. It was seen that the total labour input per household/day for maintenance of bovines in standard man-hours was more in winter season amounting to 8.5 hours in type I households, 9.6 hours in type II and 10.9 hours in type III households. In both winter and summer seasons, the contribution of paid labour towards total labour used for animal husbandry operations in type I, type II and type III household was of the order of 28 per cent, 20 per cent and 35 per cent respectively. However in rainy season percentage of paid labour employed was slightly less as compared to other two seasons in all the types of households. On an average 66 per cent of men, 47 per cent of women and 10 per cent of children were found working in all types of households.

It was observed in all the types of households that of the total hours of work the percentage of time spent by man on animal husbandry operations in the households employing man and woman combination of labour was of order 41 per cent as against 24 to 28 per cent in the households where child labour was also utilized in addition to man and woman labour. The percentage contribution of woman labour for animal husbandry operations in the households employing man and woman combination of labour was about 38 per cent in type I households, 51 per cent in type II and type III households and in the households employing man, woman and child labour, woman contribution was 38 percent, 54 percent, and 42 percent in type I, type II and type III households respectively. About 84 percent of total hours of work by child labour was spent for animal husbandry operations which was mainly for taking the animals for grazing.

To ensure proper and adequate management it is essential that the number of bovines maintained in the households should be such that these could be properly cared for with the amount of labour available in the household. The fixation of norm would require standardisation of both labour and animals. The bovine kept in the household were converted to homogenous buffalo unit (buffalo in milk) on the basis of the feed consumed by each category of the animal. It was estimated that in order to maintain a buffalo in milk in the area, on an average, 0.67 standard man hours would be required for doing various items of stall operations (exlcuding grazing time). It may be mentioned that about 0.17 standard man-hours per day would be required for maintaining the calf. Thus the total time required for stall operations per day for keeping a buffalo in milk alongwith the calf was estimated to be 0.84 standard man-hours.

3. WORKSHOP ORGANISED AT THE I.A.S.R.I.

Workshop on "Capital Requirements for Modernisation of Agriculture"

The Workshop on 'Capital Requirements for Modernisation of Agriculture' was organised by the Division of Econometric Analysis from 4th to 6th May, 1982. About 80 eminent economists and statisticians working in Agricultural Universities, I.C.A.R. Institutes, Planning Commission, C.S.O. and Directorate of Economics and Statistics, Ministry of Agriculture and other organisations participated in the Workshop.

The workshop was inaugurated by Dr. R.M. Acharya, Dy. Director General, ICAR. New Delhi. The keynote was addressed by Dr. S.P. Gupta, Advisor, Perspective Planning Division, Planning Commission, New Delhi.

Objectives of the Workshop

The main aim of the Workshop was to emphasise methodological aspects of the evaluation of production potential and yield gaps in various farming systems, present availability and future (1990-2000 A.D.) requirements for agricultural and animal husbandry production both at current as well as advanced level of technology and consequent financial requirements. The related issues such as choice of technology as well as its implications for labour employments was also to be examined.

In Inaugural Session, Dr. Prem Narain, Director, IASRI welcomed the Chief Guest, participants and invitees of the workshop and got them appraised regarding the objectives of holding the workshop.

In technical Session I, Dr. Prem Narain, Director, IASRI was the Chairman and Dr. P.K. Joshi, Economist, CSSRI, Karnal and Dr. T. Haque, Economist, IARI, New Delhi were the Rapporteurs.

In Session II, Dr. S.L. Shah, Emeritus Scientist, Vivekanand Parvatiya Krishi Anusandhan Shala, Almora, U.P., was the Chairman with Dr. B.M. Sharma, Scientist of Division of Agricultural Economics (IARI) and Sh. B.L. Kaul, Scientist (IASRI) were as Rapporteurs.

In session III, Dr. I.Z. Bhatty, Director-General, National Council of Applied Economic Research, New Delhi was Chairman with Dr. R.N. Pandey, Research Scientist, H.A.U. Hissar and Dr. Iqbal Singh, Scientist, IARI, New Delhi as Rapporteurs.

In session IV, Dr. A.S. Kahlon was the Chairman with Shri Santi Sarup of I.A.S.R.I. and Dr. A.K. Vashisht of I.A.R.I. as rapporteurs.

In session V, Dr. A.S. Sirohi, Head of Division of Agricultural Economics, IARI was the chairman and Dr. B.M. Sharma, Scientist, IARI and Shri V.S. Mathur of the same Institute were Rapporteurs.

The last session i.e. Plenary session was Chaired by Dr. R.M. Acharya, Dy. Dir. General, I.C.A.R. and Dr. R.K. Pandey, Head, Division of Econometric Analysis of this Institute was Rapporteur.

The following recommendations emerged from the discussions that followed on the 15 papers presented in all the sessions of the Workshop.

1. For estimating the capital requirements for modernisation of agriculture for the country as a whole such requirements should be estimated for each of the different regions based on agro-climatic conditions, technology and management levels.

2. In each region, the capital requirements should be separately estimated for different sectors such as crops, livestock, fisheries, forestry, support for agriculture relating to transport, storage, marketing, credit, processing and agricultural research and education.

3. The interdependence between the various sectors, within agriculture as well as outside agriculture, should also be taken into account.

4. For estimating the requirements of capital there is a need for determining the requirements of agricultural products in future. The requirements may consists of domestic demand for human consumption, intermediate demands for seed, food and waste, and requirements for export.

Workshop on 'Capital Requirements for Modernisation of Agriculture' held at IASRI
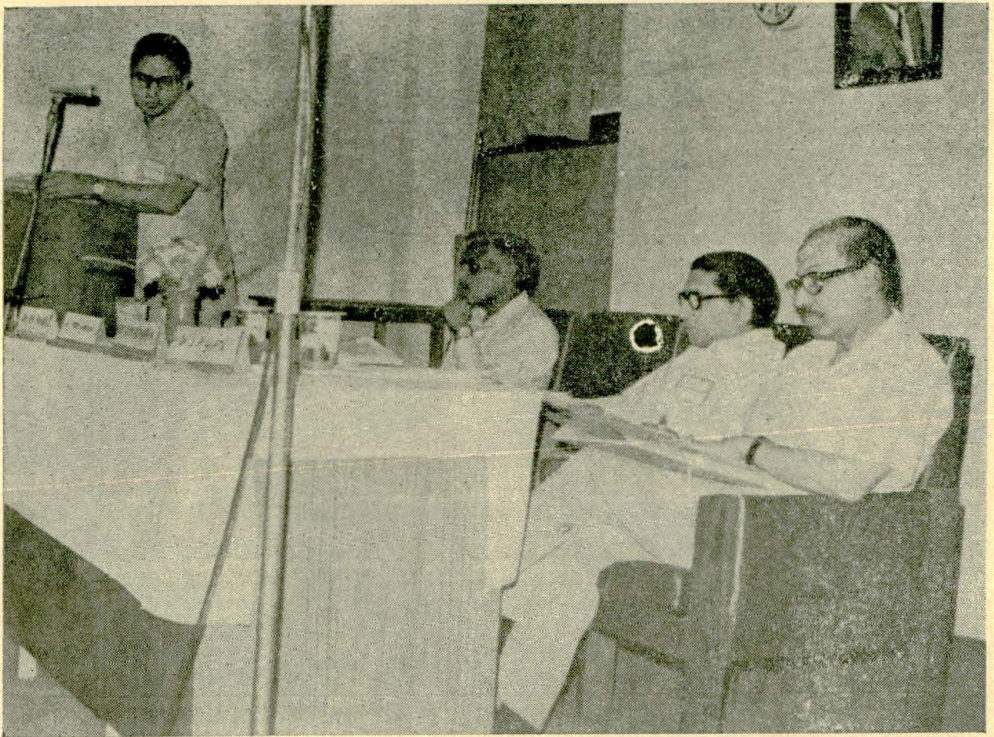
Dr. Prem Narain, Director, IASRI, welcoming the Guests and Participants.
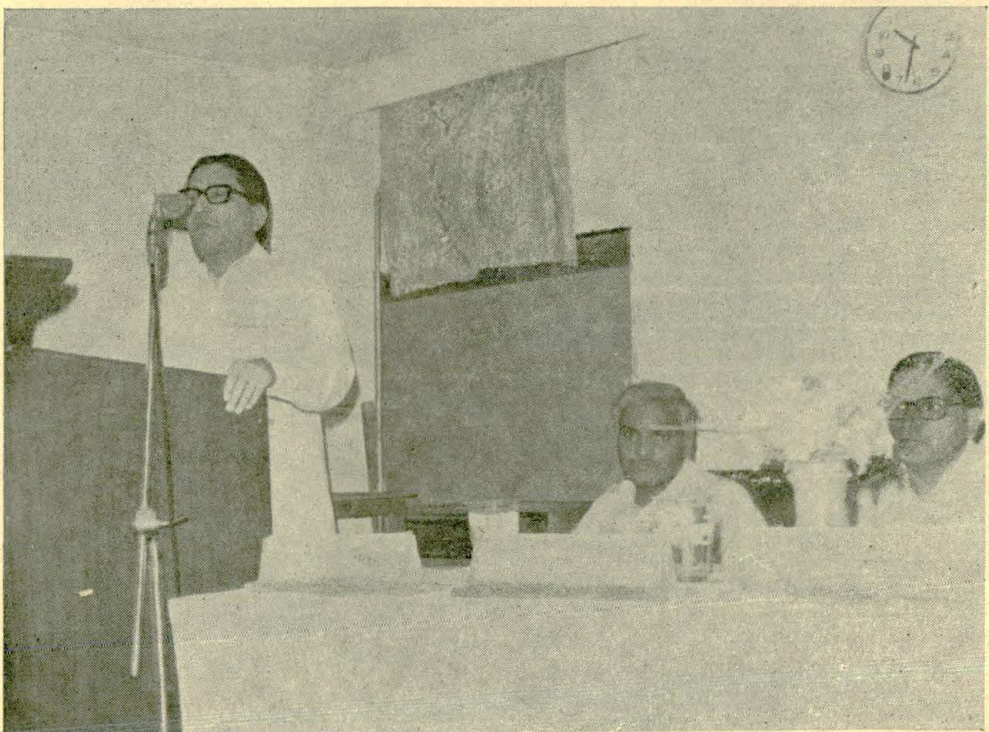
Dr. R. M. Acharya, Deputy Director General ICAR inaugurating the workshop

Presentation of recommendations at the Plenery session of the workshop under the Chairmanship of Dr. R. M. Acharya, D. D. G., ICAR,

Dr. S. P. Gupta, Adviser, Planning Commission giving key note address at the workshop.

5. The requirement for agricultural production has to be met from domestic production or from imports from outside. The domestic production can be estimated on the basis of production functions for different crops which are specific to technology and input levels in a particular region. These regional production functions for different crops should be estimated. Based on production functions the input requirement and demand for resource may be obtained. This will be helpful in estimating the future capital requirements.

6. There is a need to strengthen the data base for estimating demand and input-output relationship for different agro-climatic regions. For this purpose, concerned institutions of the region viz. agricultural universities, research institutes, state departments relating to agriculture and allied sectors including economics and statistics should join hands in developing appropriate data base by planning and conducting random sample surveys. Possibilities of getting data on input use involving seeds, fertilizers, pesticides, irrigation, water, farm power, etc. in crop cutting experiments already being conducted in different States of the country may be explored.

7. The available data are not enough to provide reliable estimates of working capital and fixed capital. A working group may be set up at IASRI to study the existing data base and to suggest a system of collection of required data. The group may include members from both Central and State govts., research institutes and universities.

8. A close look may be given to the existing system for data collection at the regional level in agricultural universities, State and Central Government organisations and the data gaps may be identified and also ways and means of improving the data may be considered by the IASRI. The IASRI may also take initiative in devising appropriate analytical models and methodological approaches to find capital requirements for modernisation of agriculture at the regional level.

9. There is a need for developing appropriate data base for constructing linear programming models. Use of inter-regional and multiperiod models can also be used for determining capital requirements. These models should be used for determining capital requirements. These models should be tested through multi-institutional collaborative studies.

10. For undertaking any exercise on capital requirements for modernisation of agriculture the modernisation of agriculture should mean, in general, more efficient cultivation. Agriculture should also absorb the innovations and advances in science and technology for increased production, processing and disposal.

11. The methodology for assessing the role of human capital in modernisation of agriculture should be appropriately developed.

12. There is a need to estimate the resource use efficiency in various farming systems with the help of current farm level data. The future level of resource use and its efficiency should be examined.

13. In connection with estimation of capital requirements for land reclamation, which is a special area problem, it was felt that in view of the high gypsum prices and its share in the total capital requirement, there is need to evolve alternative methods of soil reclamation.

14. Labour intensive technology should be adopted to maximise income and save scarce resource, viz. capital in development of barren and uncultivated land.

15. Successful implementation of reclamation programme and rational allocation of resources would increase income and production and follow labour-absorbing and capital saving path and hence favourably effect the benefit-cost ratios and pay-back period of reclamention programme.

16. Since the estimation of capital requirement is essentially an economic problem, the involvement of agricultural economists in such studies is essential from the very beginning. In fact agricultural economists should also be associated with all studies in field of agriculture.

4. TRAINING AND BASIC RESEARCH

4.1 Training activities

The following lectures/training programmes were arranged during the quarter.

SI. No.	Organisation	Period of Training	Category of trainees
(1)	(2)	(3)	(4)
1.	Department of Food and and Agriculture Marketing Services of HMS, Nepal	From 13.4.82 to 22.4. 1982	Officer trainees
2.	Indian Statistical Institute. Calcutta (Through C.S.O., New Delhi).	23.6. 1982	M. Stat. Students
3.	I.V.R.I , Izatnagar	24 6. 1982	Participants of the training course on "Epidemiology and control of Animal Diseases.

4.2 Basic Research

Some procedures of selecting a sample of size 'n' with unequal probability proportional to size are developed. All the procedures consist of writing a sample space in which the units of the population occur in proportion to their sizes. The desirable properties like-non-negative and stable variance estimator are seen to be satisfied for the sampling procedures.

4.3 Seminar

During the quarter under review, 14 seminars were delivered by the students of the Institute on various topics of interest in the field of Agricultural Statistics. Inspite of these, the following seminar was also delivered by the eminent Scientist.

Sl. No.	Speaker	Topic
1.	Dr. Jotinder, N.D. Gupta Operational Research Specialist Energy Information & Administration Washington, D.C.; U.S.A.	"Implementation of Management Sciences-Problems and Challenges".

5. ADVISORY SERVICES

During the quarter under review, technical advice and guidance was rendered to research workers and students of the Research Institute, Agricultural Universities and other research organisations of planning of their experimental investigations and statistical analysis/computerisation of their research data as also in regard to research projects referred to the Institute by the ICAR and other organisations. Some details of the technical advice and guidance given by the Institute during the quarter under review, are given below in brief:

Sample Survey Methodology

(i) Guidance given to Project Director, Lab to Land Programme (L.L.P.), ICAR for (i) preparation of Bench Mark Proforma for L.L.P. and (ii) Preparation of Annual Progress in L.L.P.

(ii) Technical advice/guidance given to Shri Dharmendra Kumar, Joint Director (Stat.), Directorate of Animal Husbandry, Uttar Pradesh in the Conduct of sample Surveys for Estimation of livestock products.

(iii) Dr. A.K. Baruah, Dy. Director, Animal Husbandry & Vaterinary Department, Assam, Gauhati was advised regarding Estimation of meat production.

(iv) Technical advice was given to Monitoring-cum-Evaluation Officer, Directorate of Agriculture, Meghalaya, Shillong for the estimation of number of animals.

6. FIELD SURVEY WORK

6.1 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) State level training programme for the field staff working under All-India co-ordinated Agronomic Research Project (AICARP)— Gauhati (Assam), Kalyani (W.B.), Bhubaneshwar (Orissa), Faizabad and Kanpur (U.P.), Siruguppa (Karnataka), Hyderabad (A.P.), Ludhiana (Punjab), Palampur (H.P.), Patna (Bihar), G.A.U. Navsari (Gujarat), Chittorgarh (Rajasthan), Nagpur (Maharashtra) and Jabalpur (M.P.)

(ii) Field Training was imparted to the field and supervisory staff under the project, "Pilot Sample Survey for Monitoring and Evaluation of Special Animal Husbandry Programmes for the small and marginal farmers and Agricultural Labours" undertaken by the Directorate of Veterinary Services, M.P.—(M.P.)

(iii) Field Training was imparted the supervisory and field staff before starting the field work for summer season for the project "pilot sample survey for developing a sampling methodology for estimation of livestock products on the basis of data collected as a part of the normal work of the field agency of animal husbandry department"—Hoshangabad (M.P.)., Patiala (Punjab).

(iv) Field training was imparted to the field staff working for collection of data pertaining to the scheme. "A study on pattern of employment among cultivators in some flood effected areas of U.P."— Ballia and Faizabad Districts (U.P.).

6.2 Field work Inspection/Supervision

Field work inspection/supervision was carried out during the quarter under review in connection with the projects given below in the areas/places shown against them : —

(i) "Study of performance of Warabandi System of Irrigation in Hissar", jointly undertaken with the Ford Foundation, New Delhi—Hissar (Haryana).

(ii) Assessment of Impact of National Demonstration Trials on Crop production level—Rohtak (Haryana).

(iii) Pilot sample survey to study the impact of flood on agricultural production in a region of U.P.—Districts of Ballia and Faizabad (U.P.)

(iv) Index of cost of production of milk, in ICD area, Bhopal, Madhya Pradesh—Bhopal (M.P.)

(v) Pilot survey to study the performance of coss-bred cattle under village conditions in palampur area (H.P.)—Palampur (H.P.).

7. ABSTRACTS OF PAPERS PUBLISHED

7.1 AGARWAL, D.K. and SINGH, PADAM—"On Cluster Sampling Strategies Using Ancillary Information"—*Sankhya, Vol. 44, Series B, Part 2, 1982.*

Two sampling schemes using auxiliary variables for cluster sampling (CAS or CBS system) have been proposed. In one of the schemes, the auxiliary variables is used in selecting the clusters whereas in the other the elements within the clusters are selected using the auxiliary variables. The efficiencies of the proposed sampling schemes as compared to the conventional cluster sampling with equal probablities of selection as well as SRSWOR have been worked out empirically for natural as well as constructed populations. It has been observed that for the types of population considered for comparison the performance of the sampling scheme utilising auxiliary variable in selecting elements within the cluster is the best of all the sampling schemes considered for comparison.

7.2 ANEJA, K.G. and NIRMAN, K.P.S.—Effectiveness of matching the sampling units under repeat surveys for building up improved estimators—*Ind. Jour. Dairy Sci., Vol. 34, No. 2, June, 1981, pp. 199-202.*

The effectiveness of a procedure for matching the sampling units in the repeat surveys carried out by I.A.S.R.I. for estimating the impact of Delhi Milk Scheme has been studied. Such procedures involve the retention and convassing of a common fraction of sampling units on the two occasions (Bench mark and Repeat surveys). These procedures are resorted to for building up improved estimators on the latter occasion by using the information for previous occasion through regression technique. The study on the effectiveness of this procedure has shown that the matching of sampling units has not been helpful in building up improved estimators for the latter occasion. In addition, it has revealed the existence of a phenomenon of interest to the industry viz., that the respective large and small commercial milk producers did not remain so on the subsequent occasion. Remedial measures for this have been suggested.

7.3 JAIN, J.P.—Note on the estimation of heterosis when performance of parents is not known. *Ind. Jour. Anim. Sci. 52 (5), pp 337-339.*

An alternative approach to the one of multiple regression for the estimation of heterosis when performance of one or both the parents is not known has been presented. This is based on fitting the biometrical genetic model to means of different grades in terms of additive, dominance and epistatic gene effects.

7.4 NEI, M., LI, W.H., TAJIMA, F. and NARAIN, P.—Polymorphism and evolution of the Rh blood groups—*Japanese J. Human Genet; 26, pp 263-278.*

With the aim of understanding the mechanism of maintenance of the Rh polymorphism in man, the probability and the first arrival time of an incompatibility mutant allele (recessive allele) to reach a high frequency by genetic drift in a finite population and the allele frequency distribution under mutation pressure are studied. The deterministic changes in allele frequency in subdivided populations are also studied. The results obtained are as follows : (1) If the effective population size is 500-1,000, the probability of a single mutant allele to reach a frequency of 0 3 or 0.5 is quite small, and without recurrent mutation it is unlikely that the mutant allele becomes polymorphic. However, if the mutant allele happens to increase in frequency by

genetic drift, the increase occurs quite rapidly. (2) In an infinitely large population, the backward (u) and forward mutations (v) produce two stable equilibria, one of which has a frequency of 0.065 for $h=0.05$ and a frequency of 0.16 for $h=0.01$ when $u=v=10^{-4}$, where h is the fitness reduction for the offspring from mating rr x RR. These frequencies are substantially higher than zero but still lower than the frequencies in the European populations (0.3-0.6). In relatively small populations, however, the probability of the allele frequency being 0.3-0.6 becomes quite high if $h=0.01$. (3) If a population is subdivided into sub-populations among which small migration occures, stable equilibria may be developed. However, the equilibrium gene frequencies do not conform to the frequencies observed in the European populations. When the migration rate becomes higher, the stable equilibria disappear, but the gene frequency change in sub-divided populations is generally much slower than that in a single random mating population, so that the Rh polymorphism may be maintained for a long time even if there are no stable equilibria. (4) If we consider all these factors together it is possible to explain the Rh polymorphism in terms of the mutation-drift hypothesis without recourse to reproductive compensation. It seems that the Rh polymorphism is transient rather than stable.

7.5 RAI, S C. and GUBHANJU, S.M.—Productivity Trends in Nepalese Farming—*Eastern Economist, Vol. 78, No. 22, pp 1288-1290.*

An attempt has been made to estimate the trends of yield rates of rice. maize and wheat crops in Nepal during the period 1967-68 to 1974-75. A regression model has been obtained for each Zone of the State for study the trends in productivity for each of these crops. The technique of analysis of variance has been applied for studying the change in productivity between years and between Zones. The impact of developmental programmes on the productivity of these crops has been estimated.

The behaviour of productivity trends in various Zones of the State has been studied and on the basis of the study, some suggestions have been given to increase the production by improving the productivity of these crops.

7.6. SAXENA, B.C., SINGH, H.P. and KRISHAN LAL —Effect of milk supply to urban milk schemes on fluid milk consumption in rural areas. *Ind. Jour. Dairy Sci., Vol. 34, June, 1981, pp 203.*

The paper is based on the data collected in the survey, "Study of the Impact of Milk Supply Scheme on rural economy in the milk collection areas of Madhavaram Milk Supply Scheme, Tamil Nadu". The main

findings of the paper are that among milk producers and non-milk producers, the class of commercial milk producers having marginal holding were found to be effected in respect of fluid milk consumption. The per head milk consumption in commercial milk producers was lowest in comparison with non-commercial as well non-milk producer. Commercial milk producers supplying milk to urban dairies were found to be much below the nutritional requirement level of, milk viz. 280 gm. per head per day. The likely reason for low fluid milk consumption in commercial milk producers may be their main source of income is dairying, as is revealed from the study also that large portion of total income is through dairying only.

7.7. SARUP, SHANTI, and RAI, S.C.—Trends in Jute Cultivation in India—*Eastern Economist, Vol. 78, No. 20, pp 1174-1176.*

Jute is an export-oriented commercial crop and its production plays very vital role in enhancing the economy of the country. This paper analyses the performance and growth of jute cultivation during the period 1967-68 to 1978-79 in important jute growing States of the country. The following broad conclusion can be drawn from the study :-

There is not much increase in the area under jute over a period of 12 years at the all-India level. The area under the crop has decreased in the States of Assam and Uttar Pradesh and it has recorded slight increase in West Bengal.

The production of jute has shown marginal improvement in all the States except for Assam and Uttar Pradesh where production has gone down by four percent in Uttar Pradesh and by two percent in Assam. The increase in production is due to increase in area and slight increase in productivity. Wide variations in jute production have been observed from State to State.

Each State except Assam has recorded an improvement in the productivity of the Crop The rate of increase in productivity is however, slow and it requires further accelerations

At All-India level, the annual increase in area, production and productivity of jute cultivation was recorded as 0.6, 1.5 and 0.8 percent respectively. The States of Assam and Uttar Pradesh have shown a decreasing trend in the area under jute.

Major breakthrough in jute productivity achieved at research farms have not been yet translated under farmer's environments in any of the States. Improved agricultural practices may be propogated to increase the productivity

of the crop as the existing high yielding varieties, have not been properly tapped so far. As is evident from the results of national demonstration trials on cultivator's fields, the existing high yielding varieties are capable of giving very high yields (25-30 q/ha) provided the recommended agronomic practices are carefully followed.

> 7.8 SINGH, R.P. and RAUT, K.C.—Studies on the lactation curve for cows under village conditions—*Ind. Jour. Anim. Sci., Vol. 52, No. 6, June, 1982, pp 375-378.*

The effect of lactation length on lactation curve and Factors associated with it of cows maintained under village conditions was studied utilising data collected in the survey in ICD area, Bikaner (Rajasthan). Order of lactation had no significant affect of lactation yield for both non-descript and Rathi cows. The average lactation yield was 1109 Kg. for ND cows and 1528 Kg for Rathi cows. The lactation period varied from 6 to 16 months. Lactation length had significant affect on lactation yield in both ND and Rathi cows. Lactation length showed significant effect on persistency and was higher for cows having longer lactation length while peak yield was not affected by lactation length. Significant positive correlations of lactation length with lactation yield and persistency were observed both for ND and Rathi cows.

> 7.9 SINGH, S. and NARAIN, PREM—Disequilibrium due to linkage in self-fertilized populations—*Ind. Jour. Genetics and Plant Breeding, Vol. 42, 1982, pp. 129-133.*

Disequilibrium due to linkage in self-fertilised populations with selection forces has been investigated with respect to two genes. The measures of disequilibrium have been used. One is the determinant of the matrix of gametic frequencies and the other is the difference in the frequencies of coupling and repulsion heterozygotes. Based on different models, numerical solutions for estimating the effect of linkage on the approach to equilibrium have been obtained with the help of computer.

It has been found that limiting value of the two measures of disequilibrium do not become zero in all cases. The rate of approach to equilibrium is found to be dependent on the intensity of linkage between the two genes. Tight linkage prolongs the approach to equilibrium. It is possible with epistatic models that although the coupling and repulsion heterozygotes becomes equally numerous in the population, the equilibrium value of 'd' need not be zero. The existence of difference in the fitnesses of the coupling and repulsion heterozygotes quickens the approach to equilibrium when the homozygotes as well as single heterozygotes have equal fitnesses.

8. PAPERS ACCEPTED FOR PUBLICATION

8.1 AGRAWAL, RANJANA, JAIN, R.C. and JHA, M.P.—Joint effects of weather variables on rice yield—*Mausam*

8.2 SARUP, SHANTI and PANDEY, R.K.—Assessment of Factors affecting Rice Productivity in Madhaya Pradesh—*Margin (published by National Council of Applied Economic Research, New Delhi.).*

8.3 SAXENA, B. C. and ANEJA, K. G.—Impact of Public Vs. Cooperative Sector Dairy on rural economy—*Indian Dairyman, Sept. 1981.*

8.4 RAUT, K. C.—Management indicators in respect of housing of buffaloes for milk production—*Ind. Jour. Anim. Sci.*

9. ABSTRACT OF DISSERTATION APPROVED

Ph. D. Degree

RAM KAUMAR—Some contribution to the field of design and analysis of experiments.

The present investigation deals with construction and analysis of confounded asymmetrical factorial designs. The method is quite general and is applicable to symmetrical factorials as well. The technique developed is an attempt towards a unified theory and is likely to prove useful in practice as the method yields designs in a reasonable number of replications. The method consists in first converting a given asymmetrical or symmetrical factorial to a symmetrical design of the type 2^n where n is the number of pseudo factors corresponding to each factor of the asymmetrical design. Next a correspondence between the levels of the factor of asymmetrical design to the combination of the levels of pseudo-factors in the symmetrical design is set up by means of linear functions developed for factors each at different levels in the given design. The set of interaction component confounded in the 2^n design leads to the confounding of one or more interaction contrast of the factors of original design. A rule has been developed to identify such confounded interactions. Finally a method of analysis of the design is given which is capable of taking account of all the affected interaction and also provide estimate for meaningful contrasts.

(Guide : Dr. A.K. BANERJEE)

10. COMPUTER SCIENCE & NUMERICAL ANALYSIS

10.1 Data Processing :

During the quarter under report, he division of Computer Science and Numerical Analysis continued to provide facilities for data processing and computer programming to the Scientists and research Scholars from various institutes under I.C.A.R., Agricultural Universities & Colleges, Directorate of Economics and Statistics, Ministry of Agriculture and Dept. of Agriculture, U.P. A few organizations were allowed to utilize the Computer Systems on payment basis.

10.2 Computer Utilization :

About 5048 production jobs were processed on B-4700 and IBM Computers during the quarter. 106 production jobs on payment basis were also processed.

10.3 Programming facilities :

During the quarter, 49 Ph. D., 28 M. Sc., and 18 other research workers were given programming and data processing help, 8 new programmes in FORTRAN IV were developed and a few old programmes were modified to meet the requirements of the users.

10.4 Visit to Computer Centre :

(i) 3 participants of the training course on "Epidemiology and Control of animal diseases" from I.V.R.I., Izatnagar visited the computer centre. The uses of Computer in Agriculture and Animal research were explained to them.

(ii) Some students of M. Stat, of I.S.I. Calcutta visited the Computer Centre. The working and uses of Computer systems were explained to them.

10.5 M.T. Unit :

About 3.90 lakhs cards were punched and verified for different Schemes and agricultural Institutes. 575 jobs were taken up on various Unit record machines during the quarter.

11. PAPERS PRESENTED IN INTER-ORGANISATIONAL SEMINARS, WORKSHOPS, ETC.

The title and authorship of papers presented and the particulars of the workshops, seminars at which these were presented, are given below :

1. Workshop on "Post Harvest Losses", with special emphasis on Small Farmers Storage for Common-Wealth Countries of South Asia and East Africa, held at India International Centre, New Delhi from 19th to 24th April, 1982.

    NARAIN, PREM and KHOSLA, R.K.—Statistical Methodology for the Estimation of Post-Harvest Food Grain Losses.

2. Workshop on "Capital Requirements for Modernisation of Agriculture", held at I.A.S.R.I., New Delhi from 4th to 6th May, 1982.

    NARAIN, PREM, PANDEY, R.K. and SARUP, SHANTI—Capital Requirements for the Modernisation of Crop Production in India.

3. Region I Conference of the Computer Society of India held at Dehradun on 11th to 13th June, 1982.

    PILLAI, S.S., MATHUR, S.N. and GOPALAN, R.—Computer in Agriculture.

12. CONFERENCES/SEMINARS/SYMPOSIA/WORKSHOPS ETC. ATTENDED BY THE SCIENTISTS.

Date	Name of the Conference/Seminar/ Workshop, etc.	Name of the Scientists with Designation
April, 19 to 24	Workshop on "Post-Harvest Losses", with special emphasis on Small Farmers storage for Common-Wealth Countries of South-Asia and East-Africa held at India International Centre, New Delhi.	Dr. Prem Narain, Director
April, 23 & 24	The FAI-NR Seminar on "Accelerating the pace of fertilizer consumption' held at I.I.T., New Delhi.	Shri H.C. Jain, Scientist (S—1)
April, 24	The Conference on Regional Development Indicators and Plan Cooperation held at Nainital, Jointly organised by the Planning Commission and Govt. of Uttar Pradesh.	Dr. B.B.P.S. Goel, Scientist (S—3)

April, 28	National Seminar on "Risk and Uncertainty in Agriculture" held at I.A.R.I., New Delhi.	Dr. R.K. Pandey, Scientist (S—3) Sh. Shanti Sarup, Scientist (S—1)
May, 4 to 6	Workshop on "Capital Requirements for Modernisation of Agriculture", held at I.A.S.R.I., New Delhi.	Dr. Prem Narain, Director, Dr. R. K. Pandey, Scientist (S-3) and other Sr. and Jr. officers of the Institute.
May, 14 to 16	Second National Workshop on "ICAR Lab to Land Programme" held at J.N.K.V.V., Jabalpur (M.P.).	Sh. S.K. Raheja, Scientist (S—3) Sh. Rajendra Singh, Field Offieer (T—7)
June, 3 to 6	Seminar on "Data Base" held at Computronics, New Delhi.	Sh. R. Gopalan, Scientist (S—2)
June, 11 & 12	Northern Regional Conference of Computer Society of India on "The State of Art of Computer Application" held at Dehradun.	Sh. S.N. Mathur, Scientist (S—2) Sh. R. Gopalan, Scientist (S—2) Sh. Ram Kumar, Scientist (S—1).

13. LIBRARY

13.1 During the period under report 74 books on various subject field of the Institure were added to the library.

13.2 The following reprints were procured for distribution by the library among the scientists on exchange basis.

S. No.	Author	Title	Source
(i)	Aneja, K.G. and Nirman, K.P.S.	Effectiveness of matching of sampling units under repeat surveys for building up improved estimators.	Ind. Jour. Dairy Sci., 34 (2), 1981.
(ii)	Saxena, B.C. and Singh, H.P.	Effect of milk supply to urban milk scheme on fluid milk consumption in rural areas.	Ind. Jour, Dairy Sci, 34 (2), 1981.

13.3 The reprographic unit of the library has attended 73 jobs covering 2008 pages sent by scientific, technical and administrative officers of the Institute.

13.4 The Issue and Return work at the Library Counter involved transaction of approx. 7,400 publications.

13.5 During the period under report approx. 6,000 persons visited the library for consultation purposes. Apart from this the library was also visited by some foreign visitors from Austria and Sri Lanka. They were impressed with the collection and set up of the library.

14. 'LAB TO LAND' PROGRAMME

Under the I.C.A.R. Lab-to-land programme implemented in village Garhi Randhala of Delhi, the Institute had conducted demonstrations on the use of balanced fertilizers on wheat and vegetable crops during rabi 1981-82 as mentioned below :-

Sl. No.	Name of the Crop	No. of demonstrations conducted	
		Target	Achievement
1.	Wheat	60	60
2.	Cauliflower	2	1
3.	Potato	8	8
4.	Tomato	3	2

The harvesting of crop in demonstration fields of Wheat was completed during the quarter under report while that of other crops had been completed during the previous quarter. The compilation of field results showed the performance of vegetables and different varieties of wheat as mentioned below :-

Crop	Variety	No. of field harvested	Field obtained in q./hec.		
			Maximum	Minimum	Average
Wheat	WL-711	17	52	26	42
	WH-147	14	50	24	39
	HD-2204	9	48	32	42
	HD-1553	19	46	24	36
	Sangam	1	32	32	32
Potato	Kufri Chandra-Mukhi	8	155	90	114
Tomato	Pusa Rubi	2	152	66	109

Cultivation of Onion :

Encouraged by the high returns obtained by some farmers from the Onion cultivation in previous year, five farmers cultivated onion during the current year. They transplanted the crop in the month of January, 1982 and harvested the same in May/June, 1982. The yield results are given below :-

Variety	No. of fields harvested	Yield obtained in q./hec.		
		Maximum	Minimum	Average
Pusa Red	5	212	150	191

15. MISCELLANEOUS

15.1 Personnel Information

15.1.1 Promotion/Transfer, etc

1. Sh. S.C. Sethi, Tech. Asstt. has been inducted into Grade (S) of A.R.S. in the pay scale of 550-900 and transferred to CSWRI, Avika Nagar, w.e.f. 11.6.1982.

2. S/Shri S.S. Walia and Rajendra Prakash, Tech. Asstts. have been inducted into Grade (S) of ARS in the pay scale of Rs. 550-900 and transferred to I.V.R.I, Izatnagar w e.f. 17.5.1982 (F.N.).

15 1.2 The Scientists of I.A.S.R.I. deputed to attend training/study tour/ meetings and to deliver lectures, etc. during April-June, 1982.

(i) Dr. Prem Narain, Director.

(i) Appointed as co-opted member of the Faculty of Mathematics of the Delhi University for 3 years w.e.f. 6th March, 1982.

(ii) Delivered two lectures on "Status of Fisheries Statistics in India" on 1st April, 1982 at the Punjab State Institute of Public Administration, Chandigarh.

(iii) Attended the Executive Council meeting of the Indian Society of Agricultural Statistics on 3rd April, 1982 under the Chairmanship of Dr. M.S. Swaminathan.

(iv) Attended the 4th meeting of the Technical Group to study the various aspects of estimating area and production of oilseeds sown mixed, on 6th April, 1982 at Directorate of Agri., Krishi Bhavan, Lucknow.

(v) Attended the executive Council meeting of the Indian Society of Animal Genetics & Breeding on 7th April, 1982 at Krishi Bhavan, New Delhi.

(vi) Attended the Sub-Committee meeting at the Instt. for Research in Medical Statistics with Dr. A.D. Taskar, Director, IRMS & others at I.C.M.R. on 15th April, 1982.

(vii) Attended the meeting of the Research Unit of the Indian Society of Agricultural Statistics on 15th April, 1982.

(viii) Attended the 6th meeting of Technical Committee of Agriculture Census, on 17th April, 1982 at Krishi Bhavan, New Delhi.

(ix) Attended the meeting of the "Committee of the Experts for improving the quality and timeliness of advance estimates of production" at Directorate of Economics & Statistics, New Delhi, on 17th April, 1982.

(x) Attended the meeting with Dr. R.M. Acharya, DDG (AS), ICAR, Dr. G.C. Taneja, Senior Scientist & others on 20th April, 1982 at Krishi Bhawan, New Delhi to discuss the proposal of evolving a dairy breed utilising crossbred animals available at Military Dairy Farms.

(xi) Attended the meeting of the Faculty of Mathematics of the University of Delhi, on 23.4.1982.

(xii) वैज्ञानिक तथा तकनीकी आयोग (शिक्षा और समाज कल्याण मन्त्रालय) द्वारा गठित "कृषि सांख्यिकी परिभाषा कोष" की प्रथम बैठक में 29.4.82 को भाग लिया।

(xiii) Attended the meeting of the Sectional Presidents of 70th Indian Science Congress (1982-83) held at Indian Science Congress Association, Calcutta, on 2nd May, 1982.

(xiv) Attended the E.F.C. meeting in the Chamber of Secretary (Expenditure) to consider the proposal "Sample surveys on estimation of production of major livestock products in States" of the Ministry of Agriculture, on 3rd May, 1982.

(xv) Attended the Advisory Committee meeting of C.S.I.R., New Delhi relating to Degree Holders & Technical Personnel Survey and review of Post-Census Survey of non-response on 11th May, 1982.

(xvi) Attended, as chairman, meeting of the Panel of Food Sampling of Indian Standards Institution, New Delhi, on 12th May, 1982

(xvii) Attended the 3rd meeting of the Committee of Experts for improving the quality & timeliness of advance estimates of production at Directorate of Economics & Statistics. New Delhi, on 29th May, 1982.

(xviii) Attended the meeting of the Academic Council of I.A.R.I., New Delhi on 7th June 1982.

(xix) Delivered a Seminar Talk on "Role of Statistics in Agricultural Research" at the Department of Statistics, College of Basic Science & Humanities, HAU, Hissar, on 9th June, 1982.

(xx) Attended the Annual General Body meeting of the Computer Society of India, New Delhi, on 30th June, 1982.

(ii) Sh. S.K. Raheja,
Scientist (S-3)

Delivered two lectures on Statistical Methods for evaluation of Soil physical parameters to the participants of Refresher Course on Methodology for soil physical analysis at Div. of Agricultural Physics, IARI, New Delhi, on 21st May, 1982.

(iii) Dr. J.P. Jain,
Scientist (S-3)

Attended the Advisory Board meeting in connection with finalisation of a short course in livestock statistics on 27th April 1982.

Attended the 16th meeting of the Project Implementation Committee of DARE on 27th May, 1982.

(iv) Dr. O.P. Kathuria, Scientist (S-3)

Delivered a lecture on "Sample Surveys for estimating resources and catch of Inland fisheries" during the Course "Designing projects for development and Management of Inland Fisheries" held at the Punjab State Institute of Public Administration, Chandigarh, on 1st April, 1982.

(v) Dr. J.S. Maini, Scientist (S-2)

Attended the Training Course in Administrative Vigilance at N.R.L. (IARI) from 14th to 26th June, 1982.

15.1.3 **Honours**

Dr. M.P. Jha, Scientist (S-3), was awarded the Degree of Doctor of Philosophy (Ph.D. degree) in Statistics from University of Delhi. The title of the thesis was "Contributions to Sample Survey Techniques Involving Multiple Characters".

15.2 **Benevolent Fund**

The annual Benevolent Fund Day was observed on 30th June, 1982 at I.A.S.R.I. A sum of Rs. 503/- (Rupees five hundred and three only) was contributed by the Officers/Staff of the Institute on that day.

15.3 **Monitoring Cell**

During the quarter under report proforma prepared by the Monitoring Cell for Monitoring the progress of Research Projects was got printed and supplied to the project leaders for transcription of the information for further processing.

Dr. Prem Narain, Director and Dr. J.P. Jain attended the meeting of the Project Implementation Committee of DARE which was held on 27th May, 1982 at Krishi Bhavan. In this meeting the E.F.C. Memo; prepared by the Monitoring Cell of the I.A.S.R.I. was discussed.

15.4 Staff Research Council

The Staff Research Council met on the three occasions during the quarter i.e. on 31st May, 1st June and 28th June, 1982 and discussed the progress of all the Research projects of the Institute.

15.5 Management Committee

1. A meeting of the Management Committee, IASRI was held on 5th April, 1982.

2. The present term of Management Committee has expired on 11.4.82. Action has been initiated by the Council to re-constitute the Management Committee of this Institute.

15.6 Other Meetings

During the quarter under report the following meetings were held:-

(i) HDS and Sr. Scientists on April, 2nd

(ii) HDS and Sr. Scientists on April, 14th

(iii) HDS and Sr. Scientists on May, 12th

(iv) HDS and Sr. Scientists on June, 17th

15.7 Other Information

Dr. Prem Narain was elected vice-president of the Indian Society of Agricultural Science at their meeting held on 2nd April, 1982. He discussed with Director-General, ICAR on 22.4.82 regarding the "Panse Memorial Lecture' of the Indian Society of Agricultural Statistics.

He was nominated on the Advisory Commission of the Governing Council of Indian Society of Human Genetics, Bombay in the field of Quantitative Genetics.

He was nominated on the Council of the Centre for Mathematical Sciences, Trivandrum *vide* letter dated 30th April, 1982.

He discussed with Dr. B.S. Pathak, Professor of Eminence, P.A.U, Ludhiana on the proposal to carry out an investigation into the energetics of Indian Agriculture, on 11th May, 1982.

He discussed with Dr. H.K. Jain, Director, I.A.R.I. and Dr. K.L. Mehra, Director, N.B.P.G.R., New Delhi regarding making effective contribution of IASRI Computer, on 13.5.1982.

He delivered a series of five lectures on "Inference in Genetic Statistics" from 17.5.82 to 20.5.82 to the participants of Advanced Level U.G.C. Summer Institute in 'Probability and Inference' conducted at Department of Statistics, Punjab University, Chandigarh from 10.5.82 to 3.6.82.

He discussed with Dr. R.S. Pandey, N.D.R.I., Karnal regarding finalisation of a publication on completed All-India Coordinated Project on Biochemical Polymorphism in Farm Animals, on 22.5.82.

He Organised combined Competitive Examination for the recruitment of section officers/Assistants at Delhi Centre through A.S.R.B. from 25.5.82 to 27.5.82 and acted as Chief Supervisor of the Examination.

He discussed with Dr. S.P. Gupta, Adviser (PP), Planning Commission, New Delhi regarding association of IASRI Scientists in the various working Groups of Planning Commission, on 5.6.82.

Dr. Narain also discussed with Dr. Ramtanu Maitra, India Coordinator of Fusion Energy Foundation, New York, U.S.A. & Dr. Susan Brady, Agriculture Editor, Executive Intelligence Review, New York, U.S.A. on Agriculture & Statistics on 8.6.82.

15.7.2 Dr. S.S. Pillai, Dr. A.K. Nigam, and Dr. B.B.P.S. Goel were acted as Supervisors in the Combined Competitive Examination for the recruitment of Section officers/Assistants at different Centres of Delhi through A.S.R.B. from 25.5.82. to 27.5.82.

15.7.3 Sh. S.C. Rai, was nominated member of the Steering Committee for organising ICAR Inter-Institutional Students Sports meet in 1982.

15.7.4 Dr. Bhagat Singh, addressed students of the Indian Statistical Institute on the Activities of the Division of Econometric Analysis on 23.6.1982.

16. दुग्ध उत्पादन के आकलन हेतु वास्तविक तोल और गुड़-ताछ के आधार पर प्राप्त आंकड़ों की सापेक्ष गुणतांक का अध्ययन करने के लिए मार्गदर्शी सर्वेक्षण

दुग्ध उत्पादन के आकलन के लिए उपयुक्त प्रतिचयन तकनीकों में सुबह एवं शाम को दुग्ध निकालने के स्थान पर वास्तविक तोल द्वारा दुग्ध पशुओं के एक मार्गदर्शक प्रतिदर्शों के दुग्ध उत्पादन पर आंकड़े एकत्रित करना सम्मिलित है जिसके लिए क्षेत्रीय कार्य हेतु पूर्णकालिक गणनाकारों की आवश्यकता होती है । आंकड़ों को एकत्रित करने की यह पद्धति महंगी होने के अतिरिक्त कुछ-कुछ अनुविद्याजनक भी है । इस पद्धति के स्थान पर गुड़-ताछ करके आंकड़ों की विश्वसनीयता पर न जाकर वास्तविक तोल द्वारा आंकड़े दर्ज करने के परीक्षण के सुझाव दिये गये हैं । गुड़-ताछ द्वारा आंकड़े एकत्रित करने का आवश्यक यह है कि दुग्ध निकालते समय अन्वेषक का उपस्थित रहना आवश्यक नहीं है । इस प्रकार दर्ज आंकड़ों की कम समय में वहां पर जाकर पूछताछ कर सकता है । मगर इस प्रकार दर्ज आंकड़ों की परिशुद्धता परिचयन के व्यक्ति के निर्णय और ईमानदारी पर निर्भर करती है । पूछताछ द्वारा दुग्ध उत्पादन पर एकत्रित आंकड़ों की उपयोगिता कहां तक है इसका अध्ययन करने के लिए संस्थान द्वारा वर्ष 1979-80 के दौरान रोहतक (हरियाणा) और बाराबंकी (उ० प्र०) जिलों में दुग्ध उत्पादन के आकलन हेतु वास्तविक तोल और पूछताछ के आधार पर प्राप्त आंकड़ों की 'दुग्ध उत्पादन का आकलन करने के लिए मार्ग दर्शी सर्वेक्षण' चलाया गया । सर्वेक्षण के उद्देश्य इस प्रकार थे :—

1. दुग्ध उत्पादन के आकलन हेतु वास्तविक तोल और पूछताछ द्वारा प्राप्त आंकड़ों की सापेक्ष गुणतांक का अध्ययन करना और

2. उपयुक्त परिशुद्धता सहित जिला स्तर पर दुग्ध के वार्षिक उत्पादन के आकलन प्राप्त करना ।

सर्वेक्षण के अधीन अपनाए गये प्रतिचयन अभिन्यास में से एक स्तरित बहुचरणीय पादुच्छिक प्रतिचयन था । दोनों ही जिलों में तहसीलों को स्तर के रूप में अपनाया गया था । प्रारंभिक प्रतिचयन इकाइयां (प्रा० प्र० इ०, p.s.u.'s.) प्रत्येक में दो गांवों के समूह थे । गांवों के समूहों को सर्वप्रथम पादुच्छिक रूप से समान संभावना सहित और बिना किसी प्रतिस्थापन

के एक गाँव को चुनकर बनाया जाता है और उसे एक और साथ के गाँव से जोड़ दिया जाता है । दूसरे चरण की प्रतिचयन एकक (p.s.u.) में दुग्ध उत्पादन पर तोल और द्वारा आंकड़ा एकत्रित करने के लिए दो समीपस्थ परिवारों के समूह थे और केवल गृहताल की एकत्रित आधार पर दुग्धउत्पादन के आंकड़े को एकत्रित करने के लिए एक घर लिया गया था । प्रतिचयन के अंतिम एकक में तोल और गृहताल दोनों के आधार पर आंकड़े एकत्रित करने के लिए एक दुग्ध पशु पर सर्वेक्षण किया गया जबकि केवल गृहताल के आधार पर आंकड़ों को एकत्रित करने के लिए सर्वेक्षण एकक के लिए आगे कोई उप-प्रतिचयन एकक नहीं था ।

प्रत्येक जिले में स्थित गाँवों की संख्या के समानुपात में भिन्न-भिन्न स्तर पर 20 प्रारंभिक प्रतिचयन एकक नियत किये गये । सर्वेक्षण सभी महत्वपूर्ण तीन मौसमों में सारे साल चला और प्रत्येक मौसम में प्रारंभिक प्रतिचयन एकक (p.s.u.) का एक नवीन प्रतिदर्श चुना गया । प्रत्येक जिले के प्रारंभिक आंकड़ों को प्रतिचयन एकक (p.s.u.) में तोल और गृहताल दोनों के आधार प्रत्येक क्षेत्रीय अन्वेषक के लिए ऽ प्रा॰ प्र॰ ए॰(p.s.u's.) नियत किये गये । प्रथम तीन प्रा॰ प्र॰ ए॰ (p.s.u's.) (जो उप-समूह I कहे जाते हैं) का वास्तविक तोल और गृहताल दोनों के आधार पर दुग्ध उत्पादन के आंकड़े एकत्रित करने और गृहताल के आधार पर दुग्ध उत्पादन हेतु आंकड़े प्रत्येक प्रा॰ प्र॰ ए॰(p.s.u's.) में तोल और गृहताल दोनों के आधार पर दुग्ध उत्पादन के आंकड़े एकत्रित करने के लिए प्रत्येक कार्यदिवस पर समीपस्थ परिवारों के एक समूह का अवलोकन किया गया । इसके अलावा केवल गृहताल द्वारा दुग्ध उत्पादन दर्ज करने के लिए प्रा॰ प्र॰ गया । उपसमूह II के प्रत्येक प्रा॰ प्र॰ चुने गये 5 परिवारों के प्रतिदर्श को भी अवलोकन किया गया । उपसमूह II के प्रत्येक प्रा॰ प्र॰ ए॰ (p.s.u's.) में से प्रत्येक कार्यदिवस पर केवल एक गृहताल करने दोनों के उत्पादन का गृहताल द्वारा चुने गये 10 परिवारों के आंकड़े अवलोकन किया गया । उपसमूह-1 के के लिए प्रत्येक प्राप्त दुग्ध उत्पादन पर आंकड़े एकत्रित करने के लिए अवलोकन किया और गृहताल दोनों के द्वारा दुग्ध उत्पादन के समूह का अवलोकन किया प्रत्येक प्रा॰ प्र॰ ए॰(p.s.u's.) में तोल और गृहताल दोनों के आधार पर वास्तविक एकत्रित करने के लिए प्रत्येक कार्यदिवस पर चयनित परिवारों के प्रतिदर्श से वास्तविक तोल प्रतिदर्श से चयनित पशुओं का एक दिन से एक दिन पूर्व दुग्ध उत्पादन गृहताल द्वारा द्वारा प्रतिदर्श से सभी पशुओं का वास्तविक तोल के दिन से एक दिन पूर्व की भी सूचना वास्तविक तोल के दर्ज किया गया । इन परिवारों से पशुओं को खिलाए गए चारे की भी सूचना वास्तविक तोल के आधार पर दर्ज की गयी ।

संक्षेप के प्रमुख निष्कर्ष निम्नानुसार हैं—

आधार पर दर्ज की गयी । यह देखा गया कि गायों और भैंसों दोनों की स्थिति में तोल के आधार पर दर्ज किये गये दूध के उत्पादन का गृहताल द्वारा दिये किये गये वास्तविक उत्पादन से सह-सम्बन्ध उच्च धनात्मक था । गायों की स्थिति में रोहतक और बारावंकी जिलों में इनका मान क्रमशः 0·95 और 0·89 था । 0·96 थे जबकि भैंसों की स्थिति में इनका मान क्रमशः 0·93 और

एक ही प्रकार के प्रतिदर्श में युग्म 't' परीक्षणों (paired 't' test) को लागू करने पर देखा

फाँसी किरोहतक जिले में बताये गये और वास्तविक तौल के आधार पर दूध के उत्पादन में भिन्नता न तो गायों और न ही भैंसों में साधक थी जबकि बारांबकी जिले में दोनों के लिए ही ऐसा था । अतः यह कहा जा सकता है कि सभी मामलों में बृहत्तालु द्वारा दूध उत्पादन दर्ज करने के तरीके को वास्तविक तौल के तरीके द्वारा प्रतिस्थापित नहीं किया जा सकता है ।

प्रतिदिन प्रति गाय का औसत दूध उत्पादन, दोनों ही जिलों में एक मौसम से दूसरे मौसम में अदलता-बदलता रहा । रोहतक और बारांबकी जिले में वर्ष भर में (प्रतिदिन) प्रति गाय का औसत दूध उत्पादन 5.7 और 8.0 प्रतिशत मानक बृहत् सहित क्रमशः 2.84 और 0.88 प्रति किलोग्राम आका गया जबकि रोहतक और बारांबकी जिले में संगत आंकलन 3.0 और 2.9 प्रतिशत मानक बृहत् सहित क्रमशः 4.84 किलोग्राम और 2.02 किलोग्राम थे ।

प्रति दुधारू पशु प्रतिदिन के औसत दूध उत्पादन का समुन्नत दोहरा प्रतिचयन आकलन वास्तविक तौल और बृहत्तालु दोनों के द्वारा एकित्रित आंकड़ों को उपयोग करके निकाला गया । जिससे कि केवल वास्तविक तौल के आधार पर प्राप्त आंकलनों की कम करने में सहायता मिलती है । इस प्रकार हालांकि बृहत्तालु द्वारा आंकड़े एकित्रित करने की पद्धति वास्तविक तौल द्वारा आंकड़े एकित्रित करने की पद्धति की जा सकती है किन्तु प्रत्येक दुधारू पशु के प्रतिदिन औसत दूध उत्पादन के आकलनों नहीं अनुमान बढ़ाने के लिए दोनों प्रकार के उपयुक्त रूप से संयुक्त विधि तैयार करने में इससे दूध उत्पादन के जिलानुसार आकलनों को प्राप्त करने के लिए उचित विधि तैयार करने में सहायता मिलेगी और इस दिशा में अध्ययन आकलनों का हाथ में लिया जा रहा है ।

रोहतक जिले में दुधारू भैंसों की संख्या 7.0 और 6.4 प्रतिशत की मानक बृहत् सहित क्रमशः 43.4 और 127.1 हजार आंकी गई थी जबकि बारांबकी जिले में ये 5.5 और 5.6 प्रतिशत की मानक बृहत् सहित 93.8 और 107.8 हजार आंकी गई थी । रोहतक जिले में दुधारू गायों का समानुपात गायों और भैंसों के लिए क्रमशः 57 और 75 था जब- कि बारांबकी जिले में यह गायों और भैंसों के लिए संगत आकलन क्रमशः 43 और 53 था ।

रोहतक जिले में केवल 1/8 भाग गायों और दुधारू भैंसों का उत्पादन सहित वार्षिक दूध उत्पादन 200.4 हजार टन था जबकि बारांबकी जिले में 1/4 भाग गायों के योगदान सहित यह उत्पादन 55.8 हजार टन था । रोहतक जिले में प्रति व्यक्ति प्रतिदिन दूध की उपलब्धि 500 ग्राम थी जबकि बारांबकी जिले में यह 93 ग्राम थी ।

अनुवादक :
अब्दलेन्द्रपालसिंह

निदेशक :
सर्वश्री महाराजस्वरूप एवं फणीन्द्रपालसिंह

17. आधुनिक ढंग के प्रयोग से चावल की उपज में सुधार

भारत एक कृषि प्रधान देश है। यहाँ के लोगों का मुख्य धन्धा कृषि तथा पशु पालन है। हरित क्रांति के फलस्वरूप 1965-66 के बाद चावल व गेहूँ की उपज में बहुत ज्यादा सुधार हुआ है। हरित क्रांति का लाभ देश के हर भाग तथा हर क्षेत्र में अनुभव किया गया है। परन्तु कुछ भागों में इसका प्रभाव बहुत ज्यादा हुआ है। इसके फलस्वरूप आमदनी बहुत ज्यादा बढ़ी है। यह खासकर उन क्षेत्रों में हुआ है जहाँ कि सिंचाई की सुविधा व अपेक्षा अधिक मात्रा में उपलब्ध है। इस हरित क्रांति का लाभ हर किसान तक पूरी तरह नहीं पहुँच पाया है। वास्तविक उपज अब भी सम्भावित उपज से काफी कम है। देश के अनेक भागों में किसी भी उपज की उपज 180 से 300 प्रतिशत तक बढ़ाई जा सकती है। यहाँ तक संभव है कि खेत के तरीकों में सुधार हो और सभी साधन संतुलित मात्रा में उपलब्ध हों।

इस लेख में पूरी जिले में चावल की सम्भावित उपज तथा औसत उपज की मात्रा तथा इनमें अन्तर इससे सम्बन्धित खेती के तरीकों व साधनों के उपयोग का वर्णन है।

इसके लिए आंकड़े पूरी जिले के चार गांवों से, जिनका नाम गोरेनिया, सियुआनपाड़ा, वेणुनीपाड़ा तथा जोरेकनी है, लिये गये है। ये चारों गांव आपरेशनल रिसर्च प्रोजेक्ट के अन्तर्गत आते है। इन गांवों में रहने वाले 113 कृषकों से आंकड़ा 19,8-79 वर्ष में मुख्य चावल की फसल के लिये लिया गया था।

खेती के उन्नत तरीके, जिनके बारे में जानकारी प्राप्त की गई थी, वे इस प्रकार है—

1. उन्नत किस्म के बीजों का प्रयोग,
2. रासायनिक खादों का प्रयोग,
3. फसल की सुरक्षा के लिए रासायनिकों का प्रयोग और
4. उन्नत तथा सुधरे कृषि यन्त्रों का प्रयोग।

ऊपर दिये हुए चार उन्नत आधुनिक तकनीकों के मुख्य आधार है जो कि कृषकों द्वारा प्रयोग में लायी जाती हैं। इनके प्रयोग से अधिक उपज प्राप्त की जा सकती है। कृषि के और उन्नत तरीके कृषकों द्वारा मुख्यतः प्रयोग में नहीं लाये जा रहे हैं। जो कृषक किसी एक भी तरीकों को छोटे से क्षेत्रफल पर भी प्रयोग में ला रहे है, उनको 'एडाप्टर' की श्रेणी में रखा

गया है तथा अन्य लोगों को 'जल-प्रहरर' माना गया है। चुने हुए कृषकों को उनके उन्नत तरीकों के प्रयोग पर 5 श्रेणियों में विभाजित किया गया है।

चुने हुए कृषकों का 28 प्रतिशत किसी भी उन्नत पद्धति का प्रयोग चावल उत्पादन के लिये नहीं करता है। करीव-करीव इतनी ही मात्रा में कृषक किसी भी नयी पद्धति का प्रयोग में लाते हैं। प्रथम श्रेणी के कृषकों की औसत उपज 1005 किलोग्राम तथा दूसरी श्रेणी के कृषकों की औसत उपज 1203 किलोग्राम प्रति हेक्टेयर की दर से है। करीव 17 प्रतिशत कृषक ऐसे हैं जो कि किसी भी तरीकों को चावल उगाने में प्रयोग में लाते हैं। इनकी औसत उपज 1294 किलोग्राम प्रति हेक्टेयर है। करीव 16 प्रतिशत लोग किसी तीन तरीकों को प्रयोग में लाने से औसत उपज बढ़ी है तथा 1593 किलोग्राम प्रति हेक्टेयर है। सभी चारों तरीकों को प्रयोग में लाने से औसत उपज 1273 किलोग्राम तथा 1628 किलोग्राम प्रति हेक्टेयर की दर से है। सब श्रेणी की औसत उपज 1732 किलोग्राम प्रति हेक्टेयर है।

इस अध्ययन से यह निष्कर्ष निकलता है कि एक-चौथाई कृषक, जो कि एक-तिहाई भूमि पर चावल उगाते हैं, किसी भी प्रकार के आधुनिक ढंग का प्रयोग नहीं करते। इससे यह भी साबित होता है कि आधुनिक ढंग के प्रयोग करने का स्तर काफी ऊंचा किया जा सकता है। अतः कृषकों को प्रसार माध्यम से या अन्य प्रोत्साहनों के द्वारा अधिक से अधिक मात्रा में आधुनिक ढंग से कृषि करने के लिए प्रेरित करना चाहिए। ऐसा करने से चावल की उपज में बहुत ज्यादा बढ़ोतरी की जा सकती है।

18. संस्थान में हिन्दी के बढ़ते चरण

गत तिमाही में संस्थान में कार्यरत अधिकारियों एवं कर्मचारियों में हिन्दी में कार्य करने के प्रति जो उत्साह देखा गया वह पहले की अपेक्षा दुगना था। सभी अनुभाग/प्रभागों के अधि-कारी एवं कर्मचारी अब स्वेच्छा से अपने दैनिक कामकाज में हिन्दी का प्रयोग करते हैं। गत तिमाही में प्रशासनिक अनुभागों से जारी होने वाले द्विभाषी पत्र, प्रपत्र, ज्ञापन इत्यादि की संख्या अब पहले से अधिक है। गत तिमाही में ही कुछ और मानक प्रपत्रों का भी हिन्दी अनुवाद किया गया।

गत तिमाही में संस्थान में होने वाली राजभाषा कार्यान्वयन समिति की तिमाही बैठक का आयोजन भी नियमित रूप से किया गया। इस बैठक में हिन्दी के प्रयोग को और अधिक बढ़ाने हेतु भिन्न सुझाव समक्ष आये जिन पर शीघ्र अमल करने हेतु अनुभागों/प्रभागों/इकाकी को निर्देश दिये गये। इसी प्रकार गत तिमाही में हिन्दी के प्रयोग से सम्बन्धित तिमाही प्रगति रिपोर्ट भी यथा समय संकलित करके भेजी गयी।

व्यक्तिगत रूप से यदि अलग-अलग अनुभागों में हिन्दी के प्रयोग पर दृष्टिपात किया जाये तो देखने में आता है कि इस तिमाही में हिन्दी का सर्वाधिक प्रयोग लेखा अनुभाग एवं प्रशासन-I अनुभाग में हुआ। इसके बाद सामान्य अनुभाग एवं प्रशासन-II अनुभाग का नम्बर आता है। रोकड़ अनुभाग में हिन्दी का प्रयोग सन्तोषजनक था। इसी प्रकार वैज्ञानिक प्रभागों में भी हिन्दी के प्रयोग का बोलबाला रहा। अर्थी तक कुछ ऐसे वैज्ञानिक प्रभाग भी थे जहां हिन्दी का प्रयोग सन्तोषजनक नहीं था। अब वहां भी आशा के अनुकूल हिन्दी का प्रयोग है।

कुल मिलाकर हम यह कह सकते हैं कि संस्थान में गत तिमाही में ६० प्रतिशत कार्य हिन्दी में हुआ। इस प्रकार अधिकारियों एवं कर्मचारियों की हिन्दी के प्रति निष्ठा देखते हुए हम आशा कर सकते हैं कि भविष्य में संस्थान के वैज्ञानिक के दैनिक काम-काज में हिन्दी का प्रयोग निरन्तर बढ़ेगा।

बड़े हर्ष का विषय है कि इसी दौरान संस्थान को एक हिन्दी अधिकारी, एक हिन्दी अनु-वादक एवं एक हिन्दी टाइपिस्ट का पद मिला। जिन्हें शीघ्र भरने के प्रयास जारी है। इन पदों के भरते ही संस्थान में पूरे-पूरे प्रयास किये जायेंगे कि यहां का दैनिक कामकाज शत-प्रतिशत हिन्दी में ही हो।

PERIODICAL PUBLICATIONS
ANNUAL REPORT

The Annual Report issued by the Institute covers all the aspects of its functions and activities and provides useful information to research workers in the field of Agricultural Statistics.

ANNUAL REPORT ON SAMPLE SURVEY METHODOLOGY

The Annual Report of Sample Surveys for Methodological Investigations nto High Yielding Varieties Programme (H·Y.V.P.) are being published since 1974-75.

ANNUAL INDEX OF AGRICULTURAL FIELD EXPERIMENTS

The Annual Index gives information on the objectives of agricultural field experiments other than varietal trials conducted during that year on various crops at different experimental research stations and their years of commencement and termination under the scheme of National Index of Agricultural Field Experiments.

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 data for the period 1966-71 have been collected and are under process which would be published in the form of cropwise compendia series.

OTHER PUBLICATIONS