

भा० कृ० सां० अ० सं०

सांख्यिकीय सूचना-पत्र

I. A. S. R. I.

**STATISTICAL NEWSLETTER**

---

Volume-VIII

July - September, 1982

Number-III

---



भारतीय कृषि सांख्यिकीय अनुसंधान संस्थान

( भा० कृ० अ० सं० )

लाइब्रेरी रो एवेन्यू, नई दिल्ली-110012

INDIAN AGRICULTURAL STATISTICS RESEARCH INSTITUTE

( I. C. A. R. )

LIBRARY AVENUE, NEW DELHI-110012

Compiled and Prepared

by

R. K. KHOSLA

A. K. MUKHERJEE    MAHARAJ SWAROOP

P. P. SINGH

## प्राक्कथन

यह भा० कु० सां० अ० सं० सांख्यकीय सूचना-पत्र का आठवाँ खण्ड, संख्या 3 है। इसमें इस संस्थान का जुलाई-सितम्बर, 1982 की तिमाही गतिविधियों से सम्बन्धित जानकारी का विवरण दिया गया है।

मुझे आशा है कि यह सूचना-पत्र कृषि अनुसंधान सांख्यकी-विदों 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 करूँगा।

मैं संस्थान के उन सभी अधिकारियों तथा सदस्यों का आभारी हूँ, जिन्होंने भा० कु० सां० अ० सं० सांख्यकीय सूचना-पत्र के इस अंक के लिए अपेक्षित सामग्री प्रदान की है।

मैं सर्व श्री सोमदत्त, महाराज सिंह काकरान, सुरेन्द्र कुमार शर्मा एवं रघुवर दत्त का भी आभारी हूँ, जिन्होंने इस सूचना-पत्र के संकलन एवं मुद्रण में अपना भरपूर सहयोग दिया है।

प्रेम नारायण

निदेशक

भारतीय कृषि सांख्यकीय अनुसंधान संस्थान

नई दिल्ली-110012

## **PREFACE**

This is Vol. VIII, No. 3, issue of 'IASRI Statistical Newsletter' and covers the activities and allied information in respect of this Institute during the quarter July-September, 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 other members of 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, and Shri R. Datt for the help rendered in compilation and printing of this Newsletter.

PREM NARAIN

DIRECTOR

INDIAN AGRICULTURAL STATISTICS  
RESEARCH INSTITUTE, NEW DELHI-12

## CONTENTS

<i>Sl. No.</i>		<i>Page No.</i>
1.	Effect of Cultural Practices on Cotton	1
2.	Possibility of securing data on live-stock productivity through self-respondents	5
3.	Training & Basic Research	6
4.	Advisory Services	7
5.	Field Survey Work	8
6.	Abstracts of Dissertations Approved	9
7.	Abstracts of Papers published	
8.	Papers accepted for publication	
9.	Computer Science and Numerical Analysis	
10.	Papers presented in Inter-Organisational Seminars, Workshops, etc.	16
11.	Conferences/Seminars/Symposia/Workshops, etc. attended by the Scientists	17
12.	Library	18
13.	Miscellaneous.	19
14.	कपास पर कृषण कार्यों का प्रभाव	24
15.	भारतीय कृषि सांख्यिकीय अनुसंधान संस्थान में हिन्दी के प्रयोग की प्रगति	28

## 1. EFFECT OF CULTURAL PRACTICES ON COTTON

Cotton is one of the important commercial crops which provides the raw material for number of industries and also foreign exchange earner. In the year 1979-80 the total value of the cotton exported was around 89 crores. It is generally grown under unirrigated and rainfed conditions. The principal crop season coincides with the tropical monsoon period of the country. The cultivated area is bounded between 9° N to 31° N latitude. The total production and average yield for All India as well as for some of the important cotton growing states is given in the table below :—

**Area and production of cotton in major cotton growing states in India (1977-78 to 1979-80)\***

State	Area in '000 ha.	Percentage of total area	Production in '000 bales of 170 kg each	Percentage of total Production	Average yield in kg/ha
Maharashtra	2470.0	30.9	1425.2	18.8	98
Gujarat	1768.1	22.1	1942.8	25.6	187
Karnataka	1018.0	12.7	757.9	10.0	126
Madhya Pradesh	655.2	8.2	276.7	3.7	72
Punjab	625.3	7.8	1261.3	16.6	343
Andhra Pradesh	411.4	5.1	333.7	4.4	138
Rajasthan	386.4	4.8	500.7	6.6	220
Tamil Nadu	317.0	4.0	480.7	6.7	258
Haryana	289.0	3.6	551.7	7.7	325
All India	8003.7	100	7586.3	100	161

Source :—"Cotton Situation", Directorate of Economics and Statistics.

\* Figures based on average of three years.

It will be observed that the total area under cotton cultivation is around 8 million hectares of which 31% is accounted by Maharashtra and another 22% by Gujarat. About 45% of the total production of the country is accounted by these two states alone. There has been a good deal of variation in the average

yield rate among different states. The yield rate for Punjab and Haryana was more than 3 q/ha whereas the yield rate for M. P., Maharashtra and Karnataka was less than 1.25 q/ha. The gap in the yield rate between these two categories of states is mainly due to the fact that in Punjab and Haryana the crop is generally grown under assured water supply conditions whereas in other states limited area enjoys irrigation facilities. In the past number of experiments were planned to investigate the effect of chemical fertilizers on yield of crop and some recommendations for different regions were also formulated on the basis of these experiments. The crop is generally grown under rainfed conditions and primarily depends on the vagaries of weather, the cultivators are generally unwilling to use the recommended dose of fertilizers and as such it is necessary to promote the use of some other suitable measures which also have a direct bearing on the effect of yield. Apart from the use of chemical fertilizers there are other non-monetary inputs like date of sowing, proper adjustment in plant and row spacing and seed rate which also have an important role in improving the yield rate. In the present note, the results of some of the experiments planned on dates of sowing in Gujarat and Maharashtra during 1966-75 are discussed.

#### **Dates of Sowing :—**

Cotton crop requires about 50 cm. rainfall for its growth but comparatively dry weather during the flowering and fruiting stages is beneficial. Rainfall during the boll opening and harvesting period proves harmful. For getting good yield it is necessary to have adequate soil moisture and appropriate temperature at different stages of crop growth. Optimum availability of all the agro-meteorological parameters during the different stages of crop growth depends on the appropriate date of sowing. As such, the knowledge on the dates of sowing in an area is necessary for the proper growth of the crop and harvesting good yield.

#### **Gujarat :—**

In Gujarat the normal period of sowing generally coincides with the commencement of monsoon. Monsoon season generally commences in the state from the last week of June to first week of July. The experiments were planned with the principal objective to investigate whether for improved varieties, the existing period is beneficial or moderate changes are required. The number of experiments were planned at Surat, Manund, Thasra and Talod agricultural research stations. In most of the experiments planned at Surat (deep black soil) on long staple varieties like H-5 the dates of sowing were first

week of June and first week of July. It has generally been observed that the first week of June is a suitable sowing period in the area ; if the sowing is delayed by one month a significant loss in the yield rate is expected. The loss in yield rate was generally of the order of 5 to 10%. The interaction between dose of fertilizer application and dates of sowing was also found to be significant in some cases. With the sowing made in the first week of June and the fertilizer rate of application being 240 KgN+120 Kg P<sub>2</sub>O<sub>5</sub>+40 Kg K<sub>2</sub>O (per hectare) the yield rate was highest and was of the order of 2531 Kg/ha. For the same dose of fertilizer and sowing delayed to the first week of July the percentage loss in the yield was of the order of about 20.

An experiment was also planned under irrigated conditions for two dates of sowing namely, end of May and end of June for some of the long staple varieties like A-218, IAN-579, H-4 and MCU-5. In respect of each variety it was observed that the most appropriate sowing period is end of May. If the sowing is delayed by about 30 days the loss expected in each case was more than 20 per cent.

At Thasra (sandy loam soil) agricultural research station an experiment was planned with Digvijay (medium staple variety) with the dates of sowing ranging from last week of June to first week of August with an interval of one week. It was found that if the sowing is done in the last week of June, the average yield obtained was around 6 q/ha; with the delay in the sowing date there was a steady decrease in the yield rate and the minimum yield obtained was of the order of 2 q/ha.

The experiment planned at Talod (sandy loam soil) to investigate the proper dates of sowing for Hybrid-5 (long staple) suggested that if the sowing is delayed by one month from third week of June the loss in yield was of the order of 48 per cent

It is, therefore, concluded that in Gujarat state in respect of soil ranging from black to deep black first week, of June is more appropriate for sowing the crop; this incidently coincides with pre-monsoon showers. However in case of sandy loam soils the third week of June is better period of sowing. The level of fertilizer application will also have to be adjusted according to the period of sowing in each case. If sowing is done in early period the recommended dose of fertilizer would be more appropriate; if the sowing is delayed the fertilizer has to be adjusted accordingly.



**Maharashtra :—**

In Maharashtra the crop is normally sown after the commencement of monsoon i. e. after the second week of June. In the state the experiments were planned to study the effect of different dates of sowing under irrigated as well as unirrigated conditions. Under irrigated conditions the experiments were planned at Padegaon (deep black soil), Parbhani (medium black soil) and at Achalpur (black soil). The experiments were planned on long staple (B-147) and medium staple (Lakshmi) varieties at Achalpur and padegaon respectively. The dates of sowing were third week of May and first and third week of June at Achalpur. It was observed that if the sowing was done in the third week of May the increase in yield was significant as compared to the other two dates of sowing. The increase in the yield was about 40 per cent as compared to that of the other periods. In case of Padegaon the dates of sowing ranged from first week of March to first week of April. It was found that if the sowing is done in the first week of March the yield was of the order of about 17 q/ha. If the sowing is delayed to the first week of April the reduction in yield was about 25 per cent. At Parbhani the experiment included the long and medium staple varieties and the dates of sowing considered for experimentation were first and third week of May and June. If the sowing is done in the third week of May the yields obtained were significantly higher as compared to other dates of sowing. The experiments planned under irrigated conditions at different research stations however suggest that early sowing is preferred over late sowing for all types of soils in the state.

To see the effect of sowing under rainfed conditions the experiments were planned at Achalpur, Akola, Nanded, Amravati, Parbhani and Jalgaon with two dates of sowing namely, normal sowing and late sowing (8 days after the normal sowing). The varieties tried were long staple (B-1007) at Achalpur and Amravati, medium staple varieties such as AK-235 and L-147 at Akola, Y-I at Jalgaon, G-46 at Nanded, and C J-73 at Parbhani. At all the centres, normal sowing had given significantly higher yield over late sowing. The reduction in yield due to late sowing ranged from 10 per cent to 47 per cent at different research centres. The maximum yield of the order of 11.7 q/ha has been observed at Nanded for normal sowing as compared to 6.8 q/ha for late sowing.

Hence, it is advisable in Maharashtra state that under irrigated conditions early sowing of the crop may be practised whereas for rainfed crop, normal sowing period i.e. sowing after the onset of monsoon is more appropriate.

---

## 2. POSSIBILITY OF SECURING DATA ON LIVESTOCK PRODUCTIVITY THROUGH SELF-RESPONDENTS

Reliable data on livestock productivity is essential for formulating animal husbandry research and developmental programmes on scientific lines. Statistics of livestock numbers are at present obtained through quinquennial censuses on All-India basis. The enumeration of livestock numbers in rural areas is done by the normal revenue agencies and other ad-hoc enumerators appointed by the state Government from amongst the staff of Agriculture and Animal Husbandry Departments, Panchayats, Union Boards, School teachers, etc. In the urban areas, the services of the municipal staff are generally availed of for this work. However, from the considerations of operational convenience and economy, the estimates of important livestock products are obtained on the basis of sample surveys, following methodology evolved by the Indian Agricultural Statistics Research Institute for the purpose. In these enquiries the collection of data is done by the ad-hoc field agency consisting of trained enumerators and supervisors employed on whole-time basis through periodical visits to the selected households. This objective system of securing data for obtaining precise estimates of livestock products would be prohibitive in cost when estimates are required at national level, Prima facie if part-time locally employed workers such as teachers, gram sewaks, patwaris, veterinary stockmen could be induced to work, the cost will be reduced considerably. But the experience of data collection by such agency in the past does not favour this system. Another alternative to regular field staff is to obtain data through respondents themselves. This is possible only if the respondents are responsive as well as sufficiently educated to record the information. This system of data collection in addition, would create awareness among the respondents for keeping proper records of their enterprise. It was in this context that a pilot enquiry was undertaken in Ludhiana district, Punjab with a view to examine the feasibility of securing data through self-respondents.

The sampling design adopted was two-stage random sampling with villages as first stage units and educated householders maintaining milch animals within each village as second stage units. Selection at each stage was done with equal probability and without replacement. In all 360 households (180 households to be canvassed by regular ad-hoc field staff and 180 by self-respondents) spread evenly in 20 randomly selected villages were selected for collection of data. Information on level of milk yield of the individual milking animal, feeds consumed by the animals, dates of calving and drying of milch stock, Market prices of feeds, and milk, etc. was collected.

It has been found that for estimating average daily milk yield of individual animals, self-respondents may not be relied upon for the present. But for estimating lactation length, dry period, calving interval, feed intake as well as market prices of feeds, the system of self-reporting is as good as the system of canvassing data through field agency.

In the sample surveys conducted for estimating the milk yield where the ultimate sampling units (households/animals) are sampled afresh in each round, estimates of vital production characteristics such as lactation length, dry period, calving interval, age at first calving, etc; cannot be obtained. As this information is also of prime importance in assessing the effectiveness of cattle improvement and dairy development programmes such data can conveniently be secured through self-respondent concurrently.

Further, estimation of cost of production of livestock products calls for conducting comprehensive surveys for a period of 2 to 3 years. Such surveys provide estimates on for the period during which these are conducted but, in fact, estimates are also needed at different points of time. Repeating surveys for the purpose would be prohibitive in cost. This could be overcome by adopting a less costly method of updating the estimates of cost using the data on major physical inputs viz; feed and labour obtained in earlier surveys and the prices of the inputs in the base and the subsequent periods. The information on market prices of feeds and labour wage rates can reliably be obtained through respondents as revealed by this investigation.

There is thus, ample justification that the sampling plans presently being followed by field agency are modified to include self-respondents for collection of requisite data. Householders involvement will not only bring awareness among them regarding usefulness of keeping proper records of their enterprise but also considerably reduce the cost of the survey and motivate the other selected householders to extend full co-operation.

### 3. TRAINING AND BASIC RESEARCH

#### 3.1 Training activities:—

The following lectures/training programmes were arranged during the quarter ending 30th September, 1982.

<i>Organisation</i>	<i>Period of Training</i>	<i>Category of Trainees</i>
Central Statistical Organisation, New Delhi.	24th July, 1982	Junior Certificate Course in Statistics

### 3.2 Basic Research in Statistics :

A shorter and elegant proof of connectedness and balance of block designs has been obtained. A series of orthogonal resolution III and resolution IV plans have been constructed. The plans are minimal.

### 3.3 Seminars :

During the quarter under review, 12 seminar talks were delivered by the Scientists, Students of the Institute on various topics of interest in the field of Agricultural Statistics.

### 3.4 Hostel Activities :

3.4.1 An I.A.S.R.I. team consisting of the students namely S/Sh. R.P. Mishra, K.V. Prasad and P. Goel bagged the first prize in the Inter Hostel Quiz Competition held at IASRI on 5th Aug., 1982.

3.4.2 An Inter Hostel Skit Competition was held at I.A.R.I. on 1st Sept., 1982. Shri D. Verma, Ph. D. Student, Miss. Malti Negi, M. Sc. Ag. (Stat.) student and others presented an English Skit named 'Miranda' which won the second prize and was declared as the best directed skit.

## 4. ADVISORY SERVICES

During the quarter under review, technical advice and guidance was rendered to research workers and students of the Research Institutes, Agricultural Universities and other Research organisations in 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 :—

### 4.1 Crop Sciences :

Technical advice/guidance given to the Govt. of Gujarat on the preparation of yardsticks of additional production.

### 4.2 Animal Sciences :

Technical advice given to tech. Asstt. working in the project for method of collection of data on water requirement experiments conducted on sheep and goat at C.A.Z.R.I., Jodhpur.

### 4.3 Sample Survey Methodology :

- (i) Technical advice/guidance given to Shri G.K. Mathur, Jt. Director and C.L. Malik, Dy. Director (AHS), Ministry of Agriculture, A.H. Wing regarding technical programme of the 6th plan scheme for sample surveys for estimation of livestock products in the country.
- (ii) Technical advice/guidance given to Dy. Director A.H. (Stat.), Directorate of A.H. Uttar Pradesh regarding sample surveys.

## 5. FIELD SURVEY WORK

### 5.1 Field Training :

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

- (i) Imparted training to the V.E.W's. for collection of information in respect of Canal irrigation fields in Hissar district for the scheme "Study of performance of Warabandi system of irrigation in Hissar" at Hissar.
- (ii) Training was imparted to the field and supervisory staff working under the project, "Pilot Sample Survey for developing a sampling methodology for estimation of livestock products as a part of normal work of field agency of animal husbandry department" at patiala.
- (iii) Imparted the field training to the students of P.S.C.C. and S.C.C. for "Evaluating the impact of Soil and Water Conservation work on dry farming" at Ranga Reddy and Hyderabad districts (A.P.).
- (iv) Field staff was imparted training for filling in schedules pertaining to the project, "To study the pattern of employment among cultivators in some flood affected areas of U.P." at Ballia and Faizabad (U.P.)
- (v) Training was imparted to field staff working under the project "Statistical analysis and interpretation of Experimental data collected under NIAFE in Eastern, Western and Northern Western region" at J.N.K.V.V. Jabalpur.

### 5.2 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 area/places shown against them :—

- (i) Pilot sample survey on cost of production of Banana/Mango and its marketing practices in Gujarat State-Ahmedabad, Surat and Navsari (Gujarat).
- (ii) Pilot sample survey for developing a sampling methodology for estimation of livestock products on the basis of data collection as a part of normal work of the field agency of animal husbandry department-Patiala.
- (iii) Pilot survey for developing sampling methodology for assessment of Impact of National Demonstration Trails on crop yields-Rohtak (Haryana).
- (iv) Evaluation of soil and water conservation works in the dry land Farming-Hyderabad (A.P.)
- (v) Planning of experiments, statistical analysis and interpretation of data under AICARP in i) Humid Western Himalayan, ii) Sub-humid Sutlej Ganga Alluvial Plains—A.R.C. Ludhiana and E.C.F. Ropar (Punjab.)
- (vi) Pilot survey to study the performance of Cross-bred cattle under village conditions in Palampur area (H.P.).
- (vii) Index of cost of production of milk in I.C.D. area, Bhopal, (M.P.).
- (viii) Pilot sample survey to study the impact of floods on agricultural production in a region of U.P. districts of Faizabad and Ballia.

## 6. ABSTRACTS OF DISSERTATIONS APPROVED

### M. Sc. Degree :

6.1 PANDA, S.K.—Application of Incomplete Block Designs in Diallel—Analysis.

In a diallel cross experiment on 'V' varieties when the parents and one sept of  $F_1$ 's are included in the experiment, the total number of crosses  $\frac{V(V+1)}{2}$  increases rapidly with slight increase in the number of parental lines. Thus it becomes necessary to lay experiment in a suitable Incomplete Block

Design to control the within block variation. The analysis of such designs is a typical one as the model contains more than treatment effects like general combining ability (g.c.a.) and specific combining ability (s.c.a.) effects etc.

Ponnuswamy (1971) suggested the construction aspects of PBIB Designs dealing with partial diallel crosses. But the theoretical expressions required for the analysis of these designs concerning Griffing's Model I were not attempted by him. In the present investigation, theoretical analysis has been carried out for the above mentioned case and the expressions for the estimates of various effects with their standard errors were derived. Further, the applicability of such design has been investigated in studying the resistance to blast diseases of rice. It reveals that the PBIB Design with two associate classes is always efficient over the pre-existing randomised block design in estimating the g.c.a. and s.c.a. effects.

(Guide : H.P. Singh)

6.2 Poddar, J.—An empirical study on relative efficiency of different methods of stratification.

By utilising the data of the Project—Sample surveys for methodological investigations into high yielding varieties programme—an attempt was made to demarcate the boundary points of strata using different methods by making use of the information on the total area under cereal crop of the selected cultivators under the Area Estimation Enquiry of the above project in Ambala district of Haryana State during the kharif season of 1977-78. It was observed that equalisation of cumulative of  $3\sqrt{f(y)}$  method of construction of strata using the regression method of estimation provides an estimate of area under HYV of the crop with minimum variance and thus could be used with advantage.

(Guide : V.S. Rustogi)

## 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, pp. 184-192 (1982).

Two sampling schemes using auxiliary variables for cluster sampling (CAS or CBS system) have been proposed. In one of the Schemes, the auxiliary variable is used in selecting the clusters whereas in the other

the elements within the clusters are selected using the auxiliary variable. The efficiencies of the proposed sampling schemes as compared to the conventional cluster sampling with equal probabilities 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 clusters is the best of all the sampling schemes considered for comparison.

- 7.2 CHAWLA, G.C. and RAJAGOPALAN, M.—Sequential Sampling of Non-overlapping Clusters Clustering After Selection. *Ind. Jour. Agril. Stat., Vol. XXXIV, No. 2, August, 1982.*

In this paper, a method of selecting one by one 'n' non-overlapping clusters of two units each by selecting one unit at random (Key unit) from the population and another randomly from the Units falling within a distance 'd' from the Key unit, selecting another unit randomly from the (N-2) units & forming another cluster in the same way and so on has been suggested. An unbiased procedure for estimating the population total has also been suggested with illustration.

- 7.3 GOEL, B.B.P.S. and SINGH, K.B.—Energy from animal sources in Agriculture and Rural Households-Measurement of Efficiency: *Jour. of Ind. Soc. of Agril. Stat., Aug., 1982.*

An attempt has been made to examine (i) the availability of bullock power vis-a-vis its requirements for meeting the various agricultural needs (ii) the possibility of meeting the fuel needs in rural households through gobar/bio-gas and (iii) how the efficiency of these alternative sources be measured in relation to that of commercial sources of energy ?

The total requirement of energy for 172 million hectares of cropped year, including 28 million hectares irrigated by sources other than canal comes out to be 8644 million H.P. days against the availability of 18000 million H.P. days from working animals, showing a surplus of 9356 H.P. days. Direct studies undertaken to estimate the extent of utilisation of working animals in the country also, support this finding. It has been suggested that fuller utilisation of animal energy in agriculture will not only save petroleum and electricity for industrial purposes but will also provide more employment in the rural areas. During the lean period for agriculture surplus animal energy can also be utilised in agro-industries and rural transport. Suitable studies to measure the efficiency of animal energy vis-a-vis energy from other sources in terms of productivity or profitability need to be undertaken.



With a rural population of about 550 million the energy needed annually for cooking is of the order of  $125 \times 10^{12}$  kilo calories. About one half of this can be met through gobar/biogas from dung, agricultural waste and human excreta. From about 250 million heads of bovines in the country and with an annual production of 2.28 tonnes of dung per head the total dung production is around 570 million tonnes. At present nearly  $2/3$  of the dung production is used for manure and about  $1/3$  as dung cakes as a result of which a large part of potential energy and soil nutrients are being wasted by digesting the entire cow dung in gobar gas plants the utilisation efficiency of energy can be increased substantially. The gas that would be available will be sufficient to meet about 50% of the fuel required for cooking and also provide an additional supply of 1.05, 0.45 and 0.60 million tonnes of N, P and K respectively to the soil through the residual slurry which will help in increasing crop production.

An integrated programme for proper management of drought and dairy animals with the twin objectives of meeting the energy needs in agriculture and rural households and raising the nutritional standard of the population on the one hand, management and disposal of dung, human and crop waste, gobar gas plants and supply of biogas/compost by village panchayats on the other hand have been suggested.

7.4 GUPTA, V. K., NIGAM, A. K., and DEY, A.—Orthogonal Main-Effect Plans for Asymmetrical Factorials. *Technometrics* (1982), Vol. 24, No. 2, pp. 135-137.

A technique for constructing orthogonal main effect plans from resolvable orthogonal arrays is described. This technique is applied to obtain two series of orthogonal main-effect plans for asymmetrical factorials of the type  $t.s^m$ . Both series of plans are saturated. A number of new plans can be derived using these series.

7.5 GUPTA, V. K., NIGAM, A. K. and KUMAR, PRANESH—On a family of sampling schemes with inclusion probability proportional to size. *Biometrika* (1982), Vol. 69, No. 1, pp.191-196.

A family of sampling schemes with inclusion probability proportional to size is proposed. The schemes are based upon certain combinatorial properties of balanced incomplete block designs and are available for any sample size. Schemes belonging to this family are satisfactory from the point of view of (i) simplicity in selection, (ii) availability of an unbiased variance estimator and (iii) precision of the estimate. The efficiency has been compared empirically with that of some well known sampling schemes.

7.6 JAIN, J. P., NARAIN, P. and MALHOTRA, J. C.—Some aspects of progeny testing under field conditions. *Indian Jour. Anim. Sci.*, Vol. 52, (1982) pp. 628-633.

The progeny testing of dairy bulls under field conditions has assumed considerable importance currently due to requirement of a large number of quality bulls for the success of various cross-breeding programmes being undertaken in the country. Testing bulls under field conditions, however, requires an effective system of milk recording of cows as well as other considerations such as proper traits to be considered, optimum size of progeny groups, etc. Some aspects of these problems have been discussed in this paper. A sampling plan of performance recording of cows under field conditions has also been presented.

7.7 MALHOTRA, P. K. and SINGH, R. P.—Note on the estimation of lactation yield from sampling of milk records. *Ind. Jour. Anim. Sci.*, Vol. 52, No. 6, 1982, pp. 429-431.

The total lactation yield has been estimated utilizing the knowledge of lactation curve fitted on sampled points recorded during the lactation of the animal. The curve based on sampled points provided as good an estimate as was based on systematic sampled points. The curve based on systematic sample points has a limitation in that the points are chosen at a specified interval of time. In the present study of sampling this limitation could be waived by choosing the points in keeping view the shape of the lactation curve.

7.8 NARAIN, P., PANDEY, R. K. and SARUP, SHANTI—"Perspective Plan for Foodgrains" *Commerce*, Vol. 145, No. 3713., August 7, 1982, pp. 184-191

The methodological aspects in determining the capital requirements for the modernisation of crop production in India have been discussed with particular reference to the type of data required. It is suggested that for this purpose the country should be divided into suitable regions depending upon agro-climatic conditions, the type of technology and management levels, and this exercise should be done crop by crop. The demand should then be projected in each of these regions on appropriate assumptions for the growth in population, income as well as income elasticities of demand.

Restricting the study to foodgrains comprising rice, wheat, coarse grains and pulses, the investment requirements for intensification of land use in terms of gross cropped area, irrigation developments and expansion of gross irrigated area, fertiliser use in terms of total, nutrients consumption, area under high yielding varieties and tractorisation were determined for the year 2000 A. D.

It is estimated that the future domestic demand of foodgrains projected at about 220 million tonnes at 2000 AD could be met by raising the total nutrients consumption to 10.5 million tonnes, gross cropped area to 150 million hectares, gross area under high yielding varieties to 90 million hectares and gross irrigated area to 66 million hectares. For meeting these input requirements, the investment required would be of the order of Rs. 4,068 crores at 1979-80 prices in the form of annual working capital. The annual investment for foodgrain production of irrigation development, soil and water conservation, tractorisation including working capital is estimated to be Rs. 9,489 crores.

7.9 NIRMAN, K. P. S., SINGH, SHIVTAR AND RAUT, K. C.—Estimates of Crop Residues Using Grain to Straw Rates. *Agricultural Situation of India*, June, 1982, pp. 149-151.

Straw to grain ratios of four major cereal crops viz; paddy, wheat, jowar and bajra were worked out separately for traditional and high-yielding varieties in different States utilizing data collected by IASRI in large scale surveys on methodological investigation in High Yielding Variety programmes (H. Y. V.). The States were divided into four agro-climatic regions i. e. (i) Northern and North-Western region (ii) Eastern and Northern Eastern region (iii) Southern region and (iv) Central and Western region. The estimates of straw to grain rates for the crops were worked out for different regions as well as for the all India level. For one unit of grain, the estimates of straw obtained for H.Y.V. and local varieties were 1.7 and 2.2 units for paddy, 1.4 and 1.7 for wheat, 4.4 and 6.1 for jowar and 4.2 and 5.0 for Bajra. Utilizing the straw to grain ratios and the production of paddy, wheat, jowar and bajra in the year 1977-78, the estimates of dry roughages from these crops were worked out.

The total food grains production during 1977-78 was 125 million tonnes; of which about 80 per cent was contributed by paddy, wheat, jowar and bajra. The dry fodder production from these crops during 1977-78 was estimated to be 235.1 million tonnes, the local and high yielding varieties contributing in the ratio 27:23. Of the total dry fodder, the estimates of paddy straw, wheat straw, jowar kadbi and bajra kadbi were 102.5, 45.2, 65.4 and 22 million tonnes respectively.

7.10 SARUP, SHANTI and PANDEY, R. K.—“Assessment of Factors Affecting Rice Productivity In Madhya Pradesh” *Margin, Quarterly Journal of N. C. A. E. R.*, July, 1982, Vol. 14, No. 4.

This paper attempts to evaluate the factors influencing productivity of rice per unit of land in Madhya Pradesh by using the linear discriminant function technique as an analytical tool. The study utilizes the data on resource endowments, crucial input use in rice production and productivity of crop on per hectare basis at the district level. The study reveals that the productivity of rice per unit of land depended mainly on input use viz; irrigation, fertilizer, adoption of HYV seeds, etc. The availability of various inputs has varied widely among different districts of the state and this has strongly influenced the productivity of rice crop in the state.

### 8. PAPERS ACCEPTED FOR PUBLICATION.

8.1 AGRAWAL, R., SINGH, D. and SINGH, P.—Systematic Sampling using varying probability. *Jour. of Ind. Soc. of Agril. Stat.*

8.2 AGRAWAL, R., SINGH, P. and SINGH, D.— $\pi$ ps Sampling Scheme through grouping. *Biometrical Journal.*

8.3 BATRA, M. S. and NARAIN, P.—Discriminatory Analysis in Wheat and Triticale with the help of Diallel—Cross data. *Annals of Agricultural Sciences.*

8.4 GOEL, B. B. P. S. and MAINI, J. S.—Estimation of pig population and number of pigs slaughtered using random sampling technique. *Ind. Jour. of Anim. Sci.*

8.5 GOEL, B. B. P. S. and SINGH, K. B.—Contribution of Animal Energy. *Jour. Bio-Energy Re-News.*

8.6 GUPTA, V. K. and NIGAM, A. K.—On a model useful for approximating fertilizer response relationship. *Jour. of Ind. Soc. of Agril. Stat.*

8.7 PANDEY, R. K. and SARUP, SHANTI—The Oilseeds Gap. *Commerce.*

8.8 RAI, S. C.—On a model for Rank Analysis in Paired Comparisons. *Jour. of Ind. Soc. of Agril. Stat.*

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

### 9. COMPUTER SCIENCE & NUMERICAL ANALYSIS

#### 9.1 Data processing :

During the quarter, the Division of C.S. & N.A. continued to provide facilities for data processing and computer programming to the Scientists and

research workers from various institutes under I.C.A.R., Agricultural Universities and Colleges, Directorate of Economics and Statistics, Ministry of Agriculture and Deptt. of Agriculture, U.P. Govt. A few private organisations were allowed to utilise the computer systems on payment basis.

### **9.2 Computer Utilisation :**

About 3775 production jobs were processed on the computer systems for the research workers. 500 testing jobs were performed for the benefit of programmers and students. 50 production jobs on payment basis were carried out during the quarter.

### **9.3 Programming facilities :**

During the quarter, 44 Ph. D., 31 M. Sc. students and 19 research workers were given help and guidance in programming and data processing. About 8 new programmes were developed and a few existing programs were modified as per the requirement of research workers.

### **9.4 M.T. Unit :**

About 3 lakhs cards were punched/varified for data in respect of various schemes/projects undertaken by I.A.S.R.I., I.A.R.I. and other Institutes under I.C.A.R., also work of Students/Research workers from various Agricultural Institutes/Universities. In addition, 61 sorting, 34 reproducing, 379 listing jobs were completed on different Unit Record Machines.

## **10. 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 :

10.1 National Seminar on "Draught Animal Power (DAP) System" held at Bangalore from 16-18th July, 1982.

RAUT, K.C.—Working bullocks, their nutritional status and utilisation in some areas.

10.2 "XVIII Dairy Industry Conference" held at Indore from 10-12th September, 1982.

RAUT, K.C.—Productivity enhancement in milk yield through breeding, feeding and management in a rural area.

10.3 Group discussion on "Potassium and crop physiology" held at IASRI, New Delhi during 14th & 15th September, 1982.

NARAIN, P., BHARGAVA, P.N. and BHATIA, A.K.—Response to application of Potash to Wheat & Rice.

10.4 The Symposium on "Productivity and Equity in Irrigation Systems" organised by Giri Institute of Development Studies, Lucknow from 22—24th Sept., 1982.

RAHEJA, S.K.—Performance in monitoring large scale irrigation system.

10.5 The International Conference on "Frontiers of Research in Agriculture", held at Indian Statistical Institute, Calcutta on 29th Sept., 1982.

NARAIN, PREM and KHOSLA, R.K.—"Post-harvest estimation of agricultural products due to biotic and abiotic sources"

10.6 Workshop for discussing problem in acquisition and dissemination of data on marine living resources of Indian Seas Organised by Central Marine Fisheries & Research Institute, Cochin from 21-23rd Oct., 1982.

PILLAI, S.S.—Problems and prospects in establishing marine fisheries information system.

#### 11. CONFERENCES/SEMINARS/SYMPOSIA/WORKSHOPS ETC. ATTENDED BY THE SCIENTISTS

<i>S. No.</i>	<i>Date</i>	<i>Name of Conferences/Seminars/Workshops, etc.</i>	<i>Name of the Scientists with Designation</i>
1.	July, 14	National Conference on Fertilizers-Rabi (1982-83) at Vigyan Bhavan, New Delhi.	Dr. Prem Narain, Director
2.	July, 16, to 18	National Seminar on Draught Animal Power (DAP) System, held at Bangalore.	Dr. K.C. Raut, Scientist (S-3)
3.	Sept., 10 to 12	XVIII Dairy Industry Conference held at Indore.	Dr. K.C. Raut, Scientist (S-3)
4.	Sept., 14 to 15	Group discussion on Potassium and Crop Physiology, held at IASRI New Delhi.	Dr. Prem Narain, Director. Sh. P.N. Bhargava, Scientist (S-3) & other Scientists
5.	Sept., 16 to 18	XI Workshop of the All India Co-ordinated Project on Soil Test Crop response correlation at PAU Ludhiana, Punjab.	Sh. P.N. Soni, Scientist (S-2)
6.	Sept., 22 to 24	Symposium on "Productivity and Equity in Irrigation systems" organised by Giri Institute of Development Studies, Lucknow.	Sh. S.K. Raheja, Scientist (S-3)
7.	Sept., 29	International Conference on "Frontiers of Research in Agriculture" at Indian Statistical Institute, Calcutta.	Dr. Prem Narain, Director.
8.	Oct., 21 to 23	Workshop for discussing problem in acquisition and dissemination of data on marine living resources of the Indian Seas organised by Central Marine Fisheries Research Institute, Cochin.	Dr. S S. Pillai, Jt. Director.

## 12. LIBRARY

12.1 During the quarter under report 121 books on various subject fields of the Institute were added to the Library.

12.2 The following reprints published in scientific journals were procured for distribution by the library among the scientists on exchange basis.

<i>S. No.</i>	<i>Author</i>	<i>Title</i>	<i>Name of the Journal</i>
i.	Jain, J.P. Narain, Prem and Malhotra, J.C.	Some aspects of progeny testing of dairy bulls under field conditions.	Ind. Jour. Anim. Sci. 52 (8) 1982.
ii.	Nei, M., Li, W.H., Tajima, F., and Narain, Prem.	Polymorphism and evolution of the Rh blood groups.	Japani Jour. Human Genetics 26 (1981) pp. 263-278.
iii.	Narain, Prem Pandey, R.K., and Sarup, Shanti.	Perspective Plan for foodgrains	Commerce, 7th Aug., 1982.
iv.	Singh, R.P. and Raut, K.C.	Studies on the lactation curve for cows under village conditions	Ind. Jour. Anim. Sci. 52 (6), 1982.

12.3 The reprographic unit of the Library has attended 71 jobs covering 2063 pages sent by scientific, technical and administrative officers of the Institute.

12.4 The Issue and Return work at the Library counter involved transaction of approx. 7600 publications.

12.5 During the period under report approx. 5500 persons visited the Library for consultation purposes.

## 13. MISCELLANEOUS

### 13.1 Personnel Information :

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

(i) Dr. Prem Narain,  
Director

- (i) Attended Joint meeting of the Executive Committee & Editorial Board of the Indian Society of Animal Genetics & Breeding held at New Delhi on 3rd July, 1982.
- (ii) Delivered a lecture "Statistical & Research activities of the IASRI" to the trainees of Junior Certificate Course in Statistics at C.S.O., New Delhi on 22nd July, 1982.
- (iii) Attended Executive Council meeting of the Indian Society of Agricultural Statistics at IASRI on 27th July, 1982.
- (iv) मिश्रित तिलहन के क्षेत्रफल एवं उपज के अनुमान लगाने के विभिन्न पहलुओं पर अध्ययन हेतु गठित प्रादेशिक समिति की बैठक में 30.7.82 को कृषि निदेशालय, लखनऊ में भाग लिया।
- (v) Attended meeting of the Academic Council of IARI on 31st July, 1982.
- (vi) Delivered two lectures on : (1) Systems of Breeding with particular emphasis on cross-breeding ; (2) Cross-Breeding of Dairy cattle in the world- A reference, to the participants of the Refresher Course organised at Military Farms Schools & Research Centre, Meerut Cantt. on 2nd August, 1982.
- (vii) Delivered a lecture on "Research in Agricultural and Animal Husbandry Statistics" to the trainees of Sr. Certificate Course at C.S.O. on 24th August, 1982.



- (viii) Attended meeting of the Data Users' Organisations in connection with Degree holders & Technical personnel/DHTP Survey, at C.S.I.R. Complex, Pusa, New Delhi on 8th September, 1982.
- (ix) Attended meeting of the National Advisory Board on Statistics held at C.S.O., New Delhi on 9th Sept., 1982.
- (ii) Dr. R.K. Pandey,  
Scientist (S-3) Attended a meeting of members of Experts Group regarding developing a model for working out requirements of fertilizers on short-term basis in the Ministry of Agriculture, New Delhi on 15th Sept., 1982.
- (iii) Shri R.K. Khosla,  
Scientific Secretary to  
Director Delivered a lecture on "Surveys on Crop Losses and Crop Forecasting" to the trainees of C.S.O. at I.A.S.R.I., New Delhi on July 24, 1982.
- (iv) Shri S.C. Rai,  
Scientist (S-2) (i) Delivered a lecture on "Reaction of farmers towards soil & Water Conservation Works" in the office of Director of Agriculture, Govt. of A.P., Hyderabad on 14th Sept., 1982.
- (ii) A lecture on "Impact of Soil & Water Conservation works on dry farming" at All India Coordinated Research Project for Dry Land Agriculture, Hyderabad on 15th September, 1982.

### 13.2 Distinguished Visitors :

13.2.1 Mr. Andrei L. Byzov, Incharge of Science & Technology Section, House of Soviet Science, Culture & Art, New Delhi visited IASRI on 1st July, 1982 and discussed with the Director regarding the various activities of the Institute.

13.2.2 Dr. Raj, S. Chhikara, Associate Professor of old Dominion University, Norfolk, USA, visited IASRI on 12th July, 1982 and discussed with the Director regarding forecasting of yield and area under crops based on 'Remote Sensing and Land Set Techniques'.

**13.3 Symposium on "Potash and Plant Physiology," held on 14th & 15th Sept., 1982 organised by I.A.S.R.I. :**

The Potash Research Institute of India Organised a group discussion on "Potash and Plant Physiology" on 14th & 15th Sept., 1982 in the Institute. This group discussion was attended by different eminent plant physiologists drawn from IARI, Central Arid Zone Research Institute, ICRISAT, etc. In this symposium, a number of papers were presented giving the results on the role of potassium on crop growth, usefulness of potassium in aspects such as extension of root system, tolerance of draught etc. About 10 scientists from the Institute participated in this group discussion and a paper entitled "Response to application of potash for wheat and rice" was presented by the Director of the Institute.

**13.4 Monitoring Cell :**

During the quarter under report, the Monitoring Cell revised the Budget allocations for the Co-ordinated Scheme on Primary Data collection involving Ad-hoc Field Staff during the VI Plan period in accordance with pattern of sharing the expenditure by ICAR vis-a-vis the state Govts/Agril. Universities as approved in the meeting of the Projects Implementation Committee (P.I.C.) of DARE.

The Monitoring Cell got printed the Research Project Files proformae, viz. (a) R.P.F.-I, (b) R.P.F.-II and (c) R.P.F.-III.

**13.5 Exhibition Room :**

The Exhibition room was updated by adding new charts in place of old ones and with latest reports and publications of the Scientists during the period under report.

**13.6 Joint Council:**

Consequent upon the expiry of term of I.A.S.R.I. Joint Council, the election for re-constitution of the Joint Council was held at IASRI on 15.9.82 and 11.10.82. The following representatives have been declared elected :—

1. Shri D.C. Pant, E.C.O. (T-4)
2. Shri R.D. Garg, T.A. (Stat).
3. Shri Mangal Singh, Card Librarian
4. Shri. D.N. Kharbanda, Assistant
5. Shri P.S. Rai, Junior Clerk
6. Shri Ram Paras Mehto, S.S. Grade-II
7. Shri Ved Prakash, S.S. Grade-I

In Scientific Group and Technical Group-III the representatives have secured the equal no. of votes. This case has already been sent to the Council for clarification *vide* this office letter No. 16 (1)/82 Admn. II dated 21.10.82.

### 13.7 Meetings :

During the quarter under report the following meetings were held :

<i>Meetings of</i>	<i>Dates</i>
(i) HDS and Sr. Scientists	July, 24
(ii) HDS and Sr. Scientists	August, 7
(iii) HDS and Sr. Scientists	August, 10
(iv) HDS and Sr. Scientists	September, 9
(v) HDS and Sr. Scientists	September, 30

### 13.8 IASRI Representatives at the meetings of Scientific panel of the ICAR :

<i>Name of the officer</i>	<i>Name of the Scientific Panel &amp; Date</i>
(i) Dr. R.K. Pandey	"Economics, Statistics & Marketing" held on 19th Aug., 1982.
(ii) Shri H.C. Jain	"Plants Physiology and Biochemistry" held on 25th & 26th Aug., 1982.
(iii) Dr. M.P. Jha	"Plant Pathology" held on 2nd to 4th Sept. 1982.
(iv) Dr. K.G. Aneja	"Entomology/Nemotology" held on 8th to 10th Sept., 1982.
(v) Dr. Prem Narain	"Agricultural Economics, Statistics & Marketing" held on 10th Sept., 1982:
(vi) Sh. P.N. Bhargava } (vii) Sh. H.C. Jain }	"Agronomy" held on 13th & 14th Sept., 1982.
(viii) Shri P.K. Batra	"Microbiology" held on 14th Sept., 1982.
(ix) Dr. Basant Lal	"Horticulture and Eloriculture" held on 15th to 18th Sept., 1982.

### 13.9 Other Information :

13.9.1 Dr. Prem Narain, Director discussed with Dr. P. Bhattacharya (a member of the Q.R.T. of IASRI) regarding the working of various projects of Genetic Cell and Division of Animal Sciences on 5th July, 1982.

He was appointed as Chairman of AFDC-57 Sampling Methods for food products and Agricultural Inputs Sectional Committee of Indian Standards Institution, New Delhi *vide* letter No. STAT/AFDC-57/A-1 dated 13th July, 1982.

He attended as Chairman meeting of AFDC-57/P-2 Sectional Committee of Indian Standards Institution, New Delhi on 26th July, 1982.

He was appointed as Member of the ICAR Scientific Panel for Agricultural Economics, Statistics & Marketing upto 28th Feb. 1985 *vide* letter No. 13 (15)/82-Cdn-I dated 26th July, 1982.

He discussed with Dr. P. Bhattacharya, Member of IASRI QRT regarding various activities of the Institute on 11th August, 1982.

He discussed with Dr. V.R. Karandikar of Mahatma Phule Krishi Vishwa Vidyalaya, Rahuri, regarding holding of 36th Annual Conference of the Indian Society of Agricultural Statistics, on 11th August, 1982.

Dr. Prem Narain was also appointed permanent member of the National Advisory Board on Statistics (NABS) established by the Govt. of India, Dept. of Statistics, Central Statistical organisation, New Delhi *vide* letter No. P-11023/10-C/82-PSST dated 17th August, 1982.

13.9.2 Dr. J.P. Jain prepared a model project on "Progressive assessment of milk production under field condition" as desired by D.D.G. (AS).

Dr. Jain also wrote a book entitled "Statistical Technique in Quantitative Genetics", which was published by Tata Mc Graw-Hill, New Delhi during the quarter.

13.9.3 Dr. B.B.P.S. Goel attended to Dr. Theodore Panayoton, Food and Agriculture Policy Specialist from Agricultural Development Council, Bangkok in September, 1982.

13.9.4 Shri S.C. Rai attended the meeting of Panel of Food Sampling of Indian Standards Institution at IASRI on 12.7.82 and at Indian Standards Institution, New Delhi on 26.7.82.

Shri Rai also attended the meeting of Steering Committee for Organising ICAR Inter-Institutional Students Sports meet at NDRI, Karnal on 20.9.82.

## 14. कपास पर कृषण कार्यों का प्रभाव

कपास एक अत्यन्त ही महत्वपूर्ण व्यवसायिक फसल है जो न सिर्फ उद्योगों को कच्चा माल उपलब्ध करती है अपितु इससे विदेशी मुद्रा भी अर्जित की जाती है। वर्ष 1979-80 के दौरान लगभग 89 करोड़ रुपये की कीमत की कपास का निर्यात किया गया। यह सामान्यतः असिंचित और वर्षा वृष्टि परिस्थितियों में उगाई जाती है। इस फसल का प्रमुख मौसम देश के उष्णकटिबंधीय मानसून की अवधि में होता है। कृष्ण क्षेत्र 9°N से 31°N अक्षांश के बीच सीमित है। पूरे भारत और कपास उगाने वाले कुछ राज्यों का कुल उत्पादन और औसत उपज निम्न सारणी में दिखाई गई है :—

**देश में (1977-78 से 1979-80)\* कपास उगाने वाले प्रमुख राज्यों में कपास का क्षेत्र और उत्पादन**

राज्य	क्षेत्र '000 हेक्टेयर में	कुल क्षेत्र का प्रतिशत	170 कि. ग्रा. की प्रत्येक गाँव का उत्पादन '000 में	कुल उत्पादन का प्रतिशत	किग्रा./हेक्ट में औसत उपज
महाराष्ट्र	2470.0	30.9	1425.2	18.8	98
गुजरात	1768.1	22.1	1942.8	25.6	187
कर्नाटक	1018.0	12.7	757.9	10.0	126
मध्य प्रदेश	655.2	8.2	276.7	3.7	72
पंजाब	625.3	7.8	1261.3	16.6	343
आन्ध्र प्रदेश	411.4	5.1	333.7	4.4	138
राजस्थान	386.4	4.8	500.7	6.6	220
तमिलनाडू	317.0	4.0	480.7	6.7	258
हरियाणा	289.0	3.6	551.7	7.7	325
समस्त भारत	8003.7	100	7586.3	100	161

साधन — “कपास अवस्था”, आर्थिक एवं सांख्यिकीय निदेशालय

\*आंकड़े 3 वर्षों की औसत पर आधारित हैं।

यह देखा गया कि कपास की खेती के अधीन कुल क्षेत्र लगभग 8 लाख हेक्टेयर है जिसमें से महाराष्ट्र में 31 प्रतिशत और गुजरात में 22 प्रतिशत क्षेत्र में कपास उगायी जाती है। देश के कुल कपास के उत्पादन का 45 प्रतिशत उत्पादन भी अकेले इन्हीं दो राज्यों से प्राप्त होता है। भिन्न-भिन्न राज्यों की औसत उपज दर में काफी अच्छा विचलन देखने में आया है। पंजाब और हरियाणा में उपज दर 3 कि०/हेक्ट० से अधिक थी जबकि मध्यप्रदेश, महाराष्ट्र और कर्नाटक में यह उपज दर 1.25 कि०/हेक्ट० से कम थी। राज्यों के इन दो वर्गों के बीच अन्तराल होने के मुख्य कारण थे कि पंजाब और हरियाणा में तो फसल सामान्यतः सुनिश्चित जल आपूर्ति की अवस्था में उगायी जाती हैं जबकि अन्य राज्यों में सीमित क्षेत्रों में ही सिंचाई सुविधाएँ उपलब्ध हैं। फसल की उपज पर रासायनिक उर्वरकों के प्रभाव का अन्वेषण करने के लिए गत वर्षों में अनेक प्रयोग नियोजित किए गए और इन

प्रयोगों के आधार पर भिन्न-भिन्न क्षेत्रों के लिए कुछ सिफारिशों भी की गयीं। यह फसल सामान्यतः वर्षा-वृष्टि वाली परिस्थितियों में उगायी जाती है। आरम्भ में यह मौसमी उत्तर-चढ़ाव पर निर्भर करती है। कृषक सामान्यतः उर्वरकों की स्वीकृत मात्रा डालने के इच्छुक नहीं होते और इसलिए यह आवश्यक है कुछ दूसरे उपयुक्त उपायों का विकास किया जाए जो उपज पर सीधा प्रभाव डाल सकें। रासायनिक उर्वरकों के उपयोग के अलावा कुछ ऐसे भी अवित्तीय उपाय हैं जैसे बुवाई की तिथि, पौधे और पंक्ति में अन्तर की समुचित व्यवस्था और बीज दर, ये भी उपज दर में सुधार लाने में महत्त्वपूर्ण भूमिका अदा करते हैं। वर्तमान टिप्पणी में 1966-75 के दौरान गुजरात और महाराष्ट्र में बुवाई की तिथियों पर नियोजित कुछ प्रयोगों पर विचार-विमर्श किया गया।

कपास की फसल को बढ़वार के लिए कम से कम 50 सें.मी० वर्षा वृष्टि की आवश्यकता होती है किन्तु फूलों और फलों की अवस्था में अपेक्षाकृत शुष्क मौसम का होना लाभप्रद होता है। गोलक खुलने के समय और कटाई से पूर्व वर्षा होना हानिकारक सिद्ध हुई। बेहतर उपज प्राप्त करने के लिए फसल बढ़वार की भिन्न-भिन्न अवस्थाओं पर मुदा में पर्याप्त नयी और समुचित तापक्रम का होना कदाचित्त आवश्यक है। फसल बढ़वार की भिन्न-भिन्न अवस्थाओं के दौरान समस्त कृषि-मौसम, विज्ञान प्रचालों की इष्टतम उपलब्धता, बुवाई की समुचित तिथि पर निर्भर करते हैं। इस प्रकार फसल की समुचित बढ़वार और बेहतर रीन उपज काटने के लिए एक क्षेत्र में बुवाई की तिथि का ज्ञान होना परम्परावश्यक है।

## गुजरात :

कपास की बुवाई का समय सामान्यतः मानसून के आरम्भ में पड़ता है। राज्य में मानसून की शुरुवात सामान्यतः जून के अंतिम सप्ताह से जुलाई के प्रथम सप्ताह में होती है। इस उद्देश्य से कि समोन्नत किस्मों के लिए क्या बुवाई का वर्तमान समय लाभप्रद है या उसमें सन्तुलित परिवर्तन करने की आवश्यकता है? सूरत, मनोद, थासरा और तालोड कृषि अनुसन्धान केंद्रों पर अनेक प्रयोग नियोजित किए गए। सूरत (गहरी काली मुदा वाले क्षेत्र) में नियोजित अधिकांश प्रयोगों में देखा गया कि H-5 जैसी लम्बी पंखुड़ियों वाली किस्मों के लिए बुवाई का समय जून और जुलाई का प्रथम सप्ताह था। सामान्यतः यह देखा गया है कि इस क्षेत्र में जून का प्रथम सप्ताह बुवाई के लिए सबसे उपयुक्त समय है। यदि बुवाई में एक माह की भी देरी हो गई तो उपज दर में महत्त्वपूर्ण गिरावट आने की सम्भावना रहती है। उपज दर में गिरावट की दर सामान्यतः 5 से 10 प्रतिशत के क्रम में थी। कुछ स्थितियों में उर्वरक डालने की मात्रा और बुवाई की तिथियों में अन्योन्यक्रिया भी महत्त्वपूर्ण पाई गई। जून के प्रथम सप्ताह में फसल बोने और 240 कि० ग्रा० N + 120 कि० ग्रा० P<sub>2</sub>O<sub>5</sub> + 40 कि० ग्रा० K<sub>2</sub>O. (प्रति हैल्टेयर) उर्वरक डालने से 2531 कि० ग्रा० हैल्टेयर के क्रम की उच्चतम उपज दर प्राप्त हुई। इतनी ही मात्रा में उर्वरक डालने पर किन्तु जुलाई के प्रथम सप्ताह में अर्थात् बुवाई देर से करने पर उपज में जो हानि हुई वह लगभग 20 प्रतिशत के क्रम में थी।

A—218, IAN—579, H—4 और MCU—5 जैसी लम्बी पंखुड़ियों वाली किस्मों की बुवाई के लिए दो तिथियों अर्थात् मई और जून के अंत के लिए संचित परिस्थितियों के अधीन एक प्रयोग नियोजित किया गया। प्रत्येक किस्म के सम्बन्ध में देखा गया कि बुवाई के लिए

सबसे उपयुक्त समय मई का अंतिम सप्ताह है। यदि इसे बोलने में 30 दिन की देरी कर दी जाए तो प्रत्येक स्थिति में 20 प्रतिशत से अधिक की हानि होने की सम्भावना रहती है।

थासरा (बालूई दुमट मूदा के क्षेत्र) में एक कृषि अनुसंधान केन्द्र पर जहाँ बुवाई की अवधि जून के अंतिम सप्ताह से अगस्त का प्रथम सप्ताह रखी गयी। दिविबजय (मध्यम आकार की पंखुड़ियों वाली किस्म) पर एक प्रयोग किया गया। इस प्रयोग से पाया गया कि यदि बुवाई जून के अंतिम सप्ताह में की गई तो औसत उपज लगभग 6 किब०/हेक्टर प्राप्त हुई। देर से बुवाई करने पर उपज दर में स्थिर रूप से गिरावट आई और कम से कम प्राप्त उपज 2 किब०/हेक्टर थी।

संकर-5 (लम्बे आकार की पंखुड़ियों वाली किस्म) की बुवाई के लिए उचित तिथियों के अन्वेषण हेतु तालोड (बालूई दुमट मूदा के क्षेत्र) में किए गए प्रयोग से ज्ञात हुआ कि यदि बुवाई में एक माह से जून के तीसरे सप्ताह तक की भी देरी कर दी तो उपज में 48 प्रतिशत तक की हानि होगी।

अतः यह निष्कर्ष निकाला गया कि गुजरात राज्य के काली से गहरी काली मूदा वाले क्षेत्रों में फसल उगाने के लिए जून का प्रथम सप्ताह सबसे उपयुक्त है। सौभाग्य से यह अवधि मानसून पूर्व वर्षा के समय पड़ती है। मगर बालूई दुमट मूदा वाले क्षेत्रों में बुवाई के लिए सबसे उपयुक्त अवधि जून का तीसरा सप्ताह पाया गया। प्रत्येक स्थिति में उर्वरक के उपयोग को बुवाई की अवधि के अनुसार नियत किया जाना चाहिए। यदि बुवाई आरम्भ में ही कर दी जाए तो उर्वरकों की स्वीकृत मात्रा डालना ही सबसे उपयुक्त है। यदि बुवाई देर से की जाए तो उर्वरक की मात्रा को तदनु रूप नियत करना चाहिए।

#### महाराष्ट्र :

महाराष्ट्र में फसल की बुवाई सामान्यतः मानसून आरंभ होने के बाद अर्थात् जून के दूसरे सप्ताह में की जाती है। राज्य में सिंचित एवं अंसिंचित परिस्थितियों में बुवाई की भिन्न-भिन्न तिथियों के प्रभाव पर अध्ययन करने के लिए प्रयोग किए गये। सिंचित परिस्थितियों में पाडेगांव (गहरी काली मूदा के क्षेत्र), परभनी (मध्यम काली मूदा के क्षेत्र) में प्रयोग किए गए। अबलपुर और पाडेगांव में क्रमशः लंबे आकार की पंखुड़ियों वाली (बी-147) और मध्यम आकार की पंखुड़ियों वाली (लक्ष्मी) किस्म पर प्रयोग किए गए। अबलपुर में बुवाई का समय मई का तीसरा सप्ताह और जून का प्रथम एवं तीसरा सप्ताह था। ऐसा देखने में आया कि मई के तीसरे सप्ताह में बुवाई करने पर अन्य दूसरी तिथियों में बुवाई करने की अपेक्षा उपज में महत्त्वपूर्ण वृद्धि हुई। अन्य अवधियों की अपेक्षा उपज में लगभग 40 प्रतिशत की वृद्धि हुई। पाडेगांव में बुवाई का समय था—मार्च के प्रथम सप्ताह से अप्रैल के प्रथम सप्ताह तक। ऐसा देखने में आया कि यदि बुवाई मार्च के प्रथम सप्ताह में कर दी जाए तो उपज लगभग 17 किब०/हेक्टर के क्रम में प्राप्त होती है। यदि फसल बोलने में अप्रैल के प्रथम सप्ताह तक की देरी कर दी जाए तो उपज लगभग 25% घट जाती है। परभनी में किए गए प्रयोगों में बड़े और मध्यम आकार की पंखुड़ियों वाली किस्म शामिल की गई है और प्रयोग के लिए बुवाई की चुनी गयी अवधियाँ मई और जून का प्रथम और तीसरा सप्ताह है। यदि मई के तीसरे

सप्तह में बुवाई की जाए तो प्राप्त उपज अन्य अवधियों की अपेक्षाकृत उच्चतम होती है। मगर भिन्न भिन्न अनुसंधान केन्द्रों पर मिश्रित परिस्थितियों में किए गए प्रयोगों से ज्ञात हुआ कि राज्य में सभी प्रकार की भूदाओं में देर से बुवाई करने की अपेक्षा जल्दी बुवाई करना अधिक पसन्द किया गया है।

वर्षा-वृष्टि की परिस्थितियों में बुवाई के प्रभाव देखने के लिए बुवाई की दो तिथियों अर्थात् सामान्य बुवाई और देर से की गयी बुवाई (सामान्य बुवाई 8 दिन बाद) सहित अचलपुर, अकोला, नानडेड, अमरावती, परभनी और जलगाँव में प्रयोग किए गए। इसमें ली गयी फिसमें—अचलपुर और अमरावती में बड़ी पंखुड़ियों वाली फिसमें, जलगाँव में AK—335 और L—14/ जैसी मध्यम आकार की पंखुड़ियों वाली फिसमें, अकोला में Y—1, नानडेड में G—46 और परभनी में CJ—73 थी। सभी केन्द्रों पर सामान्य रूप से बुवाई करने पर देर से बुवाई करने की अपेक्षा उच्चतम उपज प्राप्त हुई। भिन्न-भिन्न अनुसंधान केन्द्रों पर देर से बुवाई करने पर उपज में जो कमी आयी वह 10 से 47 प्रतिशत के क्रम में थी। नानडेड में सामान्य बुवाई करने पर 11.7 फ़ीव०/हेक्ट० के क्रम में उच्चतम उपज प्राप्त हुई जबकि देर से बुवाई करने पर 6.8 फ़ीव०/हेक्ट० की उपज प्राप्त हुई।

इस प्रकार महाराष्ट्र राज्य के लिए यह उचित होगा कि मिश्रित परिस्थितियों के अधीन फसल की बुवाई जल्दी कर देनी चाहिए जबकि वर्षा-वृष्टि वाली फसल के लिए सामान्य बुवाई का समय अर्थात् मानसून आरम्भ होने के बाद बुवाई का समय अधिक उचित है।

अनुवादक : श्री अखिलेन्द्र पाल सिंह      निरीक्षक : सर्व श्री महाराज स्वरूप एवं कपीन्द्र पाल सिंह



## 15. भारतीय कृषि सांख्यिकीय अनुसंधान संस्थान में हिन्दी के प्रयोग की प्रगति

गत तिमाही में हिन्दी एकक की सबसे महत्त्वपूर्ण उगतविद्य, हिन्दी सप्ताह का आयोजन और विभिन्न प्रतियोगिताओं का आयोजन रही। संस्थान में 13 सितम्बर से 20 सितम्बर, 1982 तक हिन्दी सप्ताह का आयोजन किया गया। इस सप्ताह के दौरान संस्थान के कर्मचारियों में हिन्दी के प्रति स्नेह देखने में आया। संस्थान के लगभग सभी अनुभाग/प्रभाग एवं एकक के कर्मचारियों में व्यापक उत्साह देखा गया। उन्होंने स्वेच्छा से अपने दैनिक काम-काज को हिन्दी में ही करने का दृढ़ संकल्प लिया। इसी सप्ताह का प्रमुख आकर्षण रही—विभिन्न प्रतियोगितायें अथवा वाद-विवाद, निबन्ध एवं टिप्पणी एवं मसौदा लेखन प्रतियोगिता, जिनमें कर्मचारियों ने बड़-बड़कर हिस्सा लिया। सर्वाधिक हिन्दी का प्रयोग करने वाले अनुष्ठान, प्रभाग/एकक के लिए चल-शील्ड प्रतियोगिता का संस्थान के प्रशासनिक एवं वैज्ञानिक संगठनों पर बड़ा ही व्यापक असर पड़ा। हिन्दी का अधिक से अधिक प्रयोग करने की एक होड़ सी लग गयी। कर्मचारियों में हिन्दी की अपनाने के लिए हिन्दी सप्ताह ने एक प्रेरणा का कार्य किया।

सप्ताह के अन्त में किये गये निरीक्षण के दौरान अनेक महत्त्वपूर्ण तथ्य समक्ष आये। जिनमें से मुख्य तथ्य यह था कि अनेक कर्मचारियों ने अपने दैनिक काम-काज में अंग्रेजी को त्याग कर हिन्दी को हेमेशा-हमेशा के लिए अपना लिया। सबसे महत्त्वपूर्ण तथ्य जो सामने आया वह यह था कि संस्थान के लेखा अनुभाग ने अपना पूरा का पूरा कार्य केवल हिन्दी में ही करने का दृढ़ संकल्प लिया है। चल शील्ड भी लेखा अनुभाग के हिस्से में आयी है। इसी प्रकार विभिन्न अनुभागों जैसे प्रशासन अनुभाग-1 और 11 में भी कुल कर्मचारियों ने अपना सारा कार्य केवल अंग्रेजी में करने का निर्णय लिया है। निरीक्षण के ही दौरान पाया गया कि संस्थान के विभिन्न अनुभागों के 6 कर्मचारी ऐसे हैं जो हेमेशा से ही अपना कार्य हिन्दी में ही करते आये हैं और उनका संकल्प है कि वे आगे भी अपना कार्य हिन्दी में ही करते रहेंगे। साथ ही कुछ कर्मचारियों का कहना है कि यदि उच्च प्राधिकारी हिन्दी का का समुचित प्रयोग करने की पहल करें तो अधीनस्थ कर्मचारियों में अधिक उत्साह आयेगा। हालांकि अधिकारण उच्च पदाधिकारी हिन्दी का प्रयोग करते हैं।

अन्ततोगत्वा यह कह देना अन्योक्ति न होगी कि इस प्रकार के आयोजनों से निसन्देह हिन्दी का प्रचार-प्रसार समुचित रूप से होगा इसके साथ-साथ कर्मचारियों में राजभाषा को अपनाने के प्रति उत्तरदायित्व की भावना बढ़ेगी। इस तिमाही में हिन्दी के उपयोग का प्रसार सर्तोषजनक रूप से हुआ। कुल मिला कर हिन्दी कार्य में 5 प्रतिशत की वृद्धि हुई। अन्य कार्य भी नियमित रूप से यथा समय हुए।

## 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 into 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 (Contd.)

	Price (Rs.)
Estimation of Area of Grazing Land and its Utilisation, Jhansi Distt. (U.P.) (1978)—K.C. Raut, U.G. Nadkarni, P.R. Srinath and B.C. Saxena.	.....
Estimation of Production of Lac (1978)—D.V.S. Rao and S.D. Bokil.	.....
Sampling Methodology for Estimation of Meat Production (1978)—D. Singh, J.S. Maini, B.B.P.S. Goel and G.S. Bassi.	.....
Report on Sample Survey for Estimation of Production of Hides and Skins in Punjab during 1974-76 (1978)—J.S. Maini, B.B.P.S. Goel and D C. Dahiya.	.....
Pilot Sample Survey for Estimating Yield of Cotton in Hissar (Haryana) during 1976-77 (1978)—S.K. Raheja, B.B.P.S. Goel, P.C. Mehrotra and V.S. Rustogi.	.....
Impact of Milk Supply Scheme on Rural Economy in Milk-collection Areas of Madhavaram Milk Supply Scheme, Chingleput (Tamil Nadu)—A Bench Mark Survey, IASRI Bulletin (1978)—H.P. Singh, B.C. Saxena, Prem Narain and S.P. Verma.	.....
Estimation of Birth and Death Rates in Bovines—A pilot survey in Andhra Pradesh (1979)—T. Jacob, B. Marutiram and S.N. Arya.	.....
A Handbook on Statistical Genetics (1979)—P. Narain, V.K. Bhatia and P.K. Malhotra.	31.00
A Handbook on Analysis of Agricultural Experiments (1979)—A.K. Nigam and V.K. Gupta.	22.00
Impact of Milk Supply Schemes on the Rural Economy in Milk Collection Areas of Dudhsagar Dairy, Mehsana, Gujarat (1979)—J.P. Jain, B.C. Saxena and P. Narain.	.....
Souvenir Volume of I.A.S.R.I., New Delhi released on the occasion of ICAR Golden Jubilee (1929—1979)—P. Narain, R.K. Khosla, D.S. Aneja and R.S. Khatri.	.....
Sampling Methodology for estimation of Milk Production in Southern Region, A.P., 1971-74 (1979)—D. Singh, B.B.P.S. Goel, J.N. Garg and K B. Singh.	.....
Statistical Methodology for Developing Efficient Selection Procedures in Poultry Breeding (1979)—Prem Narain, L.K. Garg, J. P. Jain, J.C. Puri, Prakash Lal and P.S. Rana.	.....
Forecasting of Rice yield based on weather Parameters—Raipur district, 1980—Ranjana Agarwal, R C. Jain and M. P. Jha.	.....
Estimation of genetic trend in beetal goats (1980)—L.K. Garg, P.S. Rana and Lal Chand.	.....
Methodology for Improvement of Data Base on Livestock Resources—IASRI Publication (1980).	.....
Monograph on Estimation of Incidence of Crop Pests and Diseases and Yield Losses (1981)—Daroga Singh, and R.K. Khosla.	.....
Monograph on Estimation of Cost of Production of Poultry and Eggs (1981)—U.G. Nadkarni, L.B.S. Somayazulu and T.B. Jain.	.....
Statistical Investigation on Economics of Pig Production (1981)—U.G. Nadkarni, L.B.S. Somayazulu, T.B. Jain, H. C. Gupta, and S. C. Agarwal.	.....

For copies, please write to the Chief Administrative Officer, Indian Agricultural Statistics Research Institute (ICAR), Library Avenue, New Delhi-110012.