

INDIAN SOCIETY OF AGRICULTURAL STATISTICS

FIRST ANNUAL REPORT, 1947-48

THE present report gives a brief review of the Society's activities for one year from its inception in January 1947.

FORMATION OF THE SOCIETY

The Society was formed on the 3rd of January 1947, at a meeting of statisticians and other agricultural workers who had gathered together in Delhi on the occasion of the Indian Science Congress. Mr. M. S. Randhawa was in the chair. Among those present were:

Dr. N. S. R. Sastry (Bombay), Dr. B. P. Pal (New Delhi), Dr. A. C. Joshi (Lahore), Dr. V. G. Panse (Indore), Mr. K. Kishen (Lucknow), Dr. L. A. Ramdas (Poona), Mr. Khurshid Alam (Patna), Mr. D. G. Walawalkar (Kanpur), Dr. A. V. Sukhatme (Tatanagar), Dr. B. R. Sethi (Delhi), Prof. K. B. Madhava (Mysore), Dr. U. S. Nair (Trivandrum), Mr. G. G. Mariwalla (Karachi), Miss I. R. Trivedi (Baroda), Mr. Abdul Karim Bhatti (Lyallpur), Mr. N. S. Choudhry (Jaipur), Mr. S. D. Christi (Ahmedabad), Mr. Basant Lal Sethi (Aligarh) and Dr. Zia-ud-din (Lahore).

The following Resolution was unanimously adopted:

“Resolved that a Society be formed called the ‘Indian Society of Agricultural and Animal Husbandry Statistics’ for promoting the study of, and research in, Statistics relating to these subjects.”

The Rules and Regulations of the Society as adopted at the meeting have been published in the first number of the Journal.

The following office-bearers were elected:

President.—The Hon'ble Dr. Rajendra Prasad.

Vice-Presidents.—Mr. M. S. Randhawa and Mr. D. R. Sethi.

Other Members of the Executive Council.—Dr. V. G. Panse, Dr. L. A. Ramdas, Dr. Zia-ud-din, Dr. N. S. R. Sastry, Dr. R. J. Kalamkar, Prof. J. N. Warner, Mr. N. K. Adhyantia, Mr. W. R. Natu, and Prof. D. D. Kosambi.

Secretary.—Dr. P. V. Sukhatme.

Joint-Secretary.—Mr. A. R. Roy.

Treasurer.—Mr. V. D. Thawani.

The Chairman announced that Messrs. G. D. Birla and Sir Shri Ram had agreed to become Patrons of the Society.

POSITION AT THE END OF THE YEAR

(a) *Membership.*—The Society had on its rolls 87 members classified as follows:

Honorary Member	1
Patrons	4
Life-Members who had paid full subscription ..	8
Life-Members who had paid subscription in part	10
Ordinary Members	64
	<hr/>
TOTAL	87
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A list of the members was published in the first number of the Journal.

(b) *Accounts.*—The income during the period ending 30th June 1948 was Rs. 8,444-0-0, the expenditure during the period was Rs. 938-1-6 and the balance on hand was Rs. 7,505-14-6. An audited statement of accounts for the period ending 30th June 1948 is given at the end of the report.

MEETINGS OF THE EXECUTIVE COUNCIL

Three meetings of the Executive Council were held during the year. The main business transacted at these meetings is summarised below:

(a) A Journal Committee consisting of Messrs. M. S. Randhawa, V. G. Panse, K. Kishen, O. P. Aggarwal and P. V. Sukhatme was appointed to report on the arrangements for the publication of the Society's Journal. The report submitted by this Committee was considered at a subsequent meeting of the Council. From this report the Council was satisfied that the time was ripe for the publication of a statistical journal and that sufficient contributions would be forthcoming to keep the Journal going as a regular feature. The Council recommended that the Journal should be published half-yearly, each issue containing about 100 pages. The Council examined the quotations received from different presses and decided to select The Bangalore Press, which has an established-reputation for the printing of technical journals, for printing the Society's Journal. It was also resolved that Dr. P. V. Sukhatme and Dr. V. G. Panse be appointed Joint Editors of the Journal.

(b) The Council recommended that the Indian Council of Agricultural Research and the National Institute of Sciences be approached for annual grants of Rs. 1,000 each to the Society.

(c) Seth Shyam Sundarlal Patodia, Delhi, became a Patron of the Society.

(d) The Council resolved that in view of the encouragement which the Society had received from Sir C. V. Raman, he be approached with a request to be the first Honorary Member of the Society. Sir C. V. Raman in reply to this request wrote as follows:

"I greatly appreciate the offer of the Honorary Membership of the Society and accept the same with pleasure. I shall be much obliged if you can convey my thanks to the Society."

(e) Dr. P. V. Sukhatme was requested to represent the Society at the 25th Session of the International Statistical Conference and the World Statistical Congress at Washington, in September 1947.

(f) The Council recommended that:

- (i) the name of the Society be shortened by the deletion of the words "and Animal Husbandry" from the present name;
- (ii) that in view of the fact that the President was a very busy man with diverse responsibilities of national and international importance, and as the Secretary consequently felt hesitant in seeking his advice as often as he should have liked to do in the interests of the Society, an office of Working President be created.

(g) The Council resolved that the working year of the Society should begin on 1st July and end on 30th June, and further that the subscriptions for membership received during the current year should be treated as having been received for the period ending 30th June 1948.

(h) The Council considered the possibility of bringing out a Visiting Professor from abroad for delivering a course of lectures on one or more statistical topics and authorised the Secretary to explore this possibility and submit a report to the Council for further action.

FIRST ANNUAL MEETING OF THE SOCIETY PROGRAMME

11th December 1947—

- 7 p.m. .. Opening Session.
Place: Constitution Club, New Delhi.
 Presidential Address by the Hon'ble Dr. Rajendra Prasad, President of the Society.

12th December 1947—

- 5-30 p.m. .. Symposium on "Statistical Organisation for India with Special Reference to Agriculture".
Place: Administrative Intelligence Room, New Delhi.
Chairman: The Hon'ble Mr. R. K. Shanmukham Chetty, Minister for Finance, Government of India.
Speakers: Dr. V. G. Panse and Mr. W. R. Natu.

13th December 1947—

- 5 p.m. . . . Business Meeting of the Society.
 6 p.m. . . . Symposium on "Contribution of Statistics to the
 Development of Indian Agriculture".
Place: Office of the Indian Council of Agricultural
 Research, New Delhi.
Chairman: Prof. J. N. Warner, Head of the Dairy
 Department, Allahabad Agricultural Institute.
Speaker: Dr. N. S. R. Sastry.

14th December 1947—

- 11 a.m. . . . Reading of papers.
Place: Office of the Indian Council of Agricultural
 Research, New Delhi.
Chairman: Prof. K. B. Madhava.

1. OPENING SESSION

(11th December 1947, 7 p.m.)

The President was welcomed by Mr. M. S. Randhawa, Vice-President of the Society. In welcoming the President, Mr. Randhawa observed that he himself was not a statistician but a botanist, but his interest in Statistics grew when he joined the Indian Council of Agricultural Research as its Secretary and saw the immense strides which this science has made in its applications to agriculture and in the field of crop forecasting. He was proud of the rapid progress made by the Council in extending the random sampling method of estimating crop yields to practically all provinces under the direction of Dr. P. V. Sukhatme. As a further aid to the improvement of agricultural statistics, he referred to the possible use of air photography in surveying unsurveyed areas and in measuring crop acreages. Having come in close contact with statisticians who were doing such useful work in agriculture, he was glad that he was of some help in the formation of the present Society and in its growth. He considered the Society very fortunate in having the Hon'ble Dr. Rajendra Prasad as its first President. In his view there was no one in a better position in the country to appreciate what this Society could do to promote the development of suitable methods for obtaining a complete and accurate picture of agricultural statistics as a basis for a planned food policy. He sincerely hoped that under the guidance and patronage of the President, the Society would prosper and provide a forum for the exchange of ideas to workers in Agricultural and Animal Husbandry Statistics.

The Secretary, Dr. P. V. Sukhatme, then read out his Report.

Messages of greetings were received from Sir Datar Singh, Vice-Chairman, Indian Council of Agricultural Research, Sir C. V. Raman, Indian Academy of Sciences, Bangalore, and Sir Shri Ram, Delhi.

The President then delivered his Presidential Address which has been published in the first number of the Journal.

The meeting concluded with a vote of thanks by Dr. V. G. Panse.

2. SYMPOSIUM ON "STATISTICAL ORGANISATION FOR INDIA WITH SPECIAL REFERENCE TO AGRICULTURE"

(12th December 1947, 5-30 p.m.)

Mr. D. R. Sethi, Vice-President of the Society, welcomed the Chairman, Mr. R. K. Shanmukham Chetty, and traced the events which led to the formation of the Society and his interest in it. He said that he was very intimately associated with the work of improvement of agricultural statistics both in his capacity as Agricultural Commissioner in the Indian Council of Agricultural Research and Agricultural Development Adviser to the Government of India in the Ministry of Agriculture. The Council had already made considerable progress in evolving scientific methods for the estimation of crop yields and in the application of Statistics to other agricultural problems, but the time had come when the whole statistical organisation for agriculture required to be placed on a firm footing. He therefore considered it most opportune that the Society should hold a symposium on this subject and said that they were very fortunate in having the Hon'ble Mr. Shanmukham Chetty, Finance Minister to the Government of India, to guide their deliberations.

The Address given by the Chairman, together with the proceedings of the symposium, has been published in the first number of the Journal.

3. BUSINESS MEETING OF THE SOCIETY

(13th December 1947, 5 p.m.)

The first Annual General Meeting of the Society was held at 5 P.M., on 13th December 1947, in the premises of the Indian Council of Agricultural Research, Keeling Road, New Delhi. The following members were present:

Dr. V. G. Panse, Prof. J. N. Warner, Dr. N. S. R. Sastry, Mr. V. N. Murty, Mr. V. D. Thawani, Mr. A. K. Mukherji, Mr. M. V. N. Rao, Mr. J. S. Sarma, Mr. O. P. Aggarwal, Mr. Khurshid Alam, Mr. P. Brahma, Mr. R. S. Sahota, Mr. R. Giri, Mr. S. S. Iyer, Mr. A. N. Sankaran, Mr. V. N. Amble, Mr. R. D. Narain, Mr. A. R.

Roy, Prof. K. B. Madhava, Dr. P. V. Sukhatme, Mr. R. S. Koshal, Mr. V. R. Rao, and Mr. R. Raghunathan.

Prof. K. B. Madhava was in the chair.

(i) *Secretary's Annual Report*

The Secretary reviewed the events which led to the formation of the Society on the 3rd January 1947. The Society had, since that date, enrolled 87 members. Of these, 4 were Patrons, who had paid Rs. 1,000 each, 8 were Life-Members who had paid their subscriptions in full, 10 were Life-Members who had paid their subscriptions in part and 64 ordinary members. Sir C. V. Raman was elected an Honorary Member of the Society and he had accepted the membership.

The Secretary reported that much headway had been made in the arrangements for the publication of the Journal. He hoped that the first number would be published in the beginning of 1948.

The Secretary regretted that he could not place the audited statement of accounts before the meeting, as an Honorary Auditor had only just been appointed. Copies of the audited statement would, however, be circulated to members.

The Report of the Secretary was adopted.

(ii) *Secretary's Report of Visit to the U.S.A.*

The Secretary reported that, as authorised by the Executive Council, he represented the Society at the International Statistical Conference and the World Statistical Congress at Washington, in September 1947. He took the opportunity to explain the aims and objects of the Society to all those whom he met and was glad to find that considerable interest was evinced in the formation of the Society and the activities that it proposed to undertake, especially in the publication of a scientific journal. He also gave a brief account of the lines on which associations for the advancement of statistical research have been formed in the United States and are being re-organised at the present moment.

The Chairman added that it was a matter of pride that the Secretary had helped to put India on the statistical map of the world at the conferences which he had attended and had also promoted interest in the activity of the Society among those who attended the conferences.

(iii) *Change in the Rules of the Society*

(a) *Deletion of the words "and Animal Husbandry" from the name of the Society*

The Secretary read out the recommendation made by the Executive Council in this regard and explained the object of the proposed modification in the Rules.

The Chairman put the recommendation to vote and it was carried unanimously.

(b) *Addition of the words 'Working President' after 'President' in the second sentence of the first paragraph under 'Executive Council'*

This was also a recommendation of the Executive Council which the Secretary read out. The Chairman suggested the use of the words 'Executive President' in place of 'Working President'. The amendment was put to the vote by the Chairman and was carried unanimously.

4. ELECTION OF THE EXECUTIVE PRESIDENT

Dr. V. G. Panse moved that Sir Datar Singh, the present Vice-Chairman of the Indian Council of Agricultural Research, be elected as the Executive President. In moving this Resolution, Dr. Panse explained that, in view of the encouragement that they had received from Sir Datar Singh in the formation of the Society and also in view of the fact that he was the head of the foremost organisation for agricultural research in the country and was therefore in day-to-day touch with all agricultural affairs, they could not think of anyone better suited to hold that office, and he hoped that the Society would gain all the guidance that they looked forward to from Sir Datar Singh.

The proposal was seconded by Dr. N. S. R. Sastry, Reserve Bank of India, Bombay, and was carried unanimously with acclamation.

5. POSSIBILITY OF BRINGING OUT PROF. HSU AS VISITING PROFESSOR

This was also a recommendation from the Executive Council which the Secretary read out. The Chairman, supporting the proposal, added that they were concerned with accepting the proposal in principle and that therefore it was not necessary to make a reference to the name of Prof. Hsu as such. He said that if it was not possible to bring out Prof. Hsu, the Society should explore the possibility of bringing out some other Visiting Professor of equal eminence to this country.

The proposal was seconded by Dr. N. S. R. Sastry and Mr. S. S. Iyer. The following Resolution was adopted:

"Resolved that the Secretary be authorised to take all steps to explore the possibility of bringing out a Visiting Professor to India and that the Executive Council be authorised to take the necessary executive action in this connection."

The meeting terminated with a vote of thanks to the Chair.

6. SYMPOSIUM ON "CONTRIBUTION OF STATISTICS TO THE DEVELOPMENT OF INDIAN AGRICULTURE"

(13th December 1947, 6 p.m.).

Mr. Basu, Secretary, Ministry of Agriculture, who was to have presided on the occasion, was unable to attend owing to some unforeseen difficulties. In his absence Prof. J. N. Warner of the Allahabad Agricultural Institute presided.

Dr. N. S. R. Sastry (Reserve Bank of India, Bombay), opening the Symposium, said that Statistics was not only important in agricultural research but also in the study of agricultural meteorology, and in the collection of statistics of crops, livestock and prices of agricultural products. Investigations on agro-economic problems of farm management, as also socio-economic surveys, offered a wide field for the application of statistical science. The contribution of Statistics lay not only in devising methods of sampling in such investigations but also in evolving appropriate methods of estimation from the data collected and of ascertaining the precision of the estimates made. He traced the developments in the methods of crop forecasting in India and said that the work carried out on this subject in this country both by the Indian Statistical Institute and the Indian Council of Agricultural Research had received world-wide recognition. He emphasised, however, that though considerable progress had been made, much remained to be done, as no estimates of the yield of pulses, fruits, vegetables and other similar crops were yet available. He referred to the very poor quality of statistics relating to animal husbandry and livestock products and said that although India was a great agricultural country, no census of agricultural production had been taken. Even rural surveys on sampling basis had not been undertaken. He suggested that the great experience gained in the organisation of crop-cutting surveys should be used for taking up the work of rural surveys on an all-India basis, as such a step alone would furnish information on income of individuals, standard of living, prices, wages, vital and health statistics, co-operation, rural indebtedness, etc.

He referred to the very great need for instituting, on a co-ordinated plan, agro-economic surveys for estimating the cost of production of crops, and collecting data relevant to certain agrarian reforms such as the abolition of zamindari, revision of tenures, readjustment of wages and agricultural labour, etc. Although most of these reforms were desirable from the social point of view, there was no material at the disposal of the administrator to assess their economic implications in sufficient detail. Even where such surveys were attempted, the

method of investigation was not statistically sound. He concluded by saying that in all these matters there was no uniformity of policy both at the Centre and in the provinces and stressed the need for some unitary organisation to guide all this work.

Mr. K. Kishen (Department of Agriculture, Lucknow) said that the contribution of Statistics to the development of Indian Agriculture was of an indirect character. In agricultural and animal husbandry research, Statistics had played an important role in the evolution of improved varieties, improved methods of manuring and cultural and rotational practices for increasing yield and efficacious nutritional treatments for increasing milk yield, live weight, etc. Statistical science had also made a contribution to the development of some methods for collecting statistics of area and yield of crops, agricultural prices, number of livestock, etc. As a complete and accurate picture of all agricultural items could alone be the basis of scientific planning, the contribution of statistics in collecting this information was very great indeed.

Turning to the application of Statistics in the design of experiments, Mr. Kishen traced the developments in the theory of the design of experiments both in England and in India with particular reference to the concepts of Confounding and Incomplete Blocks for testing a large number of factorial treatments or varieties. Fractional replication was a further step in this evolution. He explained this concept in some detail and described his own work in this subject, which, by the application of Projective Geometry and the Theory of Finite Groups, made available a large range of designs with Confounding and Fractional Replication.

He further referred to the importance of the discriminant function both in plant and animal breeding as an aid in evolving improved varieties and improved seeds and concluded by stating how statistical methods could be employed for estimating practical improvement effected by agricultural research.

Mr. V. R. Rao (Indian Council of Agricultural Research, New Delhi) observed that large-scale sample surveys for the estimation of crop yields by the random sampling method had gained wide recognition and this method could be employed with success in various other investigations also, particularly in the study of cost of agricultural production. He traced the attempts so far made in the latter field and indicated how previous surveys were of little value due to lack of proper statistical planning. He then described how a design almost similar to the one adopted in the crop-cutting surveys could be used for the cost of production surveys, too. While various types

of stratification were possible, the one according to the size of the holding was likely to be efficient, if practicable; the village and the family holding would respectively be the appropriate primary and ultimate sampling units. He dwelt at length on the various organisational and economic aspects of the survey and pointed out that, if the utility of these surveys was to be fully realized, they should preferably be carried out every year or at any rate for a period of three to five years so that it might be possible to cover, during the period of the survey, all the crops grown in rotation.

Mr. A. R. Roy (Indian Council of Agricultural Research) said that much of the growth of Statistics as a science could be traced to its contact with the subject to which it had been applied. He cited the example of the subject of design of experiments which originated from a need to control soil heterogeneity in agricultural field experimentation. He then proceeded to explain the special features of the subject of animal husbandry such as the inherent genetic variability of animals, the comparatively longer time it took to raise a new generation of animals and the difficulty of procuring adequate number of animals of a certain specification and stressed the need for further work for evolving suitable statistical methods to meet these needs.

He described a method of sample survey which could be adopted conveniently for the collection of marine fisheries statistics in this country. The method was suggested in the context of the fishing practices prevalent on the Malabar coast of the Madras Presidency, and consisted in taking each fish-curing yard on the coast as the primary stratum for sampling. The boat owners within the jurisdiction of each fish-curing yard would be listed serially by name and the boats owned by each boat-owner would be enumerated and listed. A pre-determined number of boat-owners would then be selected at random from the list so prepared. One boat of each of these boat-owners so chosen would be selected at random from amongst the boats owned by him and the boats so selected would form the final sample. The total catch per day of each of these boats would be recorded in terms of baskets of known capacity for a stretch of 15 days after which a fresh sample would be chosen. The process would be continued throughout the year.

Mr. V. D. Thawani (Indian Council of Agricultural Research) described briefly the stages of development of agricultural experimentation. In the past the interpretation of the results of agricultural experiments presented considerable difficulty owing to the variability due to soil differences and innumerable other chance causes which

vitiated treatment comparisons. It was not until R. A. Fisher invented the concept of randomisation as applied to field experiments and came out with the method of the analysis of variance that a valid interpretation of results was made possible. He then briefly summarised the experimental work initiated in India on modern statistical lines by the Indian Council of Agricultural Research as early as 1931 and discussed the efficiency of different designs of field experiments.

Mr. S. D. Bokil (Institute of Plant Industry, Indore) explained the role of Statistics in plant breeding which, he said, had made the greatest contribution to the agricultural development of the country. Better yielding varieties of sugarcane, rice, cotton and wheat were already being grown over a large area, but the major portion of the cultivated area in the country still remained to be covered with improved varieties and the plant breeder had an immense task before him.

In the past, plant breeding was considered an art, and each plant breeder proceeded with his work according to his own particular ideas and employed statistical designs only when the main work of selection was complete and selected varieties were ready for large-scale tests. But as a result of investigations by Dr. Panse and other workers at the Institute of Plant Industry, Indore, the position was considerably altered, and a comprehensive statistical scheme was available to breeders to help them from the stage of single plant selections and testing of their progenies, to the final stage of maintaining pure seed of the recommended improved varieties. The experimental design known as the Compact Family Block Layout was already popular and was being increasingly adopted by breeders both in India and abroad.

Further improvements in plant breeding technique were to be expected from a closer application of genetics. Here also Statistics had an important role to play because the genetics of economic characters in whose improvement the breeder was interested could be studied only as a statistical problem. In this connection he referred to the estimation of genetic variability and other studies in quantitative genetics that were in progress at Indore.

Mr. R. S. Koshal (Department of Agriculture, Bombay) said that while modern experimental designs such as randomised blocks, latin squares, factorial layouts and others were now commonly employed at all experimental farms in India, he felt that long-term experiments had not so far received the attention they deserved. Problems relating to crop rotations and the maintenance of fertility of soil could be tackled only through this type of experiment and he cited two

examples of such experiments which are in progress in Bombay Province. In one case, with a jowar-groundnut-cotton rotation, the question whether the cotton or jowar should be most profitably manured, was being investigated. Both beliefs were common among cultivators. His other example related to the frequency of ploughing in connection with the dry farming methods advocated by the agricultural department for conservation of soil moisture in the scarcity areas of the province.

In the scarcity tract of the province, comprising of certain districts in the south where rainfall was rather low and very variable, the provincial government had carried out extensive bunding operations in order to conserve moisture and prevent soil erosion. While the benefit of bunding was self-evident, the question was now raised as to what the actual improvement brought about by bunding was and he explained an experiment which he had designed in order to assess the increase in yield of crops from bunding. The experimental design necessarily differed from that in other field experiments. Whereas a field was the unit for an ordinary field trial and a village was a unit of sampling in crop surveys, in the present case a complete catchment which might extend over more than one village had to be taken as a unit. A catchment was defined as an area which dealt with its own rainfall. For the purpose of the experiment, he had selected a number of catchments divided by a ridge and one side of the ridge selected at random was to be bunded and the other left unbunded. The usual crops would be grown in both parts and small plots would be randomly located in each portion for harvesting. Each plot in the bunded area would actually consist of two sub-plots, in one of which the recommended dry farming cultivation would be carried out and in the other the cultivator's usual practices would be followed. The results would enable them to estimate the increase in yield brought about by bunding alone and by bunding plus dry farming methods. This problem illustrated the importance of planning experiments in relation to the particular conditions to which the results of the experiment are to be applied. In the past, experiments on bunding were conducted like any other ordinary field trial by dividing a given field into bunded and unbunded areas, but the results of such trials were inapplicable to large-scale bunding projects without further experimentation. Secondly, the problem also brought out the importance of planning in advance for answering questions that may be raised in future, because in the present instance, once the entire area was bunded, an experiment of the type he described would be impossible to carry out.

Mr. M. V. N. Rao (Indian Agricultural Research Institute, New Delhi) dealing with the application of Statistics to animal husbandry, spoke on the need for having a suitable sire index to evaluate the dairy sire for transmitting milk ability. The two sire indices

$$T = 2y - x \quad \text{where } y = \text{daughter's yield}$$

$$T = 2y - c - 2b(x - c), \quad \begin{array}{l} x = \text{dam's yield} \\ c = \text{herd average} \\ b = \text{intra-sire regression coefficient of daughter on dam} \end{array}$$

were inadequate in that the first does not take environmental variations into account and in the second the use of the intra-sire regression coefficient cannot be recommended in the present state of our knowledge about milk secretion. He then referred to the interesting conclusions arising out of a statistical examination of the records of the Pusa Sahiwal herd. One such was that milk yield increased by 60% by increasing the frequency of milkings from two to four a day and the other conclusion related to the optimum service period for securing maximum milk production. Orthogonal polynomials were fitted to the milk yield in the Xth week after calving, separately for the two periods (i) from calving to service and (ii) from service to date of drying. By maximising the function $\psi(n)$ (service in the n th week) the total milk in a lactation was found to give $n = 11$ weeks and similarly by maximising $\frac{\psi(n)}{n+40}$ ($n+40 =$ calving interval), it was found that the lifetime yield would be maximum if the cow was served after 7 weeks of calving. The average service period of 18 weeks usually adopted was thus very high from the economic point of view.

Mr. S. S. Iyer (Central Sugarcane Research Station, Shahjahanpur, U.P.) referred to the importance of sampling in field experiments and explained the work that he had done in designing a suitable sampling procedure for estimating the quality of sugarcane as influenced by different treatments in replicated field experiments.

Mr. S. M. Srivastava (Central Board of Revenue, New Delhi) referred to the importance of correct estimation of area and yield of tobacco as the basis for excise duty on this crop. He observed that they had found a serious discrepancy between the area figures for this crop supplied by the department of agriculture and those obtained through a survey carried out by the central excise staff. He felt the need for the application of a statistical method for eliminating such discrepancies.

Prof. J. N. Warner (Allahabad Agricultural Institute, Allahabad) winding up the proceedings, said that the subject was very important

and that they had listened to a variety of statistical applications to problems in agriculture and animal husbandry. As there was not much time, he would only refer to certain points with which he was concerned in his work at the Allahabad Agricultural Institute. The statistics of milk production were very defective. Some people placed the figure of production twice as high as others. Others claimed that the production of milk had decreased by 50% during the last few years. They had no reliable data with which to verify the truth of these assertions and he considered that the problem was one which deserved the attention of statisticians and administrators. He also referred to the urgency of ascertaining cost of production of milk and suggested that the possibility of designing a method for this purpose on the lines of sample surveys for estimating crop yield and cost of production of crops, described by earlier speakers, should be explored. He also referred to the rôle of statistics in the study of the composition of milk and the variability of its constituents and drew attention to the report on the subject prepared by Dr. Sukhatme and himself some few years back.

7. READING OF PAPERS

(14th December 1947, 11 a.m.)

Prof. K. B. Madhava was in the Chair.

The following papers were read:

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| Mr. R. D. Narain (Delhi) | A new approach to sampling distributions of the multivariate normal theory. |
| Mr. S. D. Bokil (Indore) | Estimation of genetic variability of plants. |
| Mr. K. Kishen (Lucknow) | Fractional replication of the general symmetrical factorial design. |
| Mr. V. N. Amble (Delhi) | Estimating nutrient requirements of animals. |

The proceedings of the session were wound up with a vote of thanks to the members and other delegates who had participated in the various meetings and to the Secretary of the Society, Dr. Sukhatme, and workers in the Indian Council of Agricultural Research, who had helped to make the session the great success that it was.

The Council of the Indian Society of Agricultural Statistics wish to express their grateful thanks to the National Institute of Sciences of India for their grant of Rs. 400 towards publication of the Society's Journal during 1948 and 1949 and to the Committee of the Central Board of the Reserve Bank of India for their donation of Rs. 1,000 to the Society.

INDIAN SOCIETY OF AGRICULTURAL STATISTICS

Statement of Receipts & Expenditure for the period ending 30th June 1948

RECEIPTS	Rs.	A.	P.	EXPENDITURE	Rs.	A.	P.
To Donations from 4 Patrons at Rs. 1,000 each	4,000	0	0	By Printing and Stationery	202	0	0
„ Subscription from 74 Ordinary Members for 1947-48 at Rs. 18 each ..	1,332	0	0	„ Hire of Post Box	29	12	0
„ Subscription from 2 Ordinary Members from outside India at Rs. 20 each	40	0	0	„ Part payment of remuneration for clerical assistance	330	10	0
„ Subscription from 3 Ordinary Members for 1948-49 at Rs. 18 each (but received before 30-6-1948) ..	54	0	0	„ Expenses for the first Annual General Meeting	237	0	0
„ Part payment of Subscription from 19 Life-Members	3,016	0	0	„ Printing of the contents of the Journal for advance distribution	18	0	0
„ Cheque collection charges	2	0	0	„ Postage	96	7	0
				„ Bank Commission	14	6	6
				„ Other sundry expenses	9	14	0
				„ Balance—	Rs.	A.	P.
				In Bank	7,487	0	6
				Cash on 30-6-1948	18	14	0
				7,505	14	6	
TOTAL ..	8,444	0	0	TOTAL ..	8,444	0	0

(Sd.) A. N. SANKARAN,
Hony. Auditor.

(Sd.) V. RAMACHANDRA RAO,
Hony. Treasurer.