PROCEEDINGS OF THE SYMPOSIUM ON "RESEARCH PRIORITIES IN AGRICULTURAL STATISTICS TO MEET FUTURE CHALLENGES"

Chairman :   Shri J.S. Sarma

Convener :   Dr. R.K. Pandey

The discussion covered a wide range of topics from improvement in basic statistics of area and yield to frontiers of research to meet the emerging needs.It was recognised that research work on methodological issues has to start now, even if the results have to be used after 5 or 6 years. In all, seven papers were presented by the various speakers.

The papers presented were:

1. V.K. Gupta and R.K. Pandey 'Research Priorities in Agricultural Statistics and Computer Applications to Meet Future Challenges'.
2. V.K. Bhatia and Prem Narain 'Scenario of Frontier Research Problems in Agricultural Statistics'.
3. P.C. Bansil and K.C. Seal 'Research Priorities in Agricultural Statistics'.
4. K.C. George 'Growth Studies in Avian Species'.
5. Rajiv Mehta 'Research Priorities in Agricultural Statistics in the Context of Planning and Development'.
6. K.C. Taneja 'Indian Dairy Industry - A Profile'.
7. G.S. Ram 'Research Priorities in Agricultural Statistics to Meet Future Challenges'.

The abstracts of papers presented are as follows:

Research Priorities in Agricultural Statistics and Computer Application to Meet Future Challenges

V.K. Gupta and R.K. Pandey
IASRI, Library Avenue, New Delhi - 110012

The article aims at identifying the research priorities in the field of agricultural statistics so as to meet the future challenges of agricultural systems research. This gains importance particularly because of the changing economic scenario and liberalisation policies. Some of the areas which need immediate

attention in the near future are development of a network system, communication network. Information technology, generation of strong agricultural research databases, use of GIS and remote sensing techniques improving quality of data providing quick estimates systems modelling, expert systems computer and stochastic modelling, multipurpose designs, analysis of survey data, etc. Development of in- house computer software packages augmented with the statistical software packages developed elsewhere and internationally accepted which are relevant to our indigenous problems of research in agricultural systems is also important for accelerating the pace of developmental programmes in agricultural systems research.

The future research programmes proposed are based on the present requirements and prevailing trends in Agricultural Statistics and Computer Application in agriculture, demand for statistical methods in agricultural research and current status of research. The suggested areas of research include development and analysis of experimental designs for agricultural systems research, development of techniques for planning and analysis of survey data related to agricultural systems, statistical investigations in genetics and bio-technology, statistical modelling, computer simulation and statistical computing, and methodological studies on specific statistical economics problems of current and topical interest in agriculture and information systems.

Scenario of Frontier Research Problems in Agricultural Statistics

V.K. Bhatia and Prem Narain*
IASRI, New Delhi

Statistical Science is concerned with the twin aspects of efficiently collecting observational data under some designed experiments and drawing valid inferences therefrom using the theory of estimation and testing of hypothesis. However, as a scientific activity, it is unique in the sense that it does not generate data by itself but needs a field of application to be able to do so. It is therefore at the interface of statistical methods and the field of application that statistical science really exists. Agricultural Statistics is one such interface for which this society and the Indian Agricultural Statistics Research Institute (IASRI) at New Delhi have made significant and unique contributions since forties and fifties.

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*   IARI, New Delhi

Though it is not possible to indicate the latest statistical developments in all the emerging new areas in the field of agriculture and allied disciplines but some prominent areas of importance which need urgent attention of the agricultural statisticians are in the areas of statistics for spatial processes, directional data analysis, environmental data analysis, application of gibbs sampling to agriculture, statistics in biotechnology, statistics in GIS and remote sensing, prequential forecasting system, non-parametric statistical data modelling, statistical prediction in animal breeding and computer intensive statistical methods.

Research Priorities in Agricultural Statistics

P.C. Bansil and K.C. Seal*
Techno-Economic Research Institute, New Delhi

In this paper attention has been focussed mainly on agriculture sector. Two types of problems highlighted have been for a few selected sub- sectors of agricultural statistics which deserve urgent consideration. The first type of problem concerns unreliability and poor quality of statistics and the second type highlights the major gaps still existing which need to be filled on a priority basis. The first type of problems are becoming more serious in recent years due to the fact that the quality of statistics generated through laid down procedures seems to be deteriorating in certain areas. It is urgent that the factors responsible for the deteriorating and poor quality of available agricultural statistics are carefully identified and remedial steps are taken to make them useable for development planning. This might call for operations research.

The second type of problems have to be dealt with first by evolving a suitable cost-effective method of data collection within available resources and thereafter carrying out in-depth analysis of collected data using modern computing technology to made the results available in time to the planners, policy makers and other users of such statistics. Constraints of resources both physical (particularly professional and technical manpower) and financial are often cited as the main cause of the two types of deficiencies. However, lack of strong political will and administrative support to enforce timely implementation of feasible action programme seems to be also equally responsible for the present state of affairs.

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*   Former D.G. CSO New Delhi

Growth Studies in Avian Species

K.C. George
Kerala Agricultural University, Trichur

So far statistical studies were conducted in three avian species viz. chicks, ducks and quails at KAU. In these three cases growth models were fitted. In the case of chicks the characters studied were shank length and body weight. High correlation was noticed between shank length and body weight. The most suitable pattern for expressing shank length as a function of age in weeks were found to be linear and exponential. In the case of duck also body weight and shank length were studied and growth models were fitted in the case of each character. In this case the best functional relationship for expressing shank length over a period of time were Gomperts and Von-Bertalanffy. Similarly modified exponential and Von-Bertalanffy curves were found suitable for fitting body weight for the first 12 weeks in the case of ducks. In the case of quails investigations were done on the characters, body weight and egg production. Various mathematical models were fitted for these characters. Gomperts curve was found suitable for body weight over a period of 12 weeks and quadratic function in logarithmic scale was most suitable for assertaining egg production.

Research Priorities in Agricultural Statistics in the Context of Planning and Development

Rajiv Mehta
National Sample Survey Organisation, Faridabad

The Agricultural Statistics system in India is established on a sound footing to provide a wide data base on different facets of the sector. Foremost importance was assigned in the initial decades of independent India to the timely availability of qualitative estimates of agricultural production. A need for developing sound methodologies for this purpose was obvious for the policy makers and planners to have reliable feed back of the food scenario of the country that timely action to tide over the food crisis and to meet the requirements of the growing population.

The paper focuses on the scope of empirical research and its contribution in strengthening the agricultural statistics as an important instrument for

planning and development. The onset of green revolution sustained self-sufficiency in foodgrains, dynamism of entrepreneurship in farming with gradual transformation from conventional to modern methods of cultivation changes in cropping pattern and the responsiveness of the agricultural statistical system to the changing economic environment demanding the competitiveness in the farming are some of the issues on which the priorities of research have been emphasised.

Indian Dairy Products Industry—A Profile

K.C. Taneja
Former member of ISS, New Delhi

The present study is an attempt to examine the pattern of dairy product Industry in different regions. It also examines the inter regional differentials in respect of important parameters of productivity and other related measures. The study has indicated that productivity wage and other related measures differ significantly, from region to region and those observed at the national level and no firm conclusions could be drawn from the analysis regarding the direct relationship between the productivity and wages.

Research Priorities in Agricultural Statistics to Meet Future Challenges

G.S. Ram
Economic & Statistical Adviser, Ministry of Agriculture, New Delhi

Although the system of maintaining agricultural statistics in India is well developed and time-tested, there is a lot of scope for effecting improvement in terms of contents, quality and timeliness of data. As there already exists an element of unsatiated demand for different kinds of statistics, the emerging requirement of a more comprehensive, consistent and concurrent statistics arising out of liberalised economy is going to pose serious challenges before the system. Several of such statistics would be difficult to collect within the limited funds available for the purpose. There is hence a felt need to undertake studies and evolve methodologies for generating desired statistics at the least cost.

The priority areas where research activities could be envisaged would relate to generating crop estimates for problem regions like North-Eastern states and Sikkim and special crops like fruits, vegetables, flowers, fibers, fodder, spices,

etc. under different agro-economic conditions with regard to usage of fertilisers, varieties, machinery etc.

Research would also be required to reconcile irrigation statistics compiled under the Land use system and those generated by the State Irrigation departments. It would also be worthwhile undertaking a research to explore possibility of producing a standardised statistics, say the irrigation in terms of 'watering-hectares'.

The conduct of censuses is a very expensive exercise. It requires a research probe to decide if the objectives of some of these censuses specially those conducted at short intervals could be achieved through less expensive statistical devices without hampering the precision. Money spared here could be utilised more judiciously to augment weaker fields of agricultural statistics.

Now is the right time to examine and evaluate hitherto operated methodologies and schemes. The exercise would tremendously help to re-orient the various ongoing schemes for improvement of agricultural statistics. New schemes based on well research findings could also launched in the 9th Plan for which exercise is in full swing. Perhaps the revival of the erstwhile Standing Committee on Agricultural Statistics would inter-alia help identify the issues for regular research so as to keep the system vibrant and responsive.

Recommendation

I.   Development of Techniques for Planning and Analysis of Survey Data in Agriculture

    i)   Studies pertaining to re-appraisal of sample survey methodologies for making improvements taking into account the on going changes in techniques of production, socio economic changes in farming systems and need of agro-climatic regions and micro-level planning. Such studies are required for bringing improvement in yield and area statistics of crops, vegetables and horticulture crops etc. Improvement is also required in yield statistics of livestock products.

    ii) Methodology for estimation of fodder production and production from crops.

    iii) Survey techniques have to be developed and perfected for generation of data at district/block/panchayat level concerning area and agro-climatic region.

iv)   Analysis of survey data using techniques like regression analysis, categorical data analysis, etc.

v)   Improvement in quality of statistical data.

vi)   Sampling techniques for exercising statistical quality control of agricultural and dairy products.

vii)   Development of computer software packages for analysis of survey data useful in agriculture sector.

viii)   Estimation of requirements of livestock and poultry feed.

II.   Development and Analysis of Experimental Designs for Agricultural Systems Research

    i)   Important research area includes obtaining efficient designs for experiments in crops, animal fisheries and allied sciences. This also includes planning, designing and analysis of experiments for evaluation of different agricultural systems.

   ii)   Development of computer softwares packages for analysis of data obtained from experimental designs.

  iii)   Study of constraints in application of efficient and optimal designs in field experiments.

III.   Statistical Investigations in Genetics and Biotechnology

    i)   Genetic evaluation in newer reproductive technology.

   ii)   Genetic evaluation in binary response.

  iii)   Estimation of genetic parameters in non-linear models.

  iv)   Development of statistical techniques for monitoring the quality of stored genetic resources.

   v)   Computer simulation models for studying the behaviour of genetic parameters.

IV.   Modelling of Agricultural Systems

    i)   Development of forecasting models for crop yields, livestock products, and fish production.

   ii)   Use of remote sensing and GIS to improve statistics in Agriculture sector.

  iii)   Non-linear stochastical modelling, stochastic modelling and optimisation techniques for agricultural, environmental and economic phenomena.

iv) Research on estimation of post-harvest losses in crops, fruits, vegetables and livestock products.

v) Studies pertaining to research on agricultural marketing and distribution including market intelligence and market information system.

vi) Studies pertaining to estimation of export potential and trade liberalisation of agricultural commodities.

vii) Studies pertaining to technological diffusion and resource use efficiency for sustainable development of agriculture.

viii) Statistical ecology and environmental statistics including degradation of environment and its impact on sustainable growth of agriculture.

V.   Information Systems

i) Use of computers to facilitate data analysis and reduction in time gap.

ii) Preparation of data base for various aspects of agriculture such as crops, vegetables and fruits, livestock products, fisheries and agro-forestry.