SYMPOSIUM ON
"TEACHING OF MATHEMATICS AND STATISTICS AT GRADUATE AND POST GRADUATE LEVELS IN AGRICULTURAL UNIVERSITIES"

CHAIRMAN :   PROF. P. K. BOSE, *Department of Statistics, University of Calcutta, 35 Ballygunge Circular Road, Calcutta—*700019,

CONVENOR :   DR. RANDHIR SINGH, *Senior Professor, I.A.S.R.I.,* *New Delhi —* 110012.

A symposium on "Teaching of Mathematics and Statistics at Graduate and Post Graduate Levels in Agricultural Universities" was organised on 18th December, 1989 under the Chairmanship of Prof. P.K. Bose during the 43rd Annual Conference of the Indian Society of Agricultural Statistics at H.A.U., Hisar. In the opening remarks, the Chairman pointed out the importance of the symposium . He stated that in view of the increasing demand for higher crop production, there is need to strengthen the research potential of Agricultural Statistics. In order to increase the potential of agricultural research, it is essential that agricultural scientists are adequately exposed to the basic mathematics and statistical techniques which are so very essential for any agricultural research programme. For this purpose, the teaching of Mathematics and Statistics at both the under-graduate as well as post-graduate levels has to be adequately streamlined and strengthened. He also informed that a National Committee on Mathematics Education and Research has been set up by DST to prepare a working document for a national debate on the education and research in mathematics. A National Seminar to discuss the status paper and appropriate action plan is also going to be held during December 25-27, 1989 at Calcutta.

Four papers were presented at this symposium dealing with curriculum development and importance of mathematics and statistics courses at

under-graduate and M.Sc. Agricultural Statistics students. The presentations were followed by lively discussion in which several participants expressed their views. In his concluding remarks, Chairman thanked the speakers and other participants for focussing attention on the various important problems. He pointed out that it may not be appropriate to arrive at the final conclusion regarding the course requirements, admission eligibility, examination system etc. in this symposium in view of the intricacies involved. Therefore, he suggested a Standing Committee on the courses and curriculum development in Mathematics and Statistics as at under Graduate and post Graduate levels in agricultural universities and ICAR Institutes be set up to discuss the whole problem threadbare. The composition of the Committee was proposed as follows : (to avoid expenditure and to ensure maximum participation, it was felt to have more members from Delhi and nearby areas).

Prof. P. V. Sukhatme	*Chairman*
Prof. Prem Narain	*Co-Chairman*
Dr. B. L. S. Prakasha Rao	
Dr. O. P. Srivastava	
Dr. Umed Singh	
Dr. Lal Chand	
Dr. V. P. Manglik	
Dr. M. R. Vaishnav	
Dr. Randhir Singh	*Convenor*

The terms of reference of this Committee could be :

1. To discuss syllabii for the inter-disciplinary courses in agricultural research statistics including Statistics, Mathematics for agricultural students and basic agriculture for the Statistics students at the undergraduate and post-graduate levels.
2. To suggest ways and means to minimise the variation in examination and grading systems prevailing in different Agricultural Universities and ICAR Institutes.

In the end, Prof. Prem Narain thanked the Chairman for conducting the symposium and the Convenor as well as speakers and participants for their cooperation in organising the symposium.

The extended summaries of the papers presented at the symposium are as follows :

1. ON TEACHING OF MATHEMATICS AND STATISTICS IN AGRICULTURAL UNIVERSITIES—SOME ISSUES

RANDHIR SINGH

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With increasing importance of Agriculture in the economy, the Agricultural Scientists are under more and more pressure to accelerate the research programmes for increasing productivity to meet the growing needs of a still faster growing population. To achieve this there is greater need to have more comprehensive knowledge of basic Mathematics as well as the statistical techniques for arriving at the appropriate research findings.

The State Agriculture Universities and the ICAR Institutes have the responsibility of training personnel to man the research and teaching responsibilities in the field of agricultural research and education. Most of these Institutions have a common original character and pattern of education and evaluation system borrowed heavily from the land grant institutes of USA. All these Universities follow the course credit system of education and internal assessment and grading are the important evaluation practices. However, there is lot of variation even within the agricultural universities and ICAR institutes on several of these aspects. The present paper seeks to high light some of these issues in relation to the teaching and training programmes in the ICAR Institutes and the State Agricultural Universities with special reference to strengthening of teaching of Mathematics and Statistics.

The Importance of Mathematics and Statistics Courses at undergraduate and post-graduate levels in Agricultural disciplines has been highlighted. In case of post-graduate programme in the discipline of Agril. Statistics the dilemma on admission requirements, the remedial courses for different streams of students and the need for basic core courses in statistics and statistical computing are discussed. For the Ph.D. programme in statistics, it is stressed that this course should not be introduced at every university alongwith the M.Sc. Course with one stroke. Only where competent faculty and other facilities are available, this course should be introduced and there should be almost equal emphasis on the course work and the thesis work.

2. TEACHING OF MATHEMATICS AND STATISTICS AT POST-GRADUATE LEVEL IN AGRICULTURAL UNIVERSITIES

Dr. Umed Singh

Haryana Agricultural University, Hisar-125 004

In this paper role of Mathematics and Statistics in education is explained. Requirements for admission in P.G. programmes in Statistics is discussed and it is advocated that the candidates with Mathematics/Statistics at their B Sc. level should only be admitted for M.S. programme in Statistics. The topic of course requirements for Statistics professional is examined and the model course requirement is presented in this note. Heavy concentration of computer application courses alongwith courses on important recent topics is advocated under course requirements. Courses are described under three categories namely core courses, Essential Courses and Special/Advanced Courses.

Also the evaluation system and the teaching strategies are examined and it is suggested that the classical method of teaching through the use of chalk and black board should be replaced by teaching through transparancies and P.Cs.

3. TEACHING OF MAHEMATICS AND STATISTICS IN AGRICULTURAL UNIVERSITIES FOR NON-STATISTICS STUDENTS

Dr. Randhir Singh

Haryana Agricultural University, Hisar

With the establishment of agricultural universities in the country, the scope of teaching of statistics has considerably increased. These universities have provided an opportunity to study and also to teach the subjects in association with the fields of their applications. Agricultural Statistics now has been recognised as a branch of statistics which get stimulation by the needs of research in agricultural and biological sciences. The Agricultural Statistics being basic to almost every branch of Agricultural science is needed by almost all workers engaged in agricultural research and development to plan the investigation, for collection of data, its analysis and interpretation of the results in a logical and scientific manner.

Today, statistics is used in almost every branch of agricultural science, though the extent of its use may vary. The application in Economics, Genetics, Plant Breeding and Animal Breeding is almost indispensable.

The subject like Soils, Agronomy, Meterology and Animal Nutrition are moderate users. The sample survey techniques in social science like Soeiology, Extension Education and Psychology are commonly used Bio-assay techniques are commonly used in Zoology and Entomology. In-spite of all round rapid advances, some of the branches of science have yet to make the efficient and proper use of Statistics in their respective area.

In general, agricultural sciences are mainly concerned with field experi-ments and thus there is hardly any discipline where the branch of statis-tics called 'Design of Experiments' is not used. Thus statistics in gene-ral and agricultural statistics in particular is basic to almost every branch of agricultural science. It plays a vital role in diverse field of study from basic research to practical decision making. The demand for quantitative methods of research has made the use of statistics indispensable in almost all sciences. Thus, in fact, the scope of statistics seems to be un-limited so long as the quest for new knowledge continues to understand the nature and to improve the efficiency of human efforts. The use of statistical methods has become further more popular with the develop-ment of high speed computers. The use of statistical methods with the help of electronic computer has given a powerful fillip to research in all fields of scientific activity.

4. PROBLEMS AND PROSPECTS OF TEACHING OF STATISTICS IN AGRICULTURAL UNIVERSITIES

B. V. S. SISODIA AND S. KUMAR
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.The importance of Statistics has now been duly recognised in all sphere of human activities. Subsequently, the application of statistics has in-creased manifold to research methods in Universities/Institutions. How-ever, it will not be exaggerate to state that the teaching standard has gone down in general all over the country, and teaching of statistics is not an exception to it. Various factors viz. intake stuff, infrastructure, inadequate faculty strength, socio and psychological factors, examination system etc. have affected the teaching of statistics to a great extent. Another important factor which has taken place in teaching of statistics but has adversely affected it, i.e. the emergence of computer.

These aforesaid factors have been critically analysed in the present paper and proposals are made to improve the teaching of statistics in Agricultural Universities. Proposals are also made to enhance the pros-pects of teaching of statistics at Post Graduate level leading to the degree of M. Sc. and Ph.D. in Ag. Statistics/Biometrics/Biostatistics.