

**Report on the Session on Statistical Computing held during
the 44th Annual Conference of the Indian Society of
Agricultural Statistics on 5th December, 1990 at
Gujarat Agricultural University, Anand**

1. It is very difficult to find anyone today who will dispute the use of computers in Agricultural Research. It is also agreed that data/information is the most significant component of Agricultural Research. The data, both for and from Agricultural Research, is most rapidly growing. This abnormally growing data is being demanded by the discerning scientists to meet their research requirements. In almost all main research centres, computer hardware devices and software packages either already exist or are in the process of being made available. In many such computer centres plans are afoot to establish databases that will meet the entire data requirements of the main centre as well as its substations. Unfortunately for many organisations, the problems associated with configuring and maintaining a cost-effective database are complicated by computer technologies, difficult-to-handle growth patterns, and an increasing requirement of various types of data which do not originate within. A significant break through to research scientists is the new service of communications based computer networks. In order to cover some of the major issues, the ISAS held a session on Statistical computing during its Annual Conference.

The session had as

Chairman

: Prof. J. S. RUSTAGI,
*I.B.M. Corporation, San Jose, California,
U.S.A.*

Convener

: Shri R. GOPALAN
I. A. S. R. I. New Delhi

Speakers : Shri K. V. RAMADOSS
N. I. C. New Delhi
Prof. P. NARAIN,
I. A. S. R. I., New Delhi
Dr. BALDEV SAHAI
S. A. C., Ahmedabad

Participants : All the delegates.

2. The session started with the Chairman's remarks. He drew the attention of the participants to the following :

- (i) The difficulties and challenges in the field of Statistical computing which deals with numerical methods, optimisation techniques, statistical graphics, remotely sensed data, and algorithms.
- (ii) The revolutionary change due to the use of computer intensive methods in areas like testing of hypothesis, estimating fundamental statistical quantities, Montecarlo and jackknife and bootstrap procedures.

Thereafter the Chairman invited the speakers to present their papers.

3. Shri K. V. Ramadoss spoke about issues related to Agricultural Data Management.

He listed the basic requirements in the Agricultural Sector with which the Government is concerned as timely supply of inputs in sufficient quantities at reasonable prices, quick procurement at beneficial rates, and distribution of the produces.

The inputs include quality seeds with high genetic potential, irrigation, fertilisers, pesticides, credit, know-how of improved agricultural practices, soil test reports, modern agricultural implements and machineries, proper marketing facilities, insurance, incentives, education and other closely related items.

Information system on Agriculture must provide information on all of the above in terms of demand, production, supply, import, export, consumption, price, cost, details of outcome of research projects and extension, etc.

The agencies for collection and supply of data may be revenue, extension, and development functionaries. The data may normally flow from village to block/subdivision to district to state to centre.

The volume and frequency of data may vary depending on the area and the purpose. The data so collected could be classified and preserved over time.

Most of the states have computers in their Departments of Agriculture for processing agricultural data.

The National Information Centre is the nodal agency for promoting informatics culture and computer consciousness among the Government Departments and Ministries both in the Centre and in the State by providing them hardware, software, and processing support. NIC is entrusted with the responsibility of developing computer based Management Information Systems on every sector of development, for decision support at various levels of management in the Government. A nation-wide computer communication network, NICNET, Covering all the district headquarters, the state capitals, and the centre is set up by NIC.

4. Prof. Prem Narain spoke about issues related to establishment and operation of KRISHINET. He talked about the potential of KRISHINET.

Data/information is a necessary input to research. Research data/information have accumulated in the past few years and more are produced each year. Such a growth of scientific data/information has created problems of scientific communication. To deal with this problem a system has to be organised as a comprehensive information service. A computer network service, KRISHINET, if established, will serve the users.

KRISHINET will provide a comprehensive information service to a multi-discipline team. Mechanisms will exist by which the research stations will be provided a comprehensive current data/information, in all fields of interest to Agricultural Research. Individual research centres will input. These centres, by common agreement, will share the responsibility for coverage of data/information in various areas of interest. An advisory board consisting of representatives of contributing organisations and user groups will come into existence to coordinate and guide the work of input collection, processing, merging and output of input from various sources. Once the comprehensive information service becomes operational, current data from all centres will flow into the system. Standards will be evolved for input and such created standards established. KRISHINET will have a network of specialised centres, analyses centres, and data banks. Cooperative projects will be developed. KRISHINET will aim at making scientific and technical information available, supporting and monitoring the research work, promoting coordinated activities, avoiding unnecessary and wasteful duplication and achieving compatibility in different but similar research problems. KRISHINET will provide a central source of information on the nature, location, and status of current research projects. KRISHINET will assist in the rational use of physical inputs and proper planning, and help in

optimum use of technical inputs. In short KRISHINET when developed and implemented will be a national asset.

5. Dr. Baldev Sahai spoke about Remote Sensing Techniques in Agriculture.

Remote sensing techniques are being extensively used in natural/physical resource inventoring, mapping and monitoring. The major applications related to agriculture are in agro-meteorology, in the management of land and water resources, in the crop production forecasting and in the assessment of ravages brought about by disasters such as floods, droughts, crop epidemics, etc, which seriously affect agricultural production. Technological developments during the past three decades have shown a great promise in estimating crop production as well as monitoring crop condition.

Forecasting of crop production involves crop acreage estimation and yield prediction.

Crop acreage estimation methodology was developed under "Crop Acreage and Production Estimation" program under the Remote Sensing Application Mission at the Space Application Centre, Ahmedabad. There are two approaches which are being used for acreage estimation. When the study area is small complete scene analysis has been attempted. For large study areas sampling approach is used.

Prediction of yield using remotely sensed data is essentially based on the direct relation of yield with spectral indices derived from satellite data of the crop during its maximum vegetative growth phase.

A summary of the results presented indicated that the results in most cases were available before harvesting and some of the estimates were in very good agreement with those of the State Department.

Adoption of remote sensing technique faces problems in the country. They are small land holdings, mixed crops, different cultural practices, variable crop calendars, crops having poor growth, cloud cover, etc. The problem of non-availability of cloud free data can be solved with microwave remote sensing technology with all-weather capability. Further improvements in yield estimation techniques are also expected. Improvements in remotely sensed data analysis can also be expected.

6. The chairman concluded the session with the remarks that information technology/informatics has a particular reference to Agricultural Research and the need of the hour is establishment of an Agricultural Research Information System—KRISHINET.