National Agricultural Innovation Project
Indian Council of Agricultural Research

Strengthening Statistical Computing for NARS
(Platform for Statistical Computing)
(www.iasri.res.in/sscnars)

Need and Importance of the Project

Statistical analysis is an important tool to extract as much information as possible from the given data. Statistical computing methods enable to answer quantitative biological questions from research data and help to plan new experiments in a way that the amount of information generated from each experiment is maximized. Widespread use of computers and specialized high end statistical software packages have helped and greatly improved the ability of researchers to analyze and interpret voluminous data. Developments in computerized statistical analysis have enhanced the ability of researchers to come up with better conclusions. This has helped in improving the statistical, computer-related and networking skills of the researchers. For exploiting and sustaining these developed skills, availability of proper computing and infrastructure facilities to agricultural researchers in National Agricultural Research System (NARS) is of utmost consequence. The statistical computing support would be useful in improving the quality of agricultural research and make it globally competitive and acceptable by way of publications in international refereed journals. The present project, therefore, targets at providing technical support on the component of statistical computing by applications of general purpose statistical software package that help in undertaking appropriate, sophisticated and computationally involved statistical analysis of data keeping in mind also the accuracy and precision of results. It is expected to create a healthy statistical computing environment for the benefit of the scientists in NARS by way of providing advanced, versatile and innovative and state-of-the-art high end statistical packages and enable them to draw meaningful and valid inferences from their research.

Objectives

1. To strengthen high end statistical computing environment for the scientists in NARS.
2. To organize customized training programmes and also to develop training modules and manuals for the trainers at various hubs.
3. To sensitize the scientists in NARS with the statistical computing capabilities available for enhancing their computing and research analytics skills.

Work Programme

- Procurement of general purpose statistical software package SAS with 150 perpetual licenses (100 Standalone and 50 Intranet Based) + SAS Enterprise Business Intelligence Server for NARS Organizations (ICAR Institutes/ NRCs/ PDs/ SAUs/CAUs/Agricultural Colleges with Post Graduate Education).
- Configuration of SAS EBI server at IASRI, New Delhi for the use of all researchers from NARS.
- Installation of software on server and on multiple machines in NARS organizations.
- Strengthening statistical computing hubs in terms of imparting training and technical support in the usage of statistical software package to the research personnel of statistical computing hubs. This would involve
  - Organization of installation training at each statistical computing hub.
  - Conduct of training of a total of 274 days by SAS comprising of 30 days at every statistical computing hub and 34 days at Lead Centre. Expected number of people to be trained is 180.
  - Organization of training programmes for trainers at IASRI, New Delhi.
- Organization of training programmes in the usage of statistical software package to the research personnel of different NARS organizations. This will be done both by lead centre and other 8 statistical computing hubs.
- It is expected to train approximately 1500 researchers from NARS in the usage of statistical package.
- Preparation of instructional material by including live examples from different areas of agriculture, animal and fisheries research. It will involve collection of live data sets for illustrating the power of newer statistical computing techniques which in turn is expected to enhance the quality of research.
- Development and designing of customized training programmes for specific needs of different institutions.
- Organization of workshops on specialized topics of statistical computing.

Responsibilities of the Lead Centre

- Identification and establishment of linkages with statistical computing hubs .
- Organization of training programmes for imparting training to personnel of statistical computing hubs .
- Imparting training to research personnel of different institutions of NARS under one hub.
- Making liaison with research personnel of statistical computing hubs with respect to usage of statistical software package.
- Collection and compilation of data for illustration purposes in usage of statistical software package.
- Designing and development of the statistical computing modules as short handouts for statistical analysis of data by general purpose statistical software package. The link "analysis of data" at Design Resources Server (www.iasri.res.in/design) would be used to a great extent as a reference material for these training programmes.
- Organization of sensitization and training workshops .
- Supervision and implementation of the statistical computing services.

Responsibilities of the Statistical Computing Hubs

- Organization of training programmes on usages of high end general purpose statistical software package for research organizations of that region.
- Establishment of close linkages with research personnel of NARS organizations of the concerned region for proper assessment of their training and other technical support requirements.
- Collection and compilation of the data required for illustration purposes.
- Supply of feed back, input and statistical computing requirements to the lead centre.
- Regular on-line updates of the progress of training programmes to lead centre.

Monitoring Indicators

The only monitoring indicator of the system would be the extent to which the researchers have been trained in the effective usage of computing facilities developed for improving the quality of their research. This can be quantified in many ways like, number of training programs organized, number of research personnel trained, obtaining solutions for unsolved problems by application of newer sophisticated statistical tools, number of research publications in journals of repute, etc. Some of the monitoring indicators will be as under:

- Number of software licenses procured and installed
- Number of training programmes organized
- Number of research personnel who acquired sophisticated statistical computing skills
- Number of trainings imparted to the people managing statistical computing hubs
- Number of advanced areas and topics on which training were imparted to researchers of NARS
- Number of post graduate students who took advantage of high end statistical computing facilities
- Providing a platform for knowledge sharing and cross leveraging of learning
- Enhancing scientists skills for their self confidence, independence and sound knowledge for statistical analytical techniques
- Number of data sets analyzed with advanced statistical techniques

Creation of healthy statistical computing environment and use of appropriate statistical methodologies is expected to improve the quality of research and increase

- Number of publications in International Journals with high impact factor
- Number of quality publications, both papers and reports

Expected Outcome

- Availability of a very healthy statistical computing environment for the scientists in NARS containing a very powerful, all inclusive, modern, efficient and precise general purpose statistical software package for undertaking a probing, in-depth and accurate analysis of data generated from agricultural research. This is expected to bring a revolution in the analysis of agricultural research data.

- Exploratory data analysis, which previously was avoided because of non-availability of the high end statistical package, would become a common feature of agricultural research. The power of the package to graphically display dynamic, interactive visual research can enrich the knowledge of agricultural scientists and illuminate concepts which were more difficult to comprehend earlier without statistical software package.

- Publication of research in international refereed journals of repute with high impact factors, leading thereby to an increased visibility of agricultural research at international level.

- Heavy impact on scientific research publications in general and accelerated growth of agricultural research in advanced areas like biotechnology, genomics, genetics and breeding, agricultural field experiments, micro-arrays, etc.

- Acknowledging the importance of statistical computing in agricultural research and enrichment of statistical computing skills of agricultural scientists.

- The trained researchers would become the trainers at their respective organizations to have a multiplicative effect on the development of trained manpower in the country.

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