



Consultancy and Advisory Services

Advisory services for researchers in NARS were pursued rigorously and various training programmes were conducted as consultancy (details given in Chapter 6).

Advisory Services Provided

- **Ms. Samira Zareei, Department of Agricultural Machinery Engineering, Faculty of Agriculture, University of Tabriz, Iran**

Provided advisory services on the analysis of data pertaining to a factorial experiment for a 3^4 factorial experiments run as a fractional factorial plan in 27 runs and three replications. The data analysis was also done and the results were obtained. The interest was only in main effects but several two-factor interactions were also estimable and the analysis was done by including the estimable two-factor interactions in the model.

- **Dr. Hafiz Munir Ahmed, Senior Scientist, NIFA, Peshawar, Pakistan**

Advised on the generation of layout of an augmented design with proper randomization. The data generated from an augmented design was also analyzed and the results obtained were discussed for interpretation. The data was generated using an augmented design with 24 genotypes tested along with three different controls which were repeated after every three test entries. The design was run in three blocks of size 16 each. Eight different characters were observed and analyzed.

- **Dr. Anupama Singh, Principal Scientist, Division of Agricultural Chemicals, IARI, New Delhi**

Suggested a design for a factorial experiment with 6 factors at 6 levels each and 7 factors at 3 levels each to be run in 72 runs with 4 blocks of size 18 each. The design suggested was a mixed orthogonal array of strength two with orthogonal blocking. The layout of the design is $(3^7.6^6//72)$ in 4 blocks of size 18 each.

- **Dr. Satyendra Singh, Senior Scientist (Nematology), Division of Vegetable Protection, Indian Institute of Vegetable Research, Varanasi**

Advised on the analysis of data generated from an experiment conducted using a factorial RCB design with three factors each at 2 levels.

- **Dr. Axma Dutt Sharma, Division of Germplasm Conservation, NBPGR, New Delhi**

Advised on creation of standard error bars for experimental data with 17 characters using JMP Statistical Discovery Software.

- **Dr. Ramawatar Nagar, Scientist, National Research Center for Plant Biotechnology, New Delhi**

Advised on the analysis of data generated from an experiment conducted using a factorial RCB design with 5 factors each at 4 levels. The data was collected on four characters viz. number of auxiliary shoots, auxiliary shoot length, number of leaves and number of nodes.

- **Dr. Ramkrushna G Idapuganti, Scientist, Division of Agronomy, ICAR-Research Complex for NEH Region, Umiam, Meghalaya**

Advised to use a resolvable block design with factorial treatment structure for an experiment planned to be conducted on a terraced land, where it was not feasible to have complete replication on single terrace, to study the effect of varieties of maize (6 in number) and 4 fertility treatments. The parameters and block contents of the design are $v = 24$ (6×4), $b = 6$, $r = 3$, $k = 12$, Efficiency factor for $F1=F2=1$ and interaction $F1F2=0.8968$.

Block Contents													
Replication I	Block 1	00	10	20	31	41	51	02	12	22	33	43	53
	Block 2	01	11	21	32	42	52	03	13	23	30	40	50
Replication II	Block 1	00	10	21	31	41	52	02	12	23	33	43	5
	Block 2	01	11	22	32	42	53	03	13	20	30	40	51
Replication III	Block 1	00	11	21	31	42	52	02	13	23	33	40	50
	Block 2	01	12	22	32	43	53	03	10	20	30	41	51

- **Ms. Nishu Yadav, Ph.D. student (Technology and Sciences), Department of Food and Nutrition, Halina School of Home Science, Sam Higginbotom Institute of Agriculture, Technology and Sciences, Allahabad**

Advised on analysis of data pertaining to experiments conducted using 3 factors (milk, temperature and salt) each at 3 levels for chemical analysis, 4 factors (milk, temperature and salt at 3 levels each and storage at 4 levels) using factorial completely randomized design. In this experiment, each of the treatment combinations was replicated thrice.

- **Ms. Roli Katiyar, Ph.D. student (Technology and Sciences), Department of Food and Nutrition, Halina School of Home Science, Sam Higginbotom Institute of Agriculture, Technology and Sciences, Allahabad**

Advised on analysis of data pertaining to Chemical data with 3 factors (milk, temperature and salt each at 3 levels) and another experiments with 3 factors each at 3 levels and one factor at 6 levels and Sensory data with 3 factors each at 3 levels and 1 factor at 6 levels using factorial completely randomized design with contrast analysis.

- **Dr. RB Singh, IFFCO Foundation, Nehru Place, New Delhi**

Provided compiled data related to area, production and productivity of different commodities.

- **Mohd. Hashim, Ph.D. (Agronomy) student, IARI, New Delhi**

Advised on block design with factorial treatment structure for the experiment on Crop diversification and nutrient management in mango based agri-horticulture system. The two factors were crops under mango tree and nitrogen application to mango tree. The crops under mango were cowpea, pearl millet, soybean and no crop. The three levels of fertilizer to mango tree were control, 50%RD of NP+50%RD of FYM and RD of NP+RD of FYM. The experiment is to be conducted where five different varieties of mango (Pusa Arunima, Pusa Surya, Amarpali, Mallika, Dasher) with 25 trees for each variety were established. The plantation of each variety was considered as a block and each block was divided into 8 plots with 3 trees per plot. Following block design with factorial treatment structure was suggested:

Block 1	C1F1	C2F1	C3F1	C4F1	C1F2	C2F2	C3F2	C4F2
Block 2	C1F2	C2F2	C3F2	C4F2	C1F3	C2F3	C3F3	C4F3
Block 3	C1F3	C2F3	C3F3	C4F3	C1F1	C2F1	C3F1	C4F1
Block 4	C1F1	C2F1	C3F1	C4F1	C1F2	C2F2	C3F2	C4F2
Block 5	C1F2	C2F2	C3F2	C4F2	C1F3	C2F3	C3F3	C4F3

This design is obtained by repeating first two blocks of the singular group divisible design S53 with parameters $v = 12$, $b = 3$, $r = 2$, $k = 8$, $m = 3$, $n = 4$, $l_1=1$, $l_2=1$. The final parameters of design are $v = 12$, $b = 5$, $k = 8$. He was also given an alternative with 6 plots per block, each block containing 4 trees. The layout of the design is

Block 1	C1F3	C2F2	C3F1	C3F2	C3F3	C4F3
Block 2	C1F2	C2F2	C2F3	C4F1	C4F2	C4F3
Block 3	C1F1	C1F2	C2F1	C2F3	C3F2	C4F3
Block 4	C1F1	C1F2	C1F3	C2F1	C3F3	C4F2
Block 5	C2F1	C3F1	C3F2	C3F3	C4F1	C4F2

- **Dr. Purushottam Sharma, IGFRI, Jhansi**

Advised for the data analysis on the project Livelihood condition and livestock production system of resource poor farmers, on sampling methodology, statistical analysis, optimization of herd size etc.

- **Dr. AK Mishra, IGFRI, Jhansi**

Advised for the data analysis on the project Nutritional mapping of crop residue and its implication for livestock feeding on sampling

methodology, estimation of grain straw ratio, prediction of crop residue etc.

- **Ms. Shinoji KC, Scientist, Division of Agricultural Extension, IISS, Bhopal**

Advised on the use of Kruskal-Wallis test for identifying the major factors behind the shift from inorganic farming to organic farming in Kerala based on the survey conducted on eighty farmers as a part of her Ph.D. thesis work.

- **FAO Consultancy to Government of Sri Lanka**

Advised on feasibility study on applications of remote sensing and GIS in agricultural census/surveys.

- **Dr. Neeru Bhushan, Senior Scientist, Central Research Institute on Goat, Makhdoom**

Advised on data analysis of data pertaining to Adaptation of livestock to intend climatic changes through shelter management (ICAR Network Project) and Documentation of animal husbandry's package and practices in peri-urban and urban areas around Lucknow (UPCAR Project). Also provided one month training on SAS, SAS Enterprise Guide and JMP.

- **Rainfed Areas Prioritization Index (RAPI)** on prioritization of rainfed area in the country has been developed in consultation with and guidance of NRAA, CRIDA and IASRI together have come up with Rainfed Areas Prioritization Index by combining natural resource index (NRI) and integrated livelihood index (ILI). Among the identified prioritized 167 districts based on RAPI score, 50 districts deserve immediate attention for enhancing productivity and livelihood as resource-wise they are rich but the productivity and livelihood status are poor. Besides prioritization of rainfed districts of India, the study has highlighted the crop and livestock based interventions to meet the targeted growth rate of 4 per cent per annum.

Projects undertaken in Consultancy Mode

- Study to develop an alternative methodology for estimation of cotton production funded by Directorate of Economics and Statistics (DES), Department of Agriculture & Cooperation, Ministry

of Agriculture was carried out during 01 April to 17 September 2011. The relevant study material, reports etc. relating to the project have been reviewed. Preliminary analysis of the picking-wise data acquired during previous study for the States under study namely, A.P. and Maharashtra has been completed. In the process of development of alternative procedures, estimate of average yield of cotton alongwith its percentage standard error for each picking has been obtained for Adilabad, Guntur and Karimnagar districts of A.P. State using the existing procedure. The relative contribution of each picking to the total yield has also been worked out for these three districts. The possibility of using other sampling designs is being examined. Estimation procedure for estimating average yield of cotton using double sampling approach is being developed. Data analysis for Adilabad and Guntur districts using double sampling approach has been completed and is in progress for Karimnagar district.

- A project on Evaluation of agricultural census scheme was initiated on 05 October 2011. The agricultural census related documents were studied. A one day workshop was organized with state officials involved in the agricultural census work with the aim to understand the problems encountered in the field work of the agricultural census. Questionnaires were developed for primary workers, District level officials involved, State level officials involved in the census work and the Officials responsible for the organization of agricultural census work in the Ministry of Agriculture to get their feedback on the census work and discussed with the experts Dr SK Raheja, Dr BBPS Goel, former Directors of IASRI and Dr AK Srivastava, former Joint Director, IASRI and modified as per their suggestions. The agricultural census related reports have been studied. Particularly, the estimation needs to be modified as per the domain estimation theory. Two districts of the AP State were visited to examine the progress of the IX Agricultural census work. Discussions were also held with the officials in the Ministry of Agriculture involved in the census work.





STATISTICAL PACKAGE FOR AGRICULTURAL RESEARCH



SPAR 2.0

Sangeeta Ahuja

P.K.Malhotra

V.K.Bhatia

Rajender Parsad

V.H.Gupta

Indian Agricultural Statistics Research Institute

Statistical Package for Factorial Experiments



SPFE 1.0

Sangeeta Ahuja
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SOFTWARE FOR SURVEY DATA ANALYSIS



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STATISTICAL PACKAGE FOR ANIMAL BREEDING



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DEVELOPED BY
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