

Preface

The Indian Society of Agricultural Statistics was founded on January 3, 1947 to provide a platform for disseminating research in Agricultural Statistics and also to establish its role in research in agricultural sciences. The Society had the proud privilege in having Late Hon'ble Dr. Rajendra Prasad, the then Union Minister of Agriculture as the founder President of the Society. He continued to preside over the activities of the Society for 16 years even after becoming the President of Republic of India. The Society benefited immensely by his wisdom and guidance and kept gaining strength and growing in size and stature. The Society was nurtured to cover new horizons in time by the legendary Indian Statisticians, like Late Dr. P.V. Sukhatme, Late Dr. V.G. Panse, Late Dr. G.R. Seth, Late Dr. Daroga Singh, and Dr. Prem Narain. Dr. S. Ayyappan, Secretary, Department of Agricultural Research & Education (DARE), Government of India, and Director General, Indian Council of Agricultural Research (ICAR) is its present President. The Society brings out the Journal of the Indian Society of Agricultural Statistics which holds a unique distinction of publishing research articles both in basic as well as innovative research in Agricultural Statistics with applications in agricultural sciences so as to meet challenges of agricultural research in newer emerging areas. The Journal is being reviewed by the American Mathematical Society under the Mathematical Reviews and Zentralblatt MATH, Germany. It is available online at www.isas.org.in/jisas and full papers are downloadable free of cost.

The Executive Council of the Society decided to publish the August, 2011 issue of the Journal of the Indian Society of Agricultural Statistics with contributions from eminent statisticians in the Honour of Professor Prem Narain on his 75th birthday. Professor Prem Narain began research in statistical genetics theory in the early 1960s. Since then he has worked on different aspects of statistical genetics and also contributed significantly to the theory and applications of statistics to crop and animal sciences. Recently, he has developed interests in molecular biology and computational biology also. He has guided more than 20 students for their Ph.D. degrees. He has authored seven books, ten book chapters and edited five books. He has published more than 275 research papers/reports in journals of national and international repute. He is an excellent teacher and has been invited to deliver lectures at many Universities in India and abroad. His research work has been widely appreciated. In his professional career, he has occupied several important positions in various organisations. He has served on the Editorial Boards of several international and national journals. Prof. Narain has been honoured with several awards, prizes, medals and Fellowships of international and national scientific academies/societies; he is a Fellow of Royal Statistical Society of Britain, the New York Academy of Sciences, the Indian National Science Academy, the Indian Academy of Sciences, the National Academy of Sciences, India, and the National Academy of Agricultural Sciences. He also served as a Member of National Statistical Commission.

For this Special Issue in the honour of Prof. Prem Narain, renowned and active researchers working in the area of Agricultural Statistics/Statistics/Bio-statistics from all over the globe were requested to share their research findings and submit their research articles for publication. The response was overwhelming. The papers received for possible publication were thoroughly reviewed. After the review process, thirteen papers were accepted for publication and are being published in this Special Volume. We would like to express our sincere thanks to all the authors for responding to our request. The reviewers contributed significantly in the review process by reviewing the manuscripts in a short span of time. We are grateful to all the reviewers and thank them for their support.

We would like to place on record our appreciation towards Dr. V.K. Gupta, ICAR National Professor and Chair Editor, Journal of the Indian Society of Agricultural Statistics, for his unbounded interest and support which made this Special Volume a reality. The help received from Dr. V.K. Bhatia, Director, IASRI, New Delhi and Secretary, ISAS, is gratefully acknowledged. We are also indebted to the Secretariat of the Society for their dedicated and devoted efforts in bringing out the Special Volume.

Guest Editors
Murari Singh
P.K. Malhotra
B.M. Prasanna

Professor Prem Narain – An Outstanding Agricultural Statistician

It is indeed my proud privilege, I feel flattered, I consider this to be a great personal honour to write a brief about Professor Prem Narain, who has imprinted a reputation amongst scientific fraternity as a devoted researcher committed totally to the cause of strengthening the discipline of Statistics, particularly applied research with focus on agricultural research, education and extension activities. It is a herculean task to make this brief a true representative of the complete achievements, which with my limitations, I would never be able to express.

Professor Prem Narain was born on January 03, 1934 at Lucknow. He had a uniformly brilliant academic record, obtaining B.Sc. (Hons.) and M.Sc. degrees in first division from Lucknow University during the years from 1950 to 1954. He obtained Ph.D. degree in 1969 and D.Sc. degree in 1984, both from University of Edinburgh, UK.

Professor Narain started his research career from the Ministry of Transport. He also worked at Indian Veterinary Research Institute before joining Indian Agricultural Statistics Research Institute (IASRI), New Delhi, where he held senior positions like Professor, Head of the Division, Joint Director and Director. After retiring from the position of Dean and Joint Director (Education), IARI, New Delhi, he was Professor Emeritus in the Council of Scientific and Industrial Research and worked on the project entitled “Studies on Statistical Genetics and Evolution”. He was a member of the National Statistical Commission, an apex body constituted by the Government of India in January 2000 to revamp the Indian Statistical System.

Professor Narain did original researches in the field of Statistical Genetics and also contributed significantly to theory and application of statistics to crop and animal sciences. He developed a new concept of average time taken for the fixation of a gene in finite populations, independently of similar work done by Japanese researchers Professors M. Kimura and T. Ohta. This concept has since been found to have useful applications in animal breeding and evolution. He also introduced the method of conditioned diffusion equations, parallel to famous Fokker-Plank equations used in physics, in relation to population genetics problems but applicable to other areas also such as stochastic process in economics. He developed efficient method of progeny testing, sire evaluation, phenotypic and selection indices for use in animal breeding as well as efficient designs of partial diallel crosses for use in plant breeding. In particular, he showed how the use of auxiliary traits in a progeny testing programme in dairy cattle reduces the number of progeny required to attain a pre-assigned level of accuracy resulting in decreased cost of the programme. He wrote a treatise on ‘Statistical Genetics’ which was published in 1990 by John Wiley. The book explains in statistical language the principles of population and quantitative genetics. It is one of its kinds in the literature and is extensively referred to by advanced researchers in both Indian and foreign universities.

Professor Narain also made significant contributions to the mathematics of genetic diversity. In particular, the problem of the maintenance of genetic variability for a polygenic trait due to the balance between step-wise mutation and stabilizing selection was tackled by him. He was able to generalize Haldane’s famous relation between the coefficient and intensity of selection to the multivariate situation. He also dealt with the optimality criteria in the context of Fisher’s Fundamental Theorem of Natural Selection.

Of late, his interest has been in statistical genomics. In particular, he has been contributing to the applications of statistics in solving problems related to mapping of quantitative trait loci (QTL) and marker-assisted selection (MAS).

Professor Narain also contributed to the application of computers in the field of agriculture. He was the first to develop a blue print of KRISHINET – an information system for the nation-wide agricultural research and education. Besides significant contributions in the field of statistics and computers, Professor Narain also made an impression in the philosophy of agricultural sciences.

Professor Narain was also involved in developing efficient statistical techniques for the analysis of sample survey data and early warning system based on crop forecasting and remote sensing technology. As FAO Expert, he developed a manual on ‘Training Programmes in Food and Agricultural Statistics’ and reviewed the programme on the ‘Organization of Agricultural Pilot Census in China’ (1993-96). At the instance of Commonwealth Secretariat, London, he developed a paper on ‘Methodological Issues in Estimation of Crop Production in African Countries’. He collaborated with IFPRI, Washington, DC for developing methodology on ‘Fertilizer Response Function Environment’. He organized training courses in sample surveys, crop yield modeling and computer programming of the AARRO and Food Production and Rural Development Division of the Commonwealth Secretariat. He was Chairman, Sampling Methods for Food Products and Agricultural Inputs Sectional Committee of the Bureau of Indian Standards (1982-90). He was a Member, Working Group on Agricultural Statistics, NSSO during 1988 to 1990 and a Permanent Member of the National Advisory Board on Statistics of the CSO during 1984 to 1990. He was Statistical Consultant to the Comprehensive Crop Insurance Scheme of the Government of India introduced in Kharif 1985.

Professor Narain has been holding Fellowship and Membership of several professional bodies and scientific societies both in Indian and abroad. He is a Fellow of the Royal Statistical Society of Britain and New York Academy of Sciences, Indian National Science Academy, Indian Academy of Sciences, National Academy of Sciences, India, Indian Society of Genetics and Plant Breeding and Foundation Fellow of the National Academy of Agricultural Sciences. He has also been honoured recently as the Foundation Fellow of Indian Society of Agricultural Statistics, New Delhi. He is an elected Member of the General Council of the University of Edinburgh, UK and was Council Member of International Statistical Institute, Netherlands during 1989 to 1993, a Council Member (1988-91) and President of the International Biometric Society, USA (Indian Region) during 1997 to 1998. He was President of the Statistics Section at the 70th Session of the Indian Science Congress Association held at Tirupati in January 1983. He was Secretary (1982-94), Vice President (1995-96) and Sessional President (1993) of the Indian Society of Agricultural Statistics, New Delhi. At present, he is guiding the Indian society of Agricultural Statistics as Executive President. He was Vice President and later President of the Indian Society of Agricultural Sciences, New Delhi. He was Treasurer of the National Academy of Agricultural Sciences during 1992 to 1997 and a Council Member of the Indian Mathematical Sciences, Delhi since 2000. He was a Member of the Executive Council of the Indian Society of Animal Genetics and Breeding, New Delhi, a Member of the Bernoulli Society of Mathematical Statistics and Probability, Indian Society of Medical Statistics, Indian Econometric Society, Indian Society of Human Genetics and the Computer Society of India. He was Chairman of the Editorial Board of the Journal of the Indian Society of Agricultural Statistics, New Delhi; Corresponding Editor of the Journal of Proceedings of the Royal Society, London, UK; Member, Editorial Board of Indian Journal of Pure and Applied Mathematics, Indian Journal of Genetics and Plant Breeding, Indian Association for Animal Production and Indian Dairyman. He is a Reviewer of the Mathematical Reviews published in the American Mathematical Society, USA. He is a Member of the American Statistical Association, USA.

Professor Narain was awarded Rafi Ahmad Kidwai Memorial Prize in 1977 by the Indian Council of Agricultural Research. He received G.P. Chatterjee Memorial Lecture Award in 1987 from the Indian National Science Academy. In 1991, he was honoured with the title of Sankhyiki Bhushan by the Indian Society of

Agricultural Statistics and under its auspices, he delivered Dr. Rajendra Prasad Memorial Lecture in 1993. In 1992, he received Shri Om Prakash Bhasin Foundation Award for Science & Technology in the field of agriculture and allied sciences. The Mathematical Association of India conferred on him the distinguished Service Award in 1993 and under its auspices he delivered Prof. R.S. Verma Memorial Lecture in 1985. Under the patronage of the Indian Mathematical Society, he delivered Prof. Shanti Narayan Memorial and Prof. K.G. Ramanathan Memorial Lectures in 1990 and 1993 respectively. He was awarded Dr. M.S. Randhawa Medal by the National Academy of Agricultural Sciences in 1999. In 2003, he was decorated with the highest award in Statistics in India viz. 'National Award in Statistics 2001-2002 in memory of Prof. P.V. Sukhatme' by the Ministry of Statistics and Programme Implementation, Government of India, New Delhi.

Professor Narain has published over 275 research papers/reports in Indian and foreign journals and has authored seven books, ten book chapters and edited five books.

I wish Professor Prem Narain a long, healthy and productive life.

V.K. Gupta

National Professor, ICAR and
Chair Editor, Journal of the Indian
Society of Agricultural Statistics