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**Indian Society of Agrophysics**  
Division of Agricultural Physics  
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## PREFACE

Befitting the occasion of the Golden Jubilee Celebration of India's independence a National Seminar on the 'Advances in the Studies of Physical Environment for Resource Management and Sustainable Crop Production' was organized by the Indian Society of Agrophysics during March 23-25, 1998 at the Indian Agricultural Research Institute, New Delhi. While the abstracts of all papers were printed during the National Seminar, paucity of financial resource became a hurdle in the publication of the proceedings of the Seminar. While constant endeavour was made to collect some fund, the Executive Committee, other Senior Scientists and Patrons, after taking considered opinions of the members of the Society, decided that the Indian Society of Agrophysics should publish a journal named 'Journal of Agricultural Physics'. It was also recommended that the papers presented in the above National Seminar might constitute the first one or two volumes of the Journal.

The present volume of the Journal of Agricultural Physics consists of thirty nine papers presented in the National Seminar on different themes such as characterization of physical environments of soils and plants, alleviation of soil physical constraints to crop production, use of remote sensing and GIS in resource inventories and management, crop weather relations and weather forecasting in relation to crop production etc. All the papers including invited articles have been peer reviewed. A few more papers of the National Seminar are proposed to be published in the next volume.

The publication would not have been possible without the support, assistance and cooperation of a large number of friends and colleagues, Dr. A.K. Singh, Secretary of the Society, Drs. U.K. Chopra, C.V.S. Sastry, H. Chandrasekharan and R.N. Garg who made sustained efforts and corrected the proofs to bring in uniformity of style of presentation to the extent possible. I am grateful to each one of them for their whole-hearted contribution. Constant guidance and helpful suggestions offered by the Organizing Committee of the Seminar and particularly Prof. R.B. Singh, Chairman of the Organizing Committee and former Director, IARI, and Dr. B.P. Ghildyal, President of the Indian Society of Agrophysics are gratefully acknowledged. My heartfelt thanks are due to Dr. C. Dakshinamurti, former Head of Agricultural Physics Division and Project Director, Water Technology Centre, IARI for his inspiring guidance and advice in bringing out the proceedings. I also thank M/s. Ashok Computers for the cooperation in bringing out the present volume.



**D.K. Das**

Organizing Secretary of the National Seminar

## FOREWORD

By 2020 AD India would need about 260 million tonnes of food grains to feed its ever-growing population of the order of 1.3 billion. Augmentation and sustenance of food production of such magnitude require judicious management of scarce but vital soil and water resources vis a vis maintenance of soil health and prevention of degradation of environment. All these require a thorough understanding of the nature and quantification of the physical environment of the soils and plants as affecting crop growth and yield. Since independence rapid strides have been made in the studies on dynamic interactions governing the transport and energy exchange process in the soil-plant-atmosphere continuum, on soil physical processes for amelioration of problem soils and application of new physical techniques such as remote sensing, geographic information system (GIS), information technology (IT), simulation modelling etc. in agricultural research and development. However, in most of the Agricultural Universities and other Agricultural Research and Development Organisations, detailed literatures on these subjects are not available.

The Indian Society of Agrophysics was established in 1985 with the objectives to promote basic and applied research in the fields of Physics of Soil and Plant Environment, to provide a forum for the scientists to express and exchange views on multi-disciplinary scientific matters, to collect, collate and disseminate information on Physics of Soil and Plant Environment, including soil physics, geo-hydrology, micro-meteorology, agro-ecology, remote sensing, GIS and information technology etc. in relation to crop production by organizing symposia, seminars and conferences and to publish a journal covering all these aspects. The Society had earlier arranged meetings of scientists and published monographs on Physical Environment of Rice Ecosystem, Management of Stress Environment for Sustainable Crop Production etc. However, the objective to bring out a scientific journal could not be materialized due to unavoidable reasons.

The Society in collaboration with the Division of Agricultural Physics at the Indian Agricultural Research Institute organized a National Level Seminar on "Advances in the Studies of Physical Environment for Resource Management and Sustainable Crop Production" during March 23-25, 1998, as a part of the celebration of the Golden Jubilee Year of India's independence. On the eve of the new millennium, the objectives of the Seminar were to review and take stock of the current status of the knowledge and technologies related to assessment and monitoring of the physical environment and to formulate sound planning strategies for economic and efficient use of resources. The society has taken a bold step in publication of a journal named "Journal of Agricultural Physics". The first volume of the journal consists of invited and a few contributed papers presented in the above National Seminar. A few more papers including the recommendations of the Seminar would be published in subsequent issues of the journal.

I hope that the journal published by the Indian Society of Agrophysics will provide the readers with the latest information on physical environment in relation to crop growth and serve as a very useful reference material to students, research workers and teachers on recent technologies and its application for agricultural resources management.

I wish to convey my congratulations to all the concerned scientists and other associated the Indian Society of Agrophysics for successful organization of the National Seminar and also for printing the papers in the form of a well-edited journal volume that will go a long way in scientific and efficient utilization of resources for sustainable agriculture.



**B.P. Gildyal**  
President

Indian Society of Agrophysics

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