

Management of Saline & Waste Water in Agriculture

S.K. Gupta | I.C. Gupta



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About the Authors



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Dr. I.C. Gupta (b. 1941), was awarded Ph.D. on a subject thesis of environmental soil science by CAZRI/University of Jodhpur in 1968. He worked at Central Soil Salinity Research Institute from 1970 (Junior Soil Chemist) to 1986 (Principal Scientist). Dr. I.C. Gupta served Central Arid Zone Research Institute from 1986 to 2001 where he worked as Head of Regional Research Station, Bikaner (1986-1990) and Head, Division of Natural Resources and Environment (1999-2001). A Fellow of Indian Water Works Association, United Writers Association of India & Indian Society of Salinity Research Scientists, Dr. Gupta was elected Vice-Chairman of Arid Zone Research Association of India (1998-99). He has been working as Secretary of Indian Society of Salinity Research Scientists & Chief Editor Current Agriculture since 1977. Dr. Gupta had been conferred several awards notable being Glaxo Scientific Honours Club (1980), Dr. Rajendra Prasad Puraskar, First Prize (1984), Outstanding Book Award by ISAE (1989), Dr. Gorakh Prasad Puraskar First Prize (1995), S.P. Unvala Memorial Prize by IWWA (2000) and Bharat Mata Award by Indian Astrological Research Institute (2001). He was nominated as member of the 'Environment Conservation Council of Rajasthan' and of 'Special Committee on Environment Impacts' of INCID, Ministry of Water Resources, Govt. of India. He has about 250 publications including 30 books and two inventions (Jaltripti and Jalshuddhi).

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PREFACE

Water is a renewable natural resource. On an average, about 110,000 km³ of water is received over the globe out of which Indian share is about 4000 km³ or roughly 4%. Given the huge human and animal population that India needs to support, we still have sufficient surface water/capita-annum, which is near about the comfortable level of 1700 m³/capita-annum. However, the situation may not remain so as the projected values for 2025 and 2050 are 1340 m³/capita-annum and 1140 m³/capita-annum. Even these average values hide the real facet of our water resources having large spatial and temporal variations. These variations result in cycles of water scarcity and excess over regions at the same time or in a region at different times. Even when water is in excess, pollution of water is playing havoc with our surface and ground water resources.

Agriculture has been and would continue to be the major consumer consuming more than 80% of the water being used, remaining being allocated to the other sectors. On the contrary, agriculture is the only sector that can compromise on water quality while other sectors vie only for the fresh water. These sectors release about 70-80% of the fresh water supplied albeit of impaired quality. Burgeoning population, urbanization, higher standard of living and changes in eating habits are resulting in increased demand of the domestic and industrial sectors at a much faster rate than anticipated in any projection. Thus, all eyes are upon the agricultural sector to absorb the naturally occurring poor quality or waste waters released after first use by other sectors and spare a part of the fresh water currently being used in agriculture. Since water is slowly emerging as economic good, fresh water in any case is going to be snatched by other sectors which are capable to pay more per unit of water. Thus, use of saline water and the waters that have been used once and have not yet lost their potential for use in agriculture need to be exploited for crop production. For arid and semiarid regions, the use of saline water in agriculture is otherwise of vital importance as fresh water through inter-basin transfer of water is limited. Moreover, water logging and soil salinization, inevitable consequences of the irrigation through inter-basin transfer, can only be delayed or minimized by exploiting saline ground water.

The book, in its current format, is fully revised and enlarged version of the earlier publication titled "Use of Saline Water in Agriculture: A Study of Arid and Semi-arid Zones of India". It provides comprehensive information on the extent and distribution of saline/alkali/toxic waters, quantum of waste waters generated and gives an insight into the characteristics of these waters. The latest information on technologies available for scientific use of saline/alkali/waste waters has been

included. While doing so, we purposely retained the old information, a treasure of scientifically generated data, which may sensitize the new generations to emulate their predecessors in devising science based cost effective technologies. A chapter on management of waste waters has been included as these waters are going to be the 21st century water resource for agriculture and ground water augmentation. The technologies are discussed in a self explanatory manner so that it helps the field officers and workers to learn about the latest technologies in a practical manner.

It is our bounden duty to place on record the advice and inspiration received from late Dr. J.S.P. Yadav, Formerly Chairman, ASRB and Ex-Director of the Central Soil Salinity Research Institute, Karnal, while preparing the first and later editions of this book. Although, he is not amongst us today but his heavenly blessings has made us to accomplish this difficult task of assembling the latest information on this vital subject so dear to him. We also thank all those who have helped us in preparing the first three versions of this book. We would like to express our sincere thanks to various teams that are tirelessly working in the laboratories and fields to generate technologies through All India Co-ordinated Project on Research on Use of Saline Water in Agriculture and Management of Salt Affected Soils. Our thanks are due to Dr. S. K. Ambast, Project Coordinator and his teams at SAUs who have provided full support and help during the preparation of the revised version.

In the revised format, we have tried to include many issues that are in the course curricula of various universities related to salt stress management. We sincerely believe that the book in its present format would be quite useful to the students, researchers, planners and policy makers and the officers of the line departments. We are confident that this book would help to strengthen the water supply management scenario in agriculture and generate awareness on these new resources of water. We would welcome any feedback and suggestions/comments from the readers so that the same can be incorporated in future editions of this publication.

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