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GENERAL FOREWORD

AGRONYOMY—An ASA Monograph Series

Several years ago members of the American Society of Agronomy realized the need for comprehensive treatments of specific subject-matter areas in agronomy. A series of monographs entitled “Agronomy” resulted and the first number was published in 1949. The Academic Press, Inc., of New York was the first publisher of the monographs, since the society, a nonprofit organization with no cash reserve, was not initially able to finance the project. In fact, the first six volumes of the series, which were edited by Dr. A. C. Norman, were published by Academic Press, Inc., the source from which they are available today.

During the period 1949–1957 the American Society of Agronomy developed considerably. By 1957 the society operated a headquarters office in Madison, Wisconsin, with a competent editorial staff. Its financial position had improved to the extent that it was able to pursue the monograph project independently, including complete financing and publishing of the series. In recent years this activity of the society has flourished.

Irrigation of Agricultural Lands is the 11th monograph of the Agronomy series. It comes at a time when the science and application of irrigation practices are crucial factors in areas where a delicate balance exists between the supplies of food and fiber and the demands of an exploding population. The subject of irrigation has attracted international attention for many years although scientists of different nations have not always agreed on its underlying principles. The scope of this monograph and the geographical distribution of the authors affirm its importance in serving the needs of scientists throughout the world. The American Society of Agronomy proudly presents this publication for the benefit of mankind.

The eighth number in the series was Drainage of Agricultural Lands. Already a supplement to this monograph is in preparation because of recent advances made in the subject and the heavy demand for current information. This publication on irrigation is a timely supplement to the overall subject of water for agriculture.

Two additional Agronomy monographs will be appearing in 1967. Number 12 will be entitled Soil Acidity and Liming and number 13 will be entitled Wheat and Wheat Improvement. Since soil acidity and liming are important problems affecting crop production in most, if not all, of the world’s agricultural nations and since wheat is undoubtedly one of the most important world grain crops, it is felt that these two publications will find wide application and will be of significant educational value.

In 1965, Agronomy monograph 9 on Methods of Soil Analysis was printed in two parts: “Part I—Physical and Mineralogical Properties, Including Statistics of Measurement and Sampling” and “Part II—Chemical and Biological Properties.” Monograph 10, Soil Nitrogen also appeared in late 1965 with a comprehensive treatment of the role of this all important plant nutrient in the soil environment. It might be added that monograph 7, the first published by the American Society of Agronomy, was on the subject of Oats and Oat Improvement. Copies of all volumes of the Agronomy monographs beginning with No. 7 through No. 13 may be obtained from the American Society of Agronomy, 677 South Segoe Road, Madison, Wisconsin, 53711.
The fact that the Agronomy monograph series consists of titles primarily in the areas of soil science and crop science should come as no surprise. Members of the American Society of Agronomy are for the most part also members of the Crop Science Society of America and the Soil Science Society of America. The latter societies are outgrowths of the American Society of Agronomy and, in spite of their autonomy and completely separate professional identities, are still closely associated with the founding society. This tri-society association has made it possible for ASA, CSSA, and SSSA to work harmoniously together, to share headquarters office and staff in Madison, and to publish material such as is found in this monograph series in the furtherance of their many mutual professional and scientific objectives.

January, 1967

Matthias Stelly
Executive Secretary-Treasurer
AMERICAN SOCIETY OF AGRONOMY
CROP SCIENCE SOCIETY OF AMERICA
SOIL SCIENCE SOCIETY OF AMERICA
FOREWORD

The application of water to agricultural lands for the purpose of irrigation is one of the alternate uses of this natural resource in many areas. It is essential that water be used effectively and efficiently, whether the supply is limited or excessive.

The practice of irrigation has sometimes been considered to be more of an art than a science. However, present knowledge as revealed in this monograph tends to belie this concept. Brought together in one comprehensive volume by authorities in many professional fields are the principles that form the basis of scientific irrigation—from development of water to its use and reuse. Because of the breadth of material covered and the depth in which it is reviewed, this publication by the American Society of Agronomy will be valuable to all those involved with irrigation, whether in teaching or research, development or practice, or decision making.

The need for a unified reference book for the encouragement and improvement of academic courses in irrigation has been urgent. For despite the growing recognition of its importance, irrigation is now being taught in relatively few institutions and the scope of existing courses varies widely. Where irrigation is taught from the engineering viewpoint, the soil, plant, and agricultural aspects of the subject may not receive sufficient emphasis. Where instruction is given from the viewpoint of the crop and soil scientist, little attention may be given to the engineering aspects of irrigation. This monograph covers the subject from a variety of viewpoints so that it should be useful to instructors and students in all disciplines concerned.

Irrigation of Agricultural Lands should increase the utilization of knowledge now widely scattered in many publications and stimulate new research. It should bring about increased awareness of the information available from other disciplines. It should promote effective cooperation between engineers, soil and crop scientists, and other professional groups whose combined efforts are needed to attain an abundant and permanently successful irrigation agriculture.

The officers and members of the American Society of Agronomy wish to acknowledge the tremendous effort and time expended by the editors, contributing authors, and all others concerned with the preparation of this monograph.

January 1967

ROBERT S. WHITNEY, President
American Society of Agronomy
Economic and social development depends upon the achievement of increased agricultural production. This often requires the opening of additional lands to agriculture through new irrigation projects or the improvement of existing irrigation systems and practices to ensure efficient water use and continued productivity. A recent report of the Food and Agriculture Organization of the United Nations suggests that: "... improved water management (including irrigation and drainage practices) can probably do more towards increasing food supplies and agricultural income in the irrigated areas of the world than any other agricultural practice." Science and technology in soils, water, plants, and engineering are now sufficiently advanced, if properly implemented, to transform irrigation from an age-old art into a modern science.

Irrigation needs and practices necessarily vary widely. This greatly complicates the planning of new irrigation projects or the operation of existing irrigation systems and irrigated farms. Yet one important benefit of science is the ability to predict what results can be expected in given situations. To make such predictions for situations related to irrigation, the skillful combination of knowledge in such professional fields as climatology, geology, ecology, crop science, soil science, water science and engineering, economics, and other social sciences is essential. The lack of a unifying reference work related to irrigation has made it difficult to locate and utilize the best available knowledge from these many disciplines. There is also an urgent need for a unifying reference work to encourage and improve the teaching of irrigation. Few institutions now offer instruction covering all aspects of irrigation.

Irrigation of Agricultural Lands is designed to provide a comprehensive treatment of the broad field of irrigation. So that the monograph would represent a synthesis of concepts and experiences from many sections of the world, author teams for most chapters were deliberately selected to represent widely separated geographic areas and points of view. Although this monograph emphasizes soil and plant factors involved in planning and operating an irrigation enterprise, chapters are included that summarize knowledge of other factors requiring consideration. The discussion of economics is limited to certain economic principles because their application will vary so greatly among the countries of the world. For similar reasons, legal aspects of irrigation projects have been omitted. Construction details for irrigation works are not included because of the great variety of methods and materials used and the availability of engineering publications, some of which are referenced in this monograph.

This monograph is a comprehensive reference volume which summarizes basic theories, outlines principles, and illustrates applications in practice, and is not a handbook or "how-to-do-it" manual. In some of the 62 chapters, detailed, highly theoretical discussions are presented; in others, theories and principles are illustrated by summarizing irrigation practices found useful in a variety of situations. Such information is of value to both water supply organizations and agriculturalists in the planning, design, and operation of irrigation projects. Detailed bibliographies at the end of each chapter.
provide references for specialists in each field. This monograph should be useful in any part of the world regardless of the local climate, water supply, soils, and crops.

Although *Irrigation of Agricultural Lands* is published by the American Society of Agronomy, its preparation has involved generous contributions by members of the American Society of Agricultural Engineers, American Society of Civil Engineers, American Society of Plant Physiologists, and several other professional societies. The Editors wish to express their most sincere appreciation to the authors, to the numerous reviewers, and to the officers and staff of the American Society of Agronomy for their contributions, patience, and understanding over the many years involved in completing this monograph.

January, 1967

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