Agricultural Engineers' Handbook


The handbook contains a wealth of information in condensed form previously available only in many books and bulletins. This book will be a convenient and excellent reference for practicing agricultural engineers. For engineers with one specialty, the handbook will not be completely adequate for that specialty, but will provide quick reference to related subjects. Members of SSSA will be primarily interested in Section II, Soil and Water Conservation, parts of Section I, Crop Production Equipment, and parts of Section IV, Basic Agricultural Data. Briefly the 880-page handbook contains the following material of interest to members of SSSA:

SECTION I—CROP PRODUCTION EQUIPMENT, C. B. Richey, Editor—Chapters 1 to 10 cover the principles of: economics of farm machinery, design of farm machinery, power transmission elements, wheels and tires, stress measurement and strength analysis, tractor force reactions, tractor design objectives, tractor performance tests, fuels and combustion, and power controls for implements. Chapters 12 to 19 have information that will be of direct use to SSSA members. The chapters briefly present tillage objectives, principles and characteristics of moldboard plows, disk tools, shovel and sweep tools and minor tillage tools; objectives, principles and characteristics of fertilizing and liming machines, seeding and planting machinery, sprayers and dusters, and mowers and crushers. Chapters 20 to 33 cover the principles and characteristics of rakes, hay handling equipment, balers, forage harvesters and blowers, combines, corn-harvesting machines, cotton-harvesting machines, root-harvesting machines, specialized harvesting equipment, stalk and brush shredders, farm transport equipment, tractor loaders, feed grinders, and feed elevating and conveying equipment.

SECTION II—SOIL AND WATER CONSERVATION, Paul Jacobson, Sub-editor.—Section II was written primarily by USDA, SCS personnel presenting material not readily available to the general public, but currently in general use. Some chapters give step by step design procedures, others give primarily principles depending on the author. Most chapters provide references for more detail.

Chapter 34, Principles of Agricultural Hydrology, by Lloyd L. Harrold—A brief presentation of agricultural hydrology with charts and tables for estimating purposes. Procedures presented are simple and examples are provided. This reference is sufficient for preliminary estimates but is inadequate for detailed studies or large projects.

Chapter 35, Land Leveling and Grading, by John T. Phelan—A good brief summary of the various techniques used to obtain contoured elevations for land leveling.

Chapter 36, Agricultural Drainage, by John C. Sutton and Keith H. Beauchamp—A good summary of practical procedures for designing small systems for draining agricultural lands. Charts and tables are provided with examples. The section on drainage of irrigated lands lacks sufficient detail.

Chapter 37, Mechanics of Water Erosion, by Paul Jacobson—Tables and equations for estimating erosion under different cropping and management practices for various slopes and soils in the Corn-Belt States and the Northeastern States are presented.

Chapter 38, Terraces and Diversions, by Paul Jacobson—Practices with tables and charts are provided for spacing and designing terraces and diversions.


Chapter 41, Control Structures, by Fred W. Blaisdell and Arthur F. Moratz—A good brief summary of hydraulic design criteria with equations, charts and tables. The foundation for preliminary section is brief and does not cover the in-depth book procedures. Use of this chapter will require engineering training in the subject matter.

Chapter 42, Water Management, Conservation Use, and Legal Aspects, by Edward W. Matson—A brief summary of the principles of farm ponds, water spreading, water supply forecasting, legal principles of water rights and flood prevention.

Chapter 43, Wind Erosion and Its Control, by Austin W. Zingg—A brief summary of principles of wind erosion and erosion control.

Chapter 44, Irrigation, by Wayne D. Criddle—A good summary of design procedures and consideration of other factors involved in the design of irrigation systems.

SECTION IV—BASIC AGRICULTURAL DATA.—Chapter 55, Livestock, by C. F. Kelley—A good summary of the thermal environment and its effects on production, heat and moisture loss, and feed and water requirements. A number of references are listed for more detail.

Chapter 56, Soil—A summary of Soil Formation and Classification by H. H. Krueger; Soil Physical Properties by Don Kirkham, Soil Plant Food (Nutrients) and Use of Fertilizer by O. T. Coleman. A number of references are listed for more detail.

Chapter 57, Farm Climates and Solar Energy—A good condensation of: climate classification, precipitation due to natural convection or mountains and weather fronts, sunshine on horizontal, vertical, and sloped surfaces, surface wind and probabilities of maximum velocities, summer temperatures and humidities, Thornthwaite's evapotranspiration and climatic moisture index, effects of surroundings, slope, exposure and elevation, annual graphs of climatic factors and essential climatic maps for the United States. Numerous charts and tables are presented.

A subject matter index is provided at the end of the book—

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Our Soils and Their Management


This new edition of Dr. Donahue's book should be widely available by high school vocational agriculture departments over the country and by many farm and city readers with an interest in the soil. While it is a simplified discussion, aimed to serve those without an extensive knowledge of chemistry, geology, and the other sciences, it will not be especially useful in reading even for the average high school student. It may serve better as a reference book in vocational agriculture libraries than as a text for these classes.

This edition is largely reorganized and enlarged (an additional 122 pages). It contains 20 chapters. The first 13 chapters deal with the soil itself, its importance in crop production, how to judge land (a 44-page section), the importance of organic matter, and of lime and fertilizers, and brief accounts of the necessity and usefulness of tillage, water and soil conservation measures, and irrigation and drainage practices. The last 7 chapters point up the special problems and may be involved in the wise use of soil and water for field crop, garden, lawn, pasture, rangeland, orchard, and forest production. Three appendices are included: (a) the addresses of the agricultural experiment station and of the Soil Conservation Service's state office in each state, (b) a series of conversion factors of general usefulness, and (c) a short glossary or "definition of terms."

Reference to the soil's literature is included as footnotes to tables of data and in reference sections at the end of each chapter. Some of the references will be easy to obtain—USDA Yearbook of Agriculture, and state experiment station and USDA publications such as circulars and bulletins. However, some of the reference publications will likely be difficult for readers away from college or university campuses to obtain.

The discussion is clear and down-to-earth. Illustrative material is used profusely. There are over 300 photographic reproductions, sketches, line drawings, and charts. A great deal of tabular material is also included. Considerable space is given to demonstrations to explain soils and soil management practices to adults or to young people. Proposed dialogue for some of these demonstrations is given in several chapters.

The main emphasis in this, as in the first edition, is on the management of the soil as it is involved in the production of food and fiber. Little attention is given to the soil as a natural body, except as this information may be necessary to explain why and how the management practices. While the book has an American slant, the universality of soil management principles is emphasized time and again.

While this is not a book that will be read simply for pleasure, it should prove very valuable for adult and young people. The student will read this elementary yet comprehensive discussion of soils and soil management.—J. A. HOBBS, Kansas State University, Manhattan.