

CROP PRODUCTION

FIFTH EDITION
DELOIT GREUB AHLGREN

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CROP PRODUCTION, Fifth Edition

Richard J. Delorit, Louis J. Greub, and Henry L. Ahlgren

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ABOUT THIS BOOK

More than thirty years have passed since the introduction of *Crop Production* during which the text has undergone four major revisions. New crop species have been added to the text while others have been deleted. New additions to the Fifth Edition are a chapter on sunflowers, one dealing with energy and agriculture, and the incorporation of processing peas into the field pea chapter.

The authors have again attempted to present information which is most pertinent for each crop or area and to avoid dealing with generalities which are of little value to the student. Included under each crop is a discussion of the most common diseases and insects.

Chapter 1 should serve as an introduction to the role of modern-day crop production in providing for our food, feed, and fiber needs. It also deals with the energy needs of American agriculture, energy-intensive vs. labor-intensive types of agriculture, alternative sources of energy being considered, and efforts to increase the efficiency of crop production.

Because students must possess a basic knowledge of plant growth and reproduction to understand most crop production practices, Chapter 2 should be studied before beginning any of the chapters on specific crops. It is also suggested that the study of forage legumes begin with the alfalfa chapter because certain cultural practices common to most legumes are presented in detail in this chapter and have been omitted in the discussion of other forage legumes. Some of the tillage practices which are common to both corn and soybeans are discussed in the chapter on corn but not in the soybean chapter. With these exceptions, all of the other chapters may be studied in any sequence desired.

With a few exceptions, the scientific names of weeds, diseases, and insects have been omitted from the discussions; these are presented in the appendix. Also included in the appendix are definitions of the terms which have

been set in boldface type. An understanding of these terms will be helpful to students.

The authors appreciate the suggestions that have been made by vocational agriculture teachers and other professional workers. These suggestions have been helpful in the preparation of the Fifth Edition of this text.

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1 AGRICULTURE, ENERGY, AND FOOD PRODUCTION

Agriculture is the business of food production, and agronomy is the study of the principles and practices of crop production. Food is literally the sun's energy transformed into products such as bread, milk, orange juice, cereal, a baked potato, or a hamburger, all of which have important roles in sustaining human life.

In the lesser developed Third World Countries, food is produced only through the use of vast amounts of human labor with 75 to 80 percent or more of the population directly involved in farming activities. By contrast, food production in the United States is accomplished by only three percent of the population but depends heavily upon extensive mechanization and the use of energy from oil, gas, and in some areas electricity produced by nuclear power. A number of Third World Countries do not produce enough food for their own needs, while the United States often has surpluses and in recent years has exported millions of

tons of corn, wheat, soybeans, and other products to foreign countries. Approximately 150 million metric tons of agricultural products having a total value of 43.8 billion dollars were exported in 1981.

PRODUCTIVITY OF AMERICAN AGRICULTURE

We are fortunate because our country has vast areas of land where soils are ideally suited for growing crops. Most of the good soil areas also receive ample rainfall or can be readily irrigated and have a climate that otherwise provides good growing conditions.

A large share of the credit for our extremely productive agriculture must also be given to the high priority which the legislators of our nation placed on the development of agricultural education, research, and mechanization. The early establishment of agricultural universities within each state, the teaching of vocational agriculture in

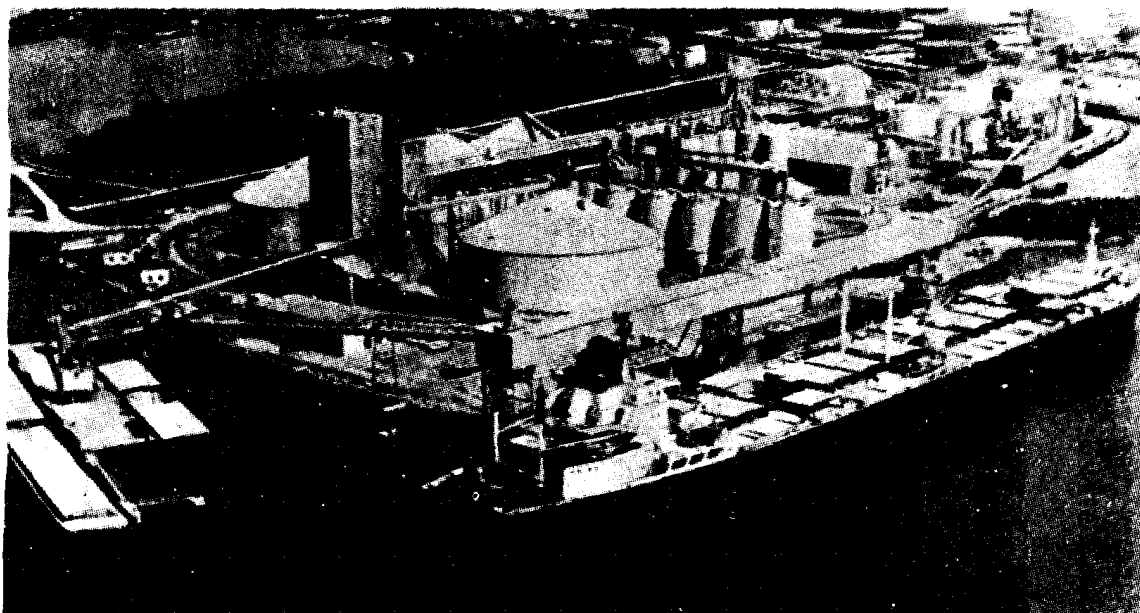


FIGURE 1-1. Loading grain for export at an eastern United States port. (Courtesy Cargill Co.)

high schools and to farmers, the high priority placed on research, and the establishment of an agricultural extension service were largely American innovations which had not been a part of the Old World tradition. The strong emphasis given to agricultural development in early America persisted for many years, but recently has dwindled and in some cases has even been neglected. This is due in large part to the fact that Americans have long enjoyed an abundance of high quality food at low prices which in turn has come to be considered a right rather than a blessing. The vast majority of our population has little or no direct contact with food production and is largely unaware of the part that research and education have played in developing a highly productive agricultural system. Abundance is a product of excellence but its value is seldom understood.

THE IMPORTANCE OF AN EFFICIENT, PRODUCTIVE AGRICULTURE

People in the United States spend only about 16 to 17 percent of their income for food while in the lesser developed countries such as India, 60 to 90 percent of a person's

income is required. In the United States one farmer, assisted by two other people in agricultural businesses and services, produces enough food for over 70 other people. This means that those 70 to 80 others can go about providing the vast array of manufactured goods and professional services which we value and desire to make life more comfortable and enjoyable.

A potential disadvantage of this system is that it is almost completely mechanized and thus is highly dependent upon a constant supply of fossil fuel energy. Currently this energy is provided by gasoline, diesel fuel, natural gas, and electricity. As the costs of these energy sources increase, the price of food will have to increase or else farmers will eventually be forced out of business. As fossil fuel supplies diminish, other energy sources will have to be found.

ENERGY REQUIREMENTS OF AGRICULTURE

Production agriculture uses about six percent of the nation's total energy requirement. Because it uses such a small percentage of the total energy consumed, farmers' conservation measures have little potential