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AGRICULTURAL TERMS

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ABSTRACT

agriculture, science and practice of producing crops and livestock from the natural resources of the earth. The primary aim of agriculture is to cause the land to produce more abundantly and at the same time to protect it from deterioration and misuse. The diverse branches of modern agriculture include agronomy, horticulture, economic entomology, animal husbandry, dairying, agricultural engineering, soil chemistry, and agricultural economics.

Early people depended for their survival on hunting, fishing, and food gathering. To this day, some groups still pursue this simple way of life, and others have continued as roving herders. However, as various groups of people undertook deliberate cultivation of wild plants and domestication of wild animals, agriculture came into being. Cultivation of crops—notably grains such as wheat, rice, corn, rye, barley, and millet— encouraged settlement of stable farm communities, some of which grew to be towns and city-states in various parts of the world. Early agricultural implements—the digging stick, the hoe, the scythe, and the plow— developed slowly over the centuries, each innovation (e.g., the introduction of iron) causing profound changes in human life. From early times, too, people created ingenious systems of irrigation to control water supply, especially in semiarid areas and regions of periodic rainfall, e.g., the Middle East, the American Southwest and Mexico, the Nile Valley, and S Asia .

Farming was often intimately associated with landholding (see tenure) and therefore with political organization. Growth of large estates involved the use of slaves (see slavery) and bound or semifree labor. In the Western Middle Ages the manorial system was the typical organization of more or less isolated units and determined the nature of the agricultural village. In Asia large holdings by the nobles, partly arising from feudalism (especially in China and Japan), produced a similar pattern.

Materials and methods

As the Middle Ages waned, increasing communications, the commercial revolution, and the rise of cities in Western Europe tended to turn agriculture away from subsistence farming toward the growing of crops for sale outside the community (commercial agriculture). In Britain the practice of inclosure allowed

landlords to set aside plots of land, formerly subject to common rights, for intensive cropping or fenced pasturage, leading to efficient production of single crops .

In the 16th and 17th cent. Horticulture was greatly developed and contributed to the so-called agricultural revolution. Exploration and intercontinental trade, as well as scientific investigation, led to the development of horticultural knowledge of various crops and the exchange of farming methods and products, such as the potato, which was introduced from America along with beans and corn (maize) and became almost as common in N Europe as rice is in SE Asia.

The appearance of mechanical devices such as the sugar mill and Eli Whitney's cotton gin helped to support the system of large plantations based on a single crop. The Industrial Revolution after the late 18th cent. Swelled the population of towns and cities and increasingly forced agriculture into greater integration with general economic and financial patterns. In the American colonies the independent, more or less self-sufficient family farm became the norm in the North, while the plantation, using slave labor, was dominant (although not universal) in the South. The free farm pushed westward with the frontier.

Results and discussion

In the N and W United States the era of mechanized agriculture began with the invention of such farm machines as the reaper, the cultivator, the thresher, and the combine. Other revolutionary innovations, e.g., the tractor, continued to appear over the years, leading to a new type of large-scale agriculture. Modern science has also revolutionized food processing; refrigeration, for example, has made possible the large meatpacking plants and shipment and packaging of perishable foods. Urbanization has fostered the specialties of market gardening and truck farming. Harvesting operations (see harvester) have been mechanized for almost every plant product grown. Breeding programs have developed highly specialized animal, plant, and poultry varieties, thus increasing production efficiency. The development of genetic engineering has given rise to genetically modified transgenic crops and, to a lesser degree, livestock that possess a gene from an unrelated species that confers a desired quality. Such modification allows livestock to be used as “factories” for the production of growth hormone and other substances (see pharming). In the United States and other leading food-producing nations agricultural colleges and government agencies attempt to increase output by disseminating knowledge of improved agricultural practices, by the release of new plant and animal types, and by continuous intensive research into basic and applied scientific principles relating to agricultural production and economics.

These changes have, of course, given new aspects to agricultural policies. In the United States and other developed nations, the family farm is disappearing, as industrialized farms, which are organized according to industrial management techniques, can more efficiently and economically adapt to new and ever-improving technology, specialization of crops, and the volatility of farm prices in a global economy. Niche farming, in which specialized crops are raised for a specialized market, e.g., heirloom tomatoes or exotic herbs sold to gourmet food shops and restaurants, revived or encouraged

some smaller farms in the latter 20th and early 21st cents., but did little to stop the overall decrease in family farms. In Third World countries, where small farms, using rudimentary techniques, still predominate, the international market has had less effect on the internal economy and the supply of food.

Most of the governments of the world face their own type of farm problem, and the attempted solutions vary as much as does agriculture itself. The modern world includes areas where specialization and conservation have been highly refined, such as Denmark, as well as areas such as N Brazil and parts of Africa, where forest peoples still employ “slash-and-burn” agriculture—cutting down and burning trees, exhausting the ash- enriched soil, and then moving to a new area. In other regions, notably SE Asia, dense population and very small holdings necessitate intensive cultivation, using people and animals but few machines; here the yield is low in relation to energy expenditure. In many countries extensive government programs control the planning, financing, and regulation of agriculture. Agriculture is still the occupation of almost 50% of the world's population, but the numbers vary from less than 3% in industrialized countries to over 60% in Third World countries.

The Agricultural Revolution was discovered, named, and studied in the 1920s through the 1940s. In 1950 it was renamed the Neolithic Revolution by (Vere) Gordon Childe, who is often considered the main early worker in the study of the Agricultural Revolution.

The Neolithic adoption of a new way of life was easy to explain before 1950. The theory was that farming is better than hunting and gathering; so when people found out about farming they stopped hunting and gathering and settled down in villages. Many scientists today, however, believe that farming is not better than hunting and gathering. People knew how to farm for a long time before they bothered to make it a main way of life. There is some evidence that people had known for at least 20,000 years that a single seed planted in the ground could grow into a plant with many seeds on it. Many people who knew how to farm never stopped hunting or gathering. Careful studies have shown that hunter-gatherers have more leisure and a better diet than farmers. People also settled down into permanent villages before they started farming.

Also, it seems very odd that the Agricultural Revolution occurred at quite close to the same time in the Near East, in Southeast Asia, in what is now Mexico, in South America, and in what is now China. Thus, a different explanation for the Agricultural or Neolithic Revolution was required, and many archaeologists have offered their opinions. Here are some of the more popular theories as well as one or two idiosyncratic ideas.

There Were Too Many People. Population pressure caused local environments to become exhausted, and people had to find new sources of food. Diminishing resources caused by population growth finally forced people to do the hard work of planting and harvesting. To replace lost game, people began to breed their own animals for meat and fiber (with milk as a side benefit). This theory does not explain why some low-density populations clearly started farming before the numbers grew (as in highland Mexico). Something else must be involved in this case. All in all, there is less evidence

to support high populations before the Agricultural Revolution than there is reason to believe that populations grew rapidly after it .

The Climate Changed. Childe thought that a drier climate induced the Agricultural Revolution in the Middle East by reducing the availability of game and wild food plants. People had to move to oases, where domestication was essential for survival. This idea ran afoul of subsequent studies showing that the Middle Eastern climate did not become drier at the right time. There are other climate-change theories. When the ice caps retreated, for example, people were forced to abandon their reliance on reindeer and mammoths, creatures of the edge of the ice and the tundra. With that major resource gone, some other source of food needed to be found. Similarly, the rise in sea level that accompanied the melting of the glaciers caused people in Southeast Asia to live on less land, resulting in the invention of agriculture there. The problem with the end-of-the-Ice-Age theory is that 1) the Ice Age ended 5000 years too soon for the Agricultural Revolution; and 2) it was not the people living near the edge of the ice or tundra who first started farming.

People Moved to Town. One good reason for calling the change the Neolithic Revolution is that more than farming was involved. About a thousand years before agriculture started, people, especially those dependent on trade or on the storage and processing of wild grass seeds (such as wheat), began to live in permanent communities. Even if the region as a whole still had good food resources, the immediate vicinity of such communities would soon run short of both wild grasses and game. Domestication of plants and animals saved village life. The problem here is showing why people settled down.

Plants Grow in Garbage. Plant remains tossed out in the garbage by people who had settled down sprouted. This produced new crops from the discarded materials, crops that could be easily harvested. People noticed this and developed the systematic way of throwing out parts of plants that we today term agriculture. Again, the problem is explaining why people lived in one place, near piles of garbage.

Society Became Complex. The longer people were around, the more they developed complex societies that included traders (for which there is good evidence), specialists of all kinds, and people in charge. Such a society, with its division of labor and the need to have wealth that can be accumulated (by the people in charge), is forced into farming. Of course, some present-day or recent hunter-gatherer societies, such as the Native Americans of the northwest coast, developed complex societies without farming - but they had salmon or some similar resource so they did not need to farm .

Articles posted on this website contain terms and phrases that are specific to agriculture or agricultural enterprises and activities. The below definitions (listed alphabetically) should aid in the understanding of the content of these articles and articles that are linked in them.

Abiotic. Environmental factors such as drought, wind, hail, or excess moisture that impact the growth of living organisms. Usually used as “abiotic stresses”.

Adsorb, adsorption. In soil terms, the adhesion of ions (i.e., K+, Ca++) or molecules to the surface of soil particles. This process differs from absorption where

a material–the absorbate–is dissolved in the soil solution.

Broadcast. Fertilizer spread on the soil surface, or herbicides applied across the entire width of a cropped or planted area.

Cover crop. Crop grown to provide soil cover during seasons when an annual grain crop is absent.

Disease. Plant injury from biotic stress resulting from infection by fungi, oomycetes, nematodes, bacteria, or viruses.

Erosion. Undesirable displacement of soil from a site by wind and/or water.

Germplasm. Collection of diverse genetic resources (e.g, soybean seed) that are available to be used in the development of improved breeding lines and varieties.

Nodules. Small bodies or organelles (on the soybean root surface) that contain Rhizobium bacteria.

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