Agriculture

From Wikipedia, the free encyclopedia

Jump to navigationJump to search

"Farming" redirects here. For other uses, see Farming (disambiguation). For Wikipedia's portal on the subject, see Portal:Agriculture.

Harvesting wheat with a combine harvester accompanied by a tractor and trailer

Agriculture is the science and art of cultivating plants and livestock.[1] Agriculture was the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that enabled people to live in cities. The history of agriculture began thousands of years ago. After gathering wild grains beginning at least 105,000 years ago, nascent farmers began to plant them around 11,500 years ago. Pigs, sheep and cattle were domesticated over 10,000 years ago. Plants were independently cultivated in at least 11 regions of the world. Industrial agriculture based on large-scale monoculture in the twentieth century came to dominate agricultural output, though about 2 billion people still depended on subsistence agriculture into the twenty-first.

Modern agronomy, plant breeding, agrochemicals such as pesticides and fertilizers, and technological developments have sharply increased yields, while causing widespread ecological and environmental damage. Selective breeding and modern practices in animal husbandry have similarly increased the output of meat, but have raised concerns about animal welfare and environmental damage. Environmental issues include contributions to global warming, depletion of aquifers, deforestation, antibiotic resistance, and growth hormones in industrial meat production. Genetically modified organisms are widely used, although some are banned in certain countries.

The major agricultural products can be broadly grouped into foods, fibers, fuels and raw materials (such as rubber). Food classes include cereals (grains), vegetables, fruits, oils, meat, milk, fungi and eggs. Over one-third of the world's workers are employed in agriculture, second only to the service sector, although the number of agricultural workers in developed countries has decreased significantly over the centuries.

Agriculture

History[show]

On land[show]

Hydroculture[show]

Related[show]

Lists[show]

Categories[show]

Agriculture portal

- v
- t
- e

Contents

Etymology and scope

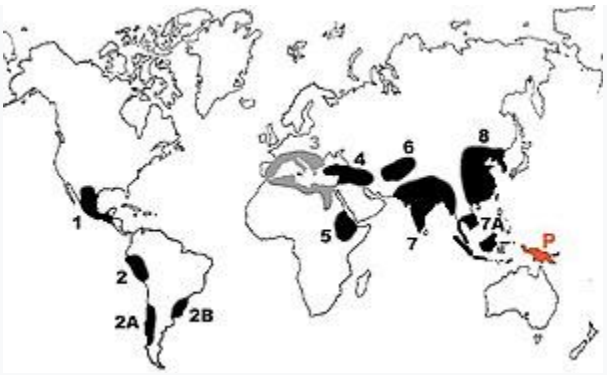
The word *agriculture* is a late Middle English adaptation of Latin ***agricultūra***, from *ager*, "field", and ***cultūra***, "cultivation" or "growing".[2] While agriculture usually refers to human activities, certain species of ant, termite and ambrosia beetle also cultivate crops.[3] Agriculture is defined with varying scopes, in its broadest sense using natural resources to "produce commodities which maintain life, including food, fiber, forest products, horticultural crops, and their related services".[4] Thus defined, it includes arable farming, horticulture, animal husbandry and forestry, but horticulture and forestry are in practice often excluded.[4]

History

Main article: History of agriculture

Origins

Main article: Neolithic Revolution



Centres of origin, as numbered by Nikolai Vavilov in the 1930s. Area 3 (gray) is no longer recognised as a centre of origin, and Papua New Guinea (area P, orange) was identified more recently.[5][6]

The development of agriculture enabled the human population to grow many times larger than could be sustained by hunting and gathering.[7] Agriculture began independently in different parts of the globe,[8] and included a diverse range of taxa, in at least 11 separate centres of origin.[5] Wild grains were collected and eaten from at least 105,000 years ago.[9] From around 11,500 years ago, the eight Neolithic founder crops, emmer and einkorn wheat, hulled barley, peas, lentils, bitter vetch, chick peas and flax were cultivated in the Levant. Rice was domesticated in China between 11,500 and 6,200 BC with the earliest known cultivation from 5,700 BC,[10] followed by mung, soy and azuki beans. Sheep were domesticated in Mesopotamia between 13,000 and 11,000 years ago.[11] Cattle were domesticated from the wild aurochs in the areas of modern Turkey and Pakistan some 10,500 years ago.[12] Pig production emerged in Eurasia, including Europe, East Asia and Southwest Asia,[13] where wild boar were first domesticated about 10,500 years ago.[14] In the Andes of South America, the potato was domesticated between 10,000 and 7,000 years ago, along with beans, coca, llamas, alpacas, and guinea pigs. Sugarcane and some root vegetables were domesticated in New Guinea around 9,000 years ago. Sorghum was domesticated in the Sahel region of Africa by 7,000 years ago. Cotton was domesticated in Peru by 5,600 years ago,[15] and was independently domesticated in Eurasia. In Mesoamerica, wild teosinte was bred into maize by 6,000 years ago.[16] Scholars have offered multiple hypotheses to explain the historical origins of agriculture. Studies of the transition from hunter-gatherer to agricultural societies indicate an initial period of intensification and increasing sedentism; examples are the Natufian culture in the Levant, and the Early Chinese Neolithic in China. Then, wild stands that had previously been harvested started to be planted, and gradually came to be domesticated.[17][18][19]

Civilizations

Agricultural scenes of threshing, a grain store, harvesting with sickles, digging, tree-cutting and ploughing from Ancient Egypt. Tomb of Nakht, 15th century BC

In Eurasia, the Sumerians started to live in villages from about 8,000 BC, relying on the Tigris and Euphrates rivers and a canal system for irrigation. Ploughs appear in pictographs around 3,000 BC; seed-ploughs around 2,300 BC. Farmers grew wheat, barley, vegetables such as lentils and onions, and fruits including dates, grapes, and figs.[20] Ancient Egyptian agriculture relied on the Nile River and its seasonal flooding. Farming started in the predynastic period at the end of the Paleolithic, after 10,000 BC. Staple food crops were grains such as wheat and barley, alongside industrial crops such as flax and papyrus.[21][22] In India, wheat, barley and jujube were domesticated by 9,000 BC, soon followed by sheep and goats.[23] Cattle, sheep and goats were domesticated in Mehrgarh culture by 8,000–6,000 BC.[24][25][25][26] Cotton was cultivated by the 5th–4th millennium BC.[27] Archeological evidence indicates an animal-drawn plough from 2,500 BC in the Indus Valley Civilisation.[28] In China, from the 5th century BC there was a nationwide granary system and widespread silk farming.[29] Water-powered grain mills were in use by the 1st century BC,[30] followed by irrigation.[31] By the late 2nd century, heavy ploughs had been developed with iron ploughshares and mouldboards.[32][33] These spread westwards across Eurasia.[34] Asian rice was domesticated 8,200–13,500 years ago – depending on the molecular clock estimate that is used[35] – on the Pearl River in southern China with a single genetic origin from the wild rice *Oryza rufipogon*.[36] In Greece and Rome, the major cereals were wheat, emmer, and barley, alongside vegetables including peas, beans, and olives. Sheep and goats were kept mainly for dairy products.[37][38]

In the Americas, crops domesticated in Mesoamerica (apart from teosinte) include squash, beans, and cocoa.[39] Cocoa was being domesticated by the Mayo Chinchipe of the upper Amazon around 3,000 BC.[40] The turkey was probably domesticated in Mexico or the American Southwest.[41] The Aztecs developed irrigation systems, formed terraced hillsides, fertilized their soil, and developed chinampas or artificial islands. The Mayas used extensive canal and raised field systems to farm swampland from 400 BC.[42][43][44][45][46] Coca was domesticated in the Andes, as were the peanut, tomato, tobacco, and pineapple.[39] Cotton was domesticated in Peru by 3,600 BC.[47] Animals including llamas, alpacas, and guinea pigs were domesticated there.[48] In North America, the indigenous people of the East domesticated crops such

as sunflower, tobacco,[49] squash and *Chenopodium*.[50][51] Wild foods including wild rice and maple sugar were harvested.[52] The domesticated strawberry is a hybrid of a Chilean and a North American species, developed by breeding in Europe and North America.[53] The indigenous people of the Southwest and the Pacific Northwest practiced forest gardening and fire-stick farming. The natives controlled fire on a regional scale to create a low-intensity fire ecology that sustained a low-density agriculture in loose rotation; a sort of "wild" permaculture.[54][55][56][57] A system of companion planting called the Three Sisters was developed on the Great Plains. The three crops were winter squash, maize, and climbing beans.[58][59]

Indigenous Australians, long supposed to have been nomadic hunter-gatherers, practised systematic burning to enhance natural productivity in fire-stick farming.[60] The Gunditjmara and other groups developed eel farming and fish trapping systems from some 5,000 years ago.[61] There is evidence of 'intensification' across the whole continent over that period.[62] In two regions of Australia, the central west coast and eastern central, early farmers cultivated yams, native millet, and bush onions, possibly in permanent settlements.[63][19]

Revolution

The Arab Agricultural Revolution, starting in Al-Andalus (Islamic Spain), transformed agriculture with improved techniques and the diffusion of crop plants.[64]

In the Middle Ages, both in the Islamic world and in Europe, agriculture transformed with improved techniques and the diffusion of crop plants, including the introduction of sugar, rice, cotton and fruit trees (such as the orange) to Europe by way of Al-Andalus.[64][65] After 1492 the Columbian exchange brought New World crops such as maize, potatoes, tomatoes, sweet potatoes and manioc to Europe, and Old World crops such as wheat, barley, rice and turnips, and livestock (including horses, cattle, sheep and goats) to the Americas.[66]An example of an advancement in the field of agriculture was the introduction of a system or method of farming in the fields. The system or method was known as the two - field crop rotation became very useful and popular way of farming during the 14th century.[67] Irrigation, crop rotation, and fertilizers advanced from the 17th century with the British Agricultural Revolution, allowing global population to rise significantly. Since 1900 agriculture in developed nations, and to a lesser extent in the developing world, has seen large rises in productivity as mechanization replaces

human labor, and assisted by synthetic fertilizers, pesticides, and selective breeding. The Haber-Bosch method allowed the synthesis of ammonium nitrate fertilizer on an industrial scale, greatly increasing crop yields and sustaining a further increase in global population.[68][69] Modern agriculture has raised or encountered ecological, political, and economic issues including water pollution, biofuels, genetically modified organisms, tariffs and farm subsidies, leading to alternative approaches such as the organic movement.[70][71]

Types

Reindeer herds form the basis of pastoral agriculture for several Arctic and Subarctic peoples.

Pastoralism involves managing domesticated animals. In nomadic pastoralism, herds of livestock are moved from place to place in search of pasture, fodder, and water. This type of farming is practised in arid and semi-arid regions of Sahara, Central Asia and some parts of India.[72]

In shifting cultivation, a small area of forest is cleared by cutting and burning the trees. The cleared land is used for growing crops for a few years until the soil becomes too infertile, and the area is abandoned. Another patch of land is selected and the process is repeated. This type of farming is practiced mainly in areas with abundant rainfall where the forest regenerates quickly. This practice is used in Northeast India, Southeast Asia, and the Amazon Basin.[73]

Spreading manure by hand in Zambia

Subsistence farming is practiced to satisfy family or local needs alone, with little left over for transport elsewhere. It is intensively practiced in Monsoon Asia and South-East Asia.[74] An estimated 2.5 billion subsistence farmers worked in 2018, cultivating about 60% of the earth's arable land.[75]

Intensive farming is cultivation to maximise productivity, with a low fallow ratio and a high use of inputs (water, fertilizer, pesticide and automation). It is practiced mainly in developed countries.[76][77]