

Agriculture is the cultivation of animals, plants, **fungi**, and other life forms for food, fiber, biofuel, medicinal and other products used to **sustain** and **enhance** human life.[1] Agriculture was the key development in the rise of sedentary human civilization, whereby farming of domesticated species created food **surpluses** that nurtured the development of civilization. The study of agriculture is known as agricultural science. The history of agriculture dates back thousands of years, and its development has been driven and defined by greatly different climates, cultures, and technologies. However, all farming generally relies on techniques to expand and **maintain** the lands that are suitable for raising domesticated species. For plants, this usually requires some form of irrigation, although there are methods of dryland farming. Livestock are raised in a combination of grassland-based and landless systems, in an industry that covers almost one-third of the world's ice- and water-free area. In the developed world, industrial agriculture based on large-scale monoculture has become the **dominant** system of modern farming, although there is growing support for sustainable agriculture, including **permaculture** and organic agriculture.

Until the Industrial Revolution, the vast majority of the human population labored in agriculture. Pre-industrial agriculture was typically **subsistence** agriculture/self-sufficiency in which farmers raised most of their crops for their own **consumption** instead of cash crops for trade. A remarkable shift in agricultural practices has occurred over the past century in response to new technologies and the development of world markets. This also has led to technological improvements in agricultural techniques such as the Haber-Bosch method for synthesizing ammonium nitrate which made the traditional practice of recycling nutrients with crop rotation and animal manure less important.

The major agricultural products can be **broadly** grouped into foods, fibers, fuels, and raw materials. Specific foods include cereals (grains), vegetables, fruits, oils, meats and spices. Fibers include cotton, wool, hemp, silk and flax. **Raw** materials include lumber and bamboo. Other useful materials are produced by plants, such as resins, dyes, drugs, perfumes, biofuels and **ornamental** products such as cut flowers and nursery plants. Over one third of the world's workers are employed in agriculture, second only to the services' sector, although the percentages of agricultural workers in developed countries has decreased significantly over the past several centuries

* **Permaculture** is a design system. It is a method of designing to provide all your needs by working with nature, not against it. It is based on three ethics Earth Care, People Care and Return of Surplus to the earth . The development of agricultural ecosystems intended to be sustainable and self-sufficient: 'his forest garden is one of Britain's best models of permaculture and to other people.

Crop cultivation systems

Cropping systems vary among farms depending on the available resources and **constraints**; geography and climate of the farm; government policy; economic, social and political pressures; and the philosophy and culture of the farmer.

Shifting cultivation (or slash and burn) is a system in which forests are burnt, releasing nutrients to support cultivation of annual and then **perennial** crops for a period of several years.[35] Then the plot is left fallow to regrow forest, and the farmer moves to a new plot, returning after many more years (10–20). This fallow period is shortened if population density grows, requiring the input of nutrients (fertilizer or manure) and some manual pest control. Annual cultivation is the next phase of intensity in which there is no fallow period. This requires even greater nutrient and pest control inputs.

Further industrialization led to the use of monocultures, when one cultivar is planted on a large acreage. Because of the low biodiversity, nutrient use is uniform and pests tend to build up, necessitating the greater use of **pesticides** and fertilizers. Multiple cropping, in which several crops are grown **sequentially** in one year, and intercropping, when several crops are grown at the same time, are other kinds of annual cropping systems known as polycultures.

In subtropical and arid environments, the timing and extent of agriculture may be limited by rainfall, either not allowing multiple annual crops in a year, or requiring irrigation. In all of these environments perennial crops are grown (coffee, chocolate) and systems are practiced such as agroforestry. In temperate environments, where ecosystems were predominantly grassland or prairie, highly productive annual cropping is the dominant farming system.

Livestock production systems

Animals, including horses, mules, oxen, water buffalo, camels, llamas, alpacas, donkeys, and dogs, are often used to help cultivate fields, crops, wrangle other animals, and transport farm products to buyers. Animal husbandry not only refers to the breeding and raising of animals for meat or to harvest animal products (like milk, eggs, or wool) on a continual basis, but also to the breeding and care of species for work and companionship

Livestock production systems can be defined based on feed source, as grassland-based, mixed, and landless. As of 2010, 30% of Earth's ice- and water-free area was used for producing livestock, with the sector employing **approximately** 1.3 billion people. Between the 1960s and the 2000s, there was a **significant** increase in livestock production, both by numbers and by carcass weight, especially among beef, pigs and

chickens, the latter of which had production increased by almost a factor of 10. Non-meat animals, such as milk cows and egg-producing chickens, also showed significant production increases. Global cattle, sheep and goat populations are expected to continue to increase sharply through 2050.[38] Aquaculture or fish farming, the production of fish for human consumption in confined operations, is one of the fastest growing sectors of food production, growing at an average of 9% a year between 1975 and 2007.

During the second half of the 20th century, producers using **selective** breeding focused on creating livestock breeds and crossbreeds that increased production, while mostly disregarding the need to preserve genetic **diversity**. This trend has led to a significant decrease in genetic diversity and resources among livestock breeds, leading to a corresponding decrease in disease resistance and local adaptations previously found among traditional breeds.

Grassland based livestock production **relies** upon plant material such as shrubland, rangeland, and pastures for feeding ruminant animals. Outside nutrient inputs may be used, however manure is returned directly to the grassland as a major nutrient source. This system is particularly important in areas where crop production is not **feasible** because of climate or soil, representing 30–40 million pastoralists. Mixed production systems use grassland, fodder crops and grain feed crops as feed for ruminant and monogastric (one stomach; mainly chickens and pigs) livestock. Manure is typically recycled in mixed systems as a fertilizer for crops.

Landless systems rely upon feed from outside the farm, representing the de-linking of crop and livestock production found more prevalently in Organisation for Economic Co-operation and Development(OECD) member countries. Synthetic fertilizers are more heavily relied upon for crop production and manure **utilization** becomes a challenge as well as a source for pollution. Industrialized countries use these operations to produce much of the global supplies of poultry and pork. Scientists **estimate** that 75% of the growth in livestock production between 2003 and 2030 will be in confined animal feeding operations, sometimes called factory farming. Much of this growth is happening in developing countries in Asia, with much smaller amounts of growth in Africa.[38] Some of the practices used in commercial livestock production, including the usage of growth hormones, are controversial