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Ancient Agriculture

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Agriculture refers to the art and science of cultivating the **soil**, growing **crops**, and raising **livestock**. Furthermore, it includes the preparation of plants and animals for people to use [1]. It is agreed on by scholars that agriculture, in particular, was the single most significant development in the transition to organized **human civilization** from a more **nomadic** lifestyle. Early civilization, such as the **Sumerian Civilization** in the Middle East as well as other Greco-Roman civilizations identified the need for a permanent agricultural **workforce** in order to meet the needs of society. However, the origins of this phenomenon occurred long before this, but did not occur as a one-time event, per se. Rather, agriculture, at least with respect to **plant domestication**, began in at least 11 independent regions across the world, known as **primary centers** [2]. After arising in these isolated regions, agriculture began to take its root in humankind in all corners and regions of the world. The remainder of this article will focus on these agricultural roots from the perspective of a number of **ancient civilizations** and regions.



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Prehistory [edit]

Up until the introduction of domestication, humans had largely existed as **hunter-gatherers**, necessitating that relatively small and unsettled groups of humans live a nomadic lifestyle. However, the transition from the hunter-gatherer lifestyle to the farmer lifestyle was a slow process, taking place over thousands of years following the origins of **farming** 10,000 years ago [3]. Beginning at around 9500 BCE, eight **crops**—emmer and einkorn wheat, bitter vetch, chick peas, barley, peas, lentils, and flax—were cultivated in the **Levant**, or the "**Fertile Crescent**," a region that today is made up of Syria, Lebanon, Jordan, Israel and Palestine [4]. Over the next 6,000 - 7,000 years, groups all around the world, from Mesopotamia to China and to the Americas, began engaging in this new lifestyle. Full dependence on agriculture, however, did not become a staple in human societies until the **Bronze Age**, by which time wild game and resources, which hunter-gather societies had previously relied upon, was contributing insignificantly to the typical diet [3].



Agriculture in Early Civilization [edit]

Sumerian Agriculture [edit]

Sumer is the earliest known civilization and was situated in the southern region of what is widely known as the cradle of civilization—**Mesopotamia**. Supporting a rapidly growing civilization, Sumer relied heavily on intensive agriculture (beginning at around 5500 BCE) because it allowed for a substantial accumulation of nutritional resources that could not only support a large population, but also support a large population all year long [5] [6]. The region received minimal rainfall, resulting in a significant reliance on the nearby **Tigris** and **Euphrates** rivers.



Sumerian farmers primary cultivated wheat and barley, which were maintained thanks to the first use of **irrigation canals**, a permanent labor force to tend to the crops, and specialized agricultural tools [3]. In **Ur**, a particularly advanced Sumerian city with a population of roughly 6,000, the labor force consisted of storehouse recorders, work foremen, and harvest supervisors to supplement the field **laborers**. In Sumer, fields were plowed by teams of up to four **oxen**, harvested using **sickles**, and were collected into carts with wheels. The oxen were initially the primary agricultural animal, however, by 2000 BCE, Sumerians began relying on horses instead [3].

Aztec and Mayan Agriculture [edit]

In **Mesoamerica**, a cultural region including modern day Mexico, Guatemala, Belize, El Salvador, Honduras, Nicaragua and Costa Rica, the transition from a hunter-gatherer based lifestyle to an agricultural based lifestyle took place over the course of 5,000 to 6,500 years. Emerging initially around 8000 BCE, agriculture in Mesoamerica involved the domestication of squash, beans, and maize—often referred to as the "**Three Sisters**"—and likely began in small patches near **seasonal camps** as a fall back food in times of draught [4] [8].



For Mesoamerican civilizations such as the **Aztecs** and **Mayans**, complex agricultural systems allowed for the growth of **cities** that were enormous for the standards of their time. The Aztec capital city **Tenochtitlan**, for example, was built on an island in **Lake Texcoco**, and supported a population of likely no less than 35,000 between 1300 and 1500 CE [9]. With fertile land surrounding the lake, the Aztecs "developed **irrigation systems**, formed **terraced hillsides**, fertilized their soil," and most significantly, developed chinampas [4] [10]. **Chinampas** are artificial islands, or "floating gardens," which were used to make the swampy areas around lakes more viable for farming. In order to create chinampas, the Aztecs would dig **canals** through the marshy islands and shores and then pile up mud from the bottom of a swamp onto woven mats, making islands with clear canals running between them. The circulation of water was able to support extremely fertile farm plots upon which the Aztecs cultivated crops such as maize [11]. On the **Yucatán Peninsula** between 400 and 900 CE, the Maya Civilization maintained densely populated cities despite their environment being "replete with recurring droughts and rising sea levels" and farmland that was "rough, rocky terrain intermixed with vast swamps, or wetlands" [12]. Using an extensive network of **irrigation canals** and relying on lowland soils, which is less prone to **erosion** and thus more sustainable, the Mayans present yet another case of remarkably advanced agricultural techniques in ancient times [13].

Roman Agriculture [edit]

Inheriting their agricultural techniques from the Sumerians, the **Roman Empire** (27 BCE - 476 CE) held agriculture and farming in high esteem. The single largest group of people in the Roman Empire, in fact, were farmers, and contemporary writings "mention **grafting** and **budding**, the use of many kinds of fruits and vegetables, legume rotation, fertility appraisals, and cold storage of fruit" [14]. Furthermore, the primary crops of the Roman Empire consisted of wheat, barley, olives, flax, pears, apples, and figs [4] [14]. Interestingly, during the Roman Empire, we find an association of social status with agriculture and the introduction of **ornamental horticulture**, or gardens: "The great fortunes of Rome were invested in farmland. The good life was that of a gentleman farmer; the sign of wealth was the country estate" [14]. Ultimately, no significant agricultural advancements took place in the Roman Empire, however, they did incorporate a strong system of **management** including **sharecropping** and farm leasing.



Indian Agriculture [edit]

As early as 9000 BCE, plant domestication was taking place on the **Indian subcontinent** [3]. By 6000 BCE, the cultivation of wheat, legumes, and oranges was widespread throughout the region, as well as the domestication of sheep, goats, and eventually, elephants. In the **Indus Valley Civilization**, a **Bronze Age** civilization beginning around 3300 BCE, in particular, there is evidence of the first use of **multi-cropping strategies** through both the summer and winter seasons [15]. The Indus Valley Civilization also utilized irrigation, which allowed for sustained growth and the establishment of **permanent settlements**. Finally, by 2500 BCE, cotton, rice, and sugar were widely cultivated, and storing grain in granaries became common place [4].

Chinese Agriculture [edit]



Historical documents from the **Warring States** through the **Han Dynasty** indicate that, in China, complex agricultural practices such as the widespread use of a **granary system** and **sericulture** were in place anywhere from 400 BCE to 100 CE. The Chinese made major advancements in agriculture, such as the invention of the **hydraulic-powered trip hammer** and the **square-pallet chain pump** by 100 CE. Hydraulic-powered trip hammers decorticate and polish grain, and square-pallet chain pumps function as **water pumps** for irrigation systems such as canals and channels for farmland. By around 900 CE, China had evolved into a unified **feudal** agricultural society whereby further agricultural advancements took place, such as the introduction of the **watermill** and **moldboard plow**. [4].

*This article is about ancient agriculture. For medieval agriculture, see **Agriculture in the Middle Ages**
For a riveting book review, see **sites.nd.edu/niovino***

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