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Foundations and Driving Forces: An Analysis of the Agricultural Economy in the Qujialing Culture*

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The Qujialing Culture is a significant cultural heritage of the late Neolithic period in China, primarily distributed in the middle reaches of the Yangtze River. Renowned for its distinctive pottery, agricultural production techniques, and settlement sites, it reflects the state of development of the agricultural society at that time. The favorable natural conditions of the Yangtze River basin provided the necessary foundation for the development of primitive agriculture in the Qujialing Culture, promoting the advancement of agricultural technology and socio-economic prosperity in the region. It was precisely the nourishment of the Yangtze River that led to the flourishing and splendor of the Qujialing Culture. This article combines archaeological and historical research methods to explore how the Qujialing Culture ushered in the early civilization of the middle Yangtze River region, providing the material foundation for social progress during the late Neolithic period in the area. It also demonstrates that the cultivation of rice, the diversification of production tools, and the emergence of settled life signaled the maturity of the agricultural economy, thereby influencing the development of Neolithic cultures in other regions.

Keywords: Qujialing Culture, Neolithic period, primitive agriculture, rice, farming tools

The Qujialing Culture is one of the key archaeological sites reflecting the development of agriculture during China's Neolithic period. By the Qujialing period, rice farming had become the primary mode of production. Archaeological findings indicate that a large quantity of carbonized rice grains was unearthed at Qujialing sites, suggesting that rice was widely cultivated at that time. The development of rice farming was closely linked to the humid climate and abundant water resources of the middle Yangtze River region, and advances in rice cultivation techniques provided the material foundation for social stability and population growth. Agricultural tools of the Qujialing Culture were primarily stone implements, including stone axes, stone adzes, and stone knives. These tools were mainly used for felling trees, clearing land, and harvesting crops. Improvements in these tools increased agricultural productivity and facilitated the expansion of farming operations. The development of agriculture enabled the ancestors of the Qujialing Culture to lead a stable, sedentary life, reflecting the ability of these early people to adapt to and transform their natural environment.

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The Yangtze River's Role in Nurturing the Primitive Agriculture of the Qujialing Culture

The Yangtze River, as the mother river of the Chinese nation, has nurtured the ancient and profound Huaxia civilization and is also the birthplace of the Qujialing Culture. In the middle reaches of the Yangtze, the topsoil is fertile, vegetation is lush, the climate is pleasant, and water resources are abundant. These favorable geographical conditions shaped the spiritual character of the early inhabitants during the Qujialing Culture period and gave rise to Chinese agricultural culture. Located in the Yangtze River basin and within the monsoon zone, the Qujialing Culture benefited from abundant rainfall, which nurtured the spiritual character of the early inhabitants as they developed agriculture. The Yangtze River played a crucial role in the formation of the Qujialing Culture. In prehistoric times, early inhabitants often established settlements along river valleys, engaging collectively in fishing, hunting, and farming, making the Yangtze River and its tributaries the very source of their lives. However, the reason the Yangtze River could serve as a gentle mother during the Neolithic era is closely tied to the geographical and climatic conditions of the Yangtze River basin.

> The Qujialing site is situated on a high plateau at the confluence of the Qingmu'ao River and the Qingmu River. The trench connecting the two small rivers on the northeastern side of the site appears to have been artificially excavated, placing the site within a ring of ditches and waterways. The Qujialing site and the surrounding elevated isolated hills and ridges, which provided protection from flooding during the rainy season, almost all contain traces of prehistoric human habitation and activity. (Liu, 2020, p. 7)

The Qujialing Culture was situated in the middle reaches of the Yangtze River, where rainfall is concentrated during the plum rain season. Consequently, a large number of water conservancy projects, such as embankments and canals, were constructed to regulate water flow and ensure the irrigation needs of farmland. These primitive hydraulic engineering projects not only demonstrate the high level of hydraulic engineering expertise possessed by the ancestors of the Qujialing Culture but also reflect their profound understanding of and ability to utilize the natural environment. The construction of these projects not only improved agricultural productivity but also promoted the stability of settled life, laying the foundation for further social development. Furthermore, the rivers, lakes, and other water bodies in the middle reaches of the Yangtze River provided the ancestors of the Qujialing Culture with abundant fishery resources. As a supplement to agriculture, fishing further diversified food sources and strengthened the economic resilience of society. Therefore, it can be said that the Yangtze River was not only the cradle of the Qujialing Culture's primitive agriculture but also a vital pillar of its socio-economic prosperity.

The Qujialing Culture flourished and prospered because of water. The Yangtze River not only provided unique natural conditions for the agricultural development of the Qujialing Culture but also shaped the farming civilization of the early inhabitants through its distinctive geographical environment. Between 8,000 and 4,500 years ago, global temperatures underwent a prolonged period of sustained rise, remaining above historical averages for an extended period. This period is known as the "Holocene Warm Phase", during which global temperatures may have been 1-3 °C higher than today; European scholars also refer to it as the "climatic optimum" (Liu & Fan, 2021). During this period, the Qujialing Culture experienced a climate characterized by concurrent rainfall and heat, with warm and humid conditions that created suitable conditions for the emergence and development of agriculture in the Yangtze River basin.

> Analysis of pollen and charcoal from fluvial-lacustrine sediment profiles and cultural layers near the Qujialing site in Hubei indicates that between 5,400 and 4,200 years ago, the surrounding area was covered by evergreen and deciduous

> broadleaf forests. The abundance of grass and pine pollen and charcoal suggests intense human activity during this period, and the warm, humid climate laid the foundation for the development of the Qujialing culture, (Li, Hou, & Mo, 2009, p. 702)

the warm and humid climate laid the foundation for the development of agricultural civilization in the Yangtze River Basin. Nourished by the Yangtze River, the Qujialing Culture achieved significant progress in agricultural technology, settlement patterns, and socio-economic structures. These achievements not only reflect our ancestors' profound understanding of and ability to utilize the natural environment but also leave a valuable agricultural cultural heritage for future generations. The ongoing excavations at the Qujialing cultural site demonstrate that the middle reaches of the Yangtze River were also an important cradle of agricultural civilization. Its cultural significance further illustrates that both the Yangtze and Yellow River basins were vital cradles of Chinese civilization, holding major historical significance for the study of the origins and development of early human settlements in China.

Crop Cultivation in the Qujialing Culture

The Qujialing Culture is a significant cultural heritage of the middle Yangtze River region, and the primitive agriculture of this period developed rapidly under the nurturing influence of the Yangtze River. The early inhabitants of that time mostly lived together in clans or tribes, eventually forming primitive villages.

> Most of the Qujialing Cultural sites are the remains of villages where people lived for a long time. They are distributed on terraces on both sides of rivers; in humid and rainy plain areas, they were mostly built on elevated earthen mounds to protect against flood attacks. The sites are generally large in area with thick cultural layers, reflecting the scale of the settlements and the duration of habitation. (Liu, 1989, p. 2)

These village sites not only demonstrate the population density of the time but also reflect the high level of organization and cooperative spirit among the ancestors of the Qujialing Culture in agricultural production. In the villages of the Qujialing Culture, agricultural activities became the core of social life, and rice cultivation techniques were widely disseminated and optimized. Archaeological evidence indicates that the inhabitants of these villages had mastered a series of techniques, including rice breeding, field management, harvesting, and processing, which significantly improved both the yield and quality of rice. Carbonized grains of rice and other crops have been found in the pits excavated from these settlement sites. As archaeological excavations continue, large quantities of carbonized rice grains have been discovered at Qujialing in Jing Shan, Hubei; Fangyingtai in Wuchang, Hubei; Qinglongquan in Yunxian, Hubei; Zhujiacui in Jing Shan, Hubei; Wangjiagang in Gong'an, Hubei, and other Qujialing Culture sites; large quantities of carbonized rice traces have been discovered. This fully demonstrates that ancient ancestors had already gained an understanding of the growth patterns of plants. They utilized the warm and humid climate and suitable temperatures, selecting areas with fertile soil and flat terrain to carry out agricultural cultivation activities. The ancestors of the Qujialing Culture period underwent a long-term process in crop cultivation. Through prolonged agricultural practice, they gradually domesticated certain wild plants and experimented with cultivation, thereby giving rise to primitive agriculture. The cultivation of rice enabled the ancient inhabitants of the Yangtze River basin to settle down and secure a stable source of livelihood; rice farming thus marked the beginning of the agricultural civilization along the Yangtze River in China.

In addition to rice, crops discovered in the Qujialing Culture include millet, wheat, soybeans, and other weed seeds. Among all these crops, rice was the most widely cultivated. Based on radiocarbon dating of intact charred

rice grains from the Qujialing Culture, the emergence of rice agriculture at the Qujialing site can be traced back to approximately 5,800 years ago. The charred rice grains from the Qujialing site already exhibit distinct characteristics of japonica rice, and the morphology of rice panicles across various periods shows signs of domestication, indicating that rice agriculture here had reached a relatively mature level from its earliest stages (Yao et al., 2019). The cultivation of these crops demonstrates the agricultural diversity and flexibility of the ancestors of the Qujialing Culture. They not only relied on rice as their primary food source but also cultivated other crops to diversify their diet and enhance their resilience against natural disasters. The cultivation of millet, wheat, and soybeans not only provided the residents of the Qujialing Culture with a variety of food options but also promoted the stability and sustainable development of the agricultural ecosystem. Furthermore, the cultivation of these crops reflects the Qujialing people's in-depth understanding and utilization of crop growth patterns. By aligning planting schedules with crop growth cycles and characteristics, they optimized crop rotation and improved agricultural productivity.

The ancestors of the Qujialing Culture had already adopted a sedentary lifestyle and were capable of constructing houses for habitation, as evidenced by the remains of red-burned earth structures found at most Qujialing cultural sites. "At Qujialing cultural sites, it has been discovered that large amounts of rice husks were mixed into the red-burned earth used for house foundations" (Fang, 1986, p. 117). It was precisely because of this sedentary lifestyle that the close connection between the early inhabitants and the land was strengthened. The origin of agriculture did not immediately result in settled agriculture, but rather developed over a considerable period of time, accompanied by seasonal and regular migrations of settlements. As agricultural practices matured and became established, the inhabitants' settlements stabilized, and primitive villages consequently formed. Evidence from the archaeological sites of the Qujialing Culture clearly shows an expansion of cultivated areas, improved production techniques, and the accumulation of grain reserves. The agricultural development stage of the Qujialing Culture had already reached a certain scale, sufficiently demonstrating that the lives of the early inhabitants had stabilized and entered a historical phase of mature, settled agriculture.

The emergence and development of primitive agriculture in the Qujialing Culture had its own distinct characteristics. Geographically, most of the agricultural areas belonged to low-lying wetlands, and the early inhabitants generally resided in paddy field agricultural zones with fertile soil conducive to cultivation. Paddy field agriculture in the Yangtze River basin is generally more complex, time-consuming, and labor-intensive than dryland farming in the Yellow River basin, and it demands stricter climatic conditions.

> Paddy fields are more complex than dry fields; crop growth requires maintaining a consistent water level, managing irrigation and drainage, leveling the land, and meticulous cultivation to yield a harvest. Dryland farming is generally simpler; cultivation does not require excessive precision, and after sowing, crops can be left to grow and bear fruit on their own, with management far less complex than that of paddy field agriculture. (Li, 1981, p. 18)

However, through their wisdom and diligence, the ancestors of the Qujialing Culture overcame the various difficulties of paddy field agriculture and created a brilliant civilization centered on paddy field farming. The development of the Qujialing Culture is closely intertwined with water. A large number of excavated pottery pieces feature exquisite patterns, including wave patterns and swirl patterns. As shown in the figure, this is a Qujialing Culture swirl-patterned painted pottery ring-footed jar. These patterns reflect the ancient people's reverence and worship of water, as well as their wisdom in living in harmony with the natural environment.

Figure 1. Qujialing Culture swirl-patterned polychrome pottery jar with ring foot.

Production Tools and Productivity Levels of Primitive Agriculture in the Qujialing Culture

The primitive agriculture of the Qujialing Culture marked the entry of Neolithic agricultural civilization into a mature stage. Archaeological excavations indicate that the early inhabitants of the Qujialing Culture primarily used stone agricultural tools, such as stone hoes and stone spades, while also employing bone, wood, and pottery tools. The emergence of these tools reflects a significant improvement in the level of productivity at that time. The primitive agriculture of the Qujialing Culture represents the mature stage of Neolithic agricultural civilization in the Yangtze River Basin. The transformation of production tools accelerated the development of agriculture. As the level of productive forces continued to rise, corresponding historical developmental stages emerged: a hunting economy suited to bow-and-arrow tools; a fishing and hunting economy suited to rudimentary composite tools; a cultivation economy suited to tools such as stone knives and wooden clubs; a fishing and hunting economy suited to wooden digging tools; a plow-based agricultural economy suited to plow and harrow tools; and a hoe-based agricultural economy suited to hoes and similar tools (Wu, 1990, p. 3). Agricultural production during the Qujialing Culture period had already reached the pinnacle of Neolithic agricultural development.

The widespread use of stone tools facilitated the farming activities of the ancestors of the Qujialing Culture. According to archaeological excavations, the stone tools unearthed from the Qujialing Culture primarily include axes, chisels, adzes, gouges, hoes, knives, sickles, and pestles. Among these, axes, adzes, chisels, and gouges were primarily used for felling and processing wood and likely served as everyday tools in the lives of the early inhabitants, while hoes, knives, sickles, and pestles were essential for agricultural production. These tools were diverse in form, numerous in quantity, and finely polished, reflecting the people's mastery of the craftsmanship required to produce agricultural tools.

A large number of stone hoes have been unearthed at the Yangbiling site in Fang County, Qinglongquan site in Yun County, and the Dasi site in western Hubei. They are generally crudely flaked, with concave waists or shoulders, and blades that are straight or slightly curved. They measure approximately 18 centimeters in length. Judging by the smooth wear marks on the blades, they were likely used as weeding tools. Stone knives and stone sickles were both tools for harvesting grain. Stone knives are mostly rectangular in shape, with 1-2 holes drilled at the top. The blades and ridges of stone sickles form a sloping arc, resembling a crescent moon, and are generally

about 10 centimeters long (Liu, 1989). The use of stone knives and sickles significantly improved the efficiency of crop harvesting and reduced the intensity of labor. In addition, the ancestors of the Qujialing Culture utilized wooden and ceramic tools for agricultural production, such as wooden plows and hoes for tilling the soil, as well as ceramic containers for storing grain. The use of these tools further diversified agricultural production methods and improved agricultural efficiency. The level of productivity in the primitive agriculture of the Qujialing Culture was reflected not only in the advancement of production tools but also in the improvement of agricultural production techniques. Through long-term agricultural practice, the ancestors accumulated a wealth of farming experience. They arranged crop planting schedules according to seasonal changes and managed their fields—including fertilization, irrigation, and weeding—to ensure normal growth and high yields. These interconnected steps formed a complete agricultural production chain. At the same time, they mastered crop storage and processing techniques, such as turning paddy into rice, which naturally led to the widespread use of stone pestles as processing tools.

In the agricultural practices of the Qujialing Culture, soil improvement and the use of fertilizers also became important markers of agricultural progress. Through observation and practice, the ancient people gradually recognized the impact of different soil types on rice growth and began experimenting with the method of burning fields to improve soil texture and enhance soil fertility.

> Through their agricultural practices, the ancient people developed methods to enhance soil fertility. They used hard tools they had crafted—such as stone axes and stone adzes—to fell trees growing on flat land, then set the area on fire. The ash left after the initial burning served as high-quality fertilizer, facilitating seed growth and ensuring that the planted seeds yielded a substantial harvest. (Mi, 2023, p. 113)

These measures to increase soil fertility not only boosted rice yields but also provided valuable experience for subsequent agricultural production. In addition, the primitive agriculture of the Qujialing Culture also involved the cultivation of other crops, such as millet and soybeans. These crops served as a supplement to rice, enriching food sources and enhancing the economic resilience of society. At the same time, the early inhabitants utilized local natural resources to develop animal husbandry and fisheries, further diversifying the economic structure and raising living standards.

The cultivation of rice also facilitated the emergence of a sedentary lifestyle among the ancestors of the Qujialing Culture. A stable food supply enabled them to reside in fixed areas for extended periods, thereby promoting the formation and development of villages. The rise of villages not only strengthened the ancestors' sense of community and belonging but also provided them with a safer and more comfortable living environment. As the level of productivity in the Qujialing Culture increased, small-scale urban sites began to emerge.

> During the Qujialing Culture period, prehistoric urban sites began to appear in the middle reaches of the Yangtze River. These sites all featured moats and defensive ditches, and some even had internal trenches. Some of these sites became central settlements, covering areas of hundreds of thousands or even nearly a million square meters. (Tian, 2023, p. 7)

The formation of these sites was an inevitable outcome of the development of sedentary agriculture in the Qujialing Culture, indicating that agricultural practices had reached a mature stage and that the lives of the early inhabitants had stabilized.

> The evolution from ordinary settlements to fortified sites marked a leap forward in the history of settlement development. Through the construction of public facilities such as fortification ditches, social cohesion was strengthened, and the capacity for cooperative labor was enhanced. When external forces invaded and people's livelihoods were threatened, the advantages

> of walled settlements became apparent. By utilizing tall, wide, and deep moats to ward off natural and external threats, they ensured the continuity of local development, (Peng, 2022, p. 38)

indicating that with the development of agriculture, the social structure of the Qujialing Culture underwent profound changes. The prosperity of agricultural production spurred population growth and the expansion of settlements, giving rise to more complex social organizations. Early inhabitants likely began forming clans and tribal confederations to jointly manage farmland, distribute produce, and defend against external enemies, thereby laying the foundation for further social division of labor and specialization. The agricultural development of the Qujialing Culture not only achieved remarkable accomplishments at the time but also left a valuable agricultural heritage for future generations. Their rice cultivation techniques, irrigation systems, and agricultural knowledge systems had a profound impact on subsequent agricultural production. At the same time, the agricultural practices of the Qujialing Culture embodied the concept of harmonious coexistence between humans and the natural environment, offering valuable insights for promoting sustainable agricultural development today.

Conclusion

The Qujialing Culture serves as a significant historical testament to the acceleration of the integration of prehistoric cultures in the Yangtze River Basin. Nurtured by the Yangtze River, our ancient ancestors developed China's early rice-growing civilization, cultivating crops such as rice, millet, and soybeans. Through their agricultural practices, they gained valuable experience and improved their tools—including stone knives, stone axes,stone chisels, stone adzes, stone hoes, stone sickles, and stone pestles, forming a relatively comprehensive agricultural production system for the Neolithic era. The use of these tools not only enhanced agricultural productivity but also spurred socio-economic transformation in prehistoric society. The primitive agriculture of the Qujialing Culture constitutes a vital component of the development of Chinese civilization and represents a pivotal juncture in the evolution of early Chinese rice-based agricultural civilization. It signifies that Neolithic agricultural civilization had entered a mature stage, with economic structures fully exhibiting diverse characteristics: Primitive gathering and hunting economies coexisted alongside the farming economy. However, crop cultivation dominated production, and the living environment of our ancestors became increasingly stable. Primitive settlements emerged, and as these settlements developed, fortified sites appeared. The population began to grow on a large scale, and a clear social division of labor emerged. The pottery of the Qujialing Culture was exquisitely crafted; it not only met the daily needs of our ancestors but also evolved into works of art that unified the expression of values with spiritual pursuits, reflecting their aesthetic aspirations and creativity. The primitive agriculture of the Qujialing Culture not only provided a stable food source for the society of that time but also drove the comprehensive development of the socio-economy, laying a solid foundation for the civilizational progress of later generations.

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