Lecture Notes on History (2020) 3: 1-11
Clausius Scientific Press, Canada

DOI: 10.23977/history.2020.030101
ISSN 2616-227X

An Observation on the historical geography of the prehistoric production in China

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Keywords: Prehistory, man-land relationship, Location factor, Nature of production area, Law of hierarchical evolution

Abstract: The transformation process of "gathering-hunting, fire-farming, hoeing and ploughing farming " from lower level to higher level profoundly reflects the three stages of the prehistoric man-land relationship: dependent man-land relationship, utilization man-land relationship and transformation man-land relationship; Starting from two aspects of natural factors and human activity factors, this paper uses the analysis method of production location factors to divide production area and explore the nature of production area, so as to clarify the production location level and its spatial evolution law of “generative area, transition zone secondary area, marginal zone secondary area”.

1. Introduction

In the narrow sense, production only refers to human's agricultural production activities, while in the broad sense, it refers to the combination of activities formed by human's acquisition of survival materials, including gathering, fishing and hunting, agricultural planting and livestock raising. This paper takes the broad concept as the criterion. From the perspective of historical geography, the first thing to be clear is the evolution of prehistoric production in China. The evolution of the prehistoric industry in China is a comprehensive expression of chronology and regionalism, which profoundly reflects the spatiotemporal characteristics of the prehistoric industry and the phased expression of the human-earth relationship. On this basis, taking the research path of location theory as the investigation method and the production area as the investigation unit, through the spatial deduction of points, lines and planes, the function mechanism and spatial evolution law of each location factor in the formation and development of the production area are revealed.

2. Prehistoric production and the evolution of the human-earth relationship

In the Paleolithic age, human beings were completely dependent on the supply of natural environment, and the only way to obtain survival information was through hunting and fishing. Since the Neolithic age, marked by the emergence of grinding stone tools, livestock raising and agriculture, the way of human beings to obtain survival materials has changed from direct to natural to consciously productive activities, and the production industry has begun to present a situation of

diversification and optimization of each specific form.

The occurrence of agriculture is an important symbol of the transformation of production and industry. Between 12, 000 and 10, 000 years ago, humans stepped out of caves and entered the plains, domesticating wild crops. Between 10,000 and 8,000 years ago, tools for agricultural production and tools for grain processing appeared in the grinding stone tools. Herbivorous animals such as cattle and sheep were mainly raised in livestock. Agriculture was mainly characterized by "fire-farming", which was cut down and burned. Around 8,000 to 5,000 years ago, there was a lot of stone plows, shovels, and hoes. Pigs became the main domestic animals and agriculture changed from "fire-farming" to "hoeing farming". Between 5,000 and 4,000 years ago, large Numbers of stone adzes, plows, scythes and other harvesting tools appeared, leading to the transformation of China's agriculture from "hoeing farming" to "ploughing farming". Will be subject to agricultural development sequence, we can create the basic means of livelihood of prehistoric roughly experienced "the gathering - fire farming - hoeing and ploughing farming" is the process of shift from junior to senior, is the production in the natural environmental change and human demand is the result of joint action, profoundly reflect the relationship between the prehistoric people in three stages: dependent relationship, use to relationship and transformation relationship between people.

(1) Gathering, fishing, hunting and dependent man-land relationship

The number of cultural sites dating back to 12,000-10,000 years ago is small, and their spatial distribution is also very scattered. They are basically distributed in the Haihe Plain, the upper and middle reaches of the Yellow River Basin, the upper reaches of the Qiantang River, the northwest of Dongting Lake, the coastal areas of the middle reaches of the Yangtze River and A high-mountain girdle of the northern tributaries of the Pearl River Basin.

On the whole, the unearthed production tools in each region are relatively primitive, and they are still dominated by making stone tools. The number of grinding stone tools is small and the shape is simple. The tools are mainly stone hammers, chopping tools and pointed tools with the nature of hunting and fishing. The discovery of the remains of the fire pit shows that at least part of the human population has a relatively fixed dwelling place and habits, which is a necessary condition for the emergence and development of primitive agriculture. However, the phenomenon of livestock raising is not widespread, the number of houses and burial remains are small and scattered, and the signs of settlement life are not obvious. The production pattern of each district is mainly gathering, fishing and hunting, and agriculture is not common. The way of obtaining human survival resources is completely dependent on the natural gifts, and biological resources are the main survival information. The diet structure is the combination form of collected plant fruits and wild meat, and the eating method is mainly raw food.

(2) Fire tillage agriculture and utilization type of man-land relationship

From 10000 to 8000 years ago, the number and scale of cultural sites increased, and they all spread outward centering on the distribution range of previous sites. On the basis of the previous distribution, it extends to the northeast of the Huaihe River basin and the south side of the Tailuyi Mountains in Shandong province, the north of the Lishui River in the middle reaches of the Yangtze River, the upper basin of qiantang River and the lower coastal plain, and the middle reaches of the Pearl River.

Production tools unearthed from various sites have improved in number, variety of types and technological upgrading. The number of polished stone tools increased, and the production of polished stone tools was better than that of the early stage. The proportion of stone tools in production tools increased significantly, and the proportion of the artifacts which are made of bone, horn, mussel was decreased. The firing technology of earthenware improved, and the vessel shape increased. Large amounts of rice husks and leaves are commonly mixed into pottery bodies. Most of the sites have the discovery of ash pits, houses and tombs of a considerable scale and have

certain distribution rules, indicating that human beings have been able to settle in a certain place for a long time to obtain long-term living resources, and primitive settlements have formed. No obvious signs of agriculture in the pearl river middle reaches area, area in the middle reaches of the Yellow River and the huaihe river in northeast is given priority to with corn millet crops, lishui river basin in the middle reach of Yangtze river, the qiantang river basin upstream and downstream of the coastal plain area is given priority to with rice crop, unearthed a large area of rice remains, but found no digging hoeing link of agricultural production tools, can be concluded that this stage profession form by gathering, fishing and hunting low-level profession form to settle the advanced forms of agricultural production, agricultural production way should be cut down to the ground "fire farming".

The key to the transition from hunting and gathering to agricultural production is the artificial domestication of crops, which is actually the use of natural processes. Prehistoric people knew how to choose the seeds with full grains and big ears as seeds for easy harvest. After repeated selection, the seeds containing the best genes were recognized and planted as a common practice. [1]

(3) Hoe - plough agriculture and transformation of the man-land relationship

From 8000 to 4000 years ago, the number of cultural sites increased rapidly, and their scale and density increased. In addition, large groups of sites were formed. The distribution space was expanded to the whole country, and the interaction between different regions was strengthened.

The development of production in northeast China is uneven. The prehistoric industry in the north of northeast China has always been gathering-fishing and hunting, and a small amount of crops began to appear in the south at least 8000 years ago. Western liaoning region affected by the profession pattern in north, hunting activity as the supplement of the agricultural production accounts for a large proportion in the early, along with the development of agriculture, hunting components to reduce gradually, raising livestock component mounting. [2] In the southern part of Liaodong Peninsula, agriculture and livestock breeding gradually became the main forms of production. [3] The Hetao region is deeply influenced by the Central plains. Since the middle Neolithic age, agriculture has been developed, and the production in the Inner Mongolia Plateau region has always been gathering-fishing and hunting. The region of Gansu, Qinghai, and Ningxia province in the upper reaches of the Yellow River, the Central Plain area in the middle reaches of the Yellow River and Haidai area in the lower reaches of the Yellow River have basically formed dry-farming agriculture dominated by millet. Although the overall form of production is relatively unified, regional characteristics are obvious. The prehistoric production in The Upper reaches of the Yellow River in Ganqingning area showed a remarkable pattern of "farming, herding and hunting". Means of livelihood in the central plains in the middle reaches of the Yellow River is given priority to with agriculture, livestock is complementary, hunting for supplement, development to late formation is given priority to with animal husbandry, agriculture is complementary, hunting culture as the supplementary means of livelihood, handicraft industry since the middle neolithic age began full development, and formed the development sequence of "small workshop-family workshop-group core workshop". [4] Haidai area in the lower reaches of the Yellow River is mainly agricultural and has developed handicraft industry. Due to the interaction of production and industry in Huaihe River Basin and Yangtze River Basin, rice still exists in Haidai and Central Plains. Agriculture in the Yangtze River Basin was fully developed around 8,000 years ago. Animal resources were mainly hunting and gathering, supplemented by domestic cultivation. Plant resources were gradually transferred from aquatic plant fruits to rice, and paddy cultivation techniques were developed. From 5000 to 4000 years ago, agricultural development reached its peak, and the production pattern supported by rice intensification production and domestic pig raising was established. [5] In the northwest Yunnan and Qinghai-Tibet regions, hunting and animal husbandry were always the main forms of prehistoric production. In the late period, cold-resistant

barley was the main crop in The Qinghai-Tibet Plateau. The agriculture in the northwest Yunnan region developed in the late prehistoric period, and rice farming was formed. The survival means of Pearl River basin region experienced the "sampling fishing and hunting-fishing and hunting economy development-plant improved using-regional economic transformation-the development of rice cultivation popularization and specialization of fishing and hunting" five stages. [6]

On the whole, this stage is characterized by mixed and diversified forms of concurrent business. Agriculture is a kind of life-long industry in China. Animal husbandry and handicraft industry have gradually evolved with the development of agriculture. In the late prehistoric period, the middle reaches of the Yellow River and the middle reaches of the Yangtze River and other agricultural developed areas basically abandoned the activities of gathering, fishing and hunting. It can be inferred from the unearthed large-scale carbonized rice remains, carbonized millet, millet and tuber crops, as well as agricultural production tools in the process of soil turning, hoeing and ploughing. It can be inferred that "hoe farming" has been quite developed in this stage, and the development trend towards "Ploughing agriculture" is obvious. And basically formed two farming systems of rice farming and millet farming, showing the agricultural pattern of "south rice and North millet". For the purpose of cultural development and production, human beings can upgrade tools and technologies and improve crop varieties, which profoundly reflect the transformation of human land relationship.

3. The location factor analysis of production

Location factor refers to the reasons or conditions that promote the formation and change of production characteristics and functions. Human beings are part of nature. As the basic production activities of human beings, production and occupation should be carried out in nature and subject to the influence and restriction of nature. The light, heat and soil conditions of the natural environment have a profound influence on the form, distribution and combination of production. Prehistoric people chose their production paths according to the characteristics of the natural environment, and the space expansion and migration after human settlement also included the re-selection of the natural environment. With the development of human physical condition, accumulation of living experience, upgrading of production tools and other internal and external factors, the space scope of human activities has been expanded. With the expansion of the distribution scope and scale of settlements, the population and labor force of settlements have also been increasing. Population output and technology output promote increasingly frequent inter-regional exchanges. Human beings show their subjective initiative in the dynamic relationship between nature and production activities, and human spatial selection behavior and resource utilization ability begin to play a role in the space-time pattern of production. Therefore, the location factors of prehistoric production include both natural factors and human activity factors.

(1) Location factor system and application principle of production

Natural factors mainly include geographical location, topography, solar radiation, climate, rivers, biological resources, soil and so on. The long-term changes of natural factors affect the stage performance of production, and the micro-geomorphology and micro-ecology shaped by natural factors affect the regional performance of production.

Rivers have always been the primary factor in choosing to settle down for agricultural life. Prehistoric people lived along rivers. Rivers provided necessary water and aquatic resources for human life and production, bred suitable places for agricultural development, shaped the terrain and topography, formed natural defense barriers, and inspired the development of human life and industry. In the origin of agriculture, people moved out of caves to river terraces and plain areas with dense river network, gentle water flow, sufficient water source and convenient irrigation,

which provided natural places for agricultural production activities. The formation of human settlements is shown as point-like distribution along the river and then aggregated into flake sites. Agricultural communication and transmission is basically based on the track of the river, which gradually expands from the main stream coast to the tributary, and then spreads from the tributary coast to the adjacent area. In mountainous areas and high plains where rivers are few, the natural environment is relatively closed, forming a natural enclosed space, which is less affected by external influences, and the production form shows more primitiveness and regional characteristics. After the establishment of the agricultural society, the agriculture in each river basin developed faster than that in the north and south of Yanshan Mountain and Hengduan Mountain, and three spatial types of millet agriculture, rice agriculture and tuber crop agriculture were formed with the Yellow River, Yangtze River and Pearl River basins as the core areas. The production is more diversified and comprehensive, and the form is more advanced. The degradation of the low-level production form of gathering-fishing and hunting is more obvious.

The process of climate change and the transformation and development of prehistoric industry constitute a dynamic response relationship. From 12000 to 8500 years ago, the temperature was generally low and fluctuated greatly, which easily led to abrupt climate change and environmental disasters. There is less precipitation and the climate is mainly characterized by cold and dry weather. As a result, sites throughout the country during this period were concentrated in plains, basins and river valleys that had abundant water and were warm. Restricted by the climatic conditions, human reproduction and the slow growth of biological resources, agricultural activities are not obvious, human beings to collect - fishing and hunting way to obtain material survival data. About 85,000 years ago, there was a sudden change in climate caused by a sharp rise in temperature. From 8500 to 7200 years ago, the climate was still unstable and the temperature changed from warm to cold. [7] When the climate is drier and colder, people will choose to migrate to the warmer east and south directions. [8] Therefore, although the middle reaches of the Yangtze River and the Qiantang River started a little later than the middle reaches of the Yellow River in this period, the scale of settlements expanded rapidly, the agricultural development progressed rapidly, and the agricultural development level was high. Huai River basin is located in the key area of eastward and southward, and its production pattern is influenced by the middle reaches of the Yellow River and the middle and lower reaches of the Yangtze River. From 7200 to 6000 years ago, the climate was relatively stable, characterized by warmth and humidity, and it was the peak of the Atlantic Warm period. [9] When the climate is hot and humid, human beings tend to move to the cooler western and northern regions with high altitude and high latitude. [10], production technology and crop planting spread to the west and north with human migration direction. At this stage, there were signs of agricultural development in the south of northeast China, The area of Gansu, Qinghai, Ningxia and hetao area. Favorable climate promotes stable living environment, adequate water for living and production, flourishing and growth of biological resources, and is conducive to the development of agriculture, improvement of agricultural tools and upgrading of agricultural technologies. Agriculture in various regions has begun to take shape. From 6000 to 4000 years ago, it was a period of frequent climate fluctuations and poor environmental conditions. [11] The Pearl River Basin area has excellent natural environment conditions, dense river network and rich natural resources. The material data needed for survival can be satisfied through collecting and hunting. The necessity and driving force of developing agricultural production activities are small, and it has the characteristics of endogenous production and long closure period. At this stage, the balance of the original ecosystem was broken due to the influence of the climate, and human beings urgently needed to seek new ways of production to maintain survival and development, which contributed to the important transformation of production in the Pearl River Basin region from fishing and hunting to cultivation agriculture and hunting specialization.

The factors of human activities mainly include settlement scale, population quantity, labor force, interregional communication, cultural development, and production technology, etc. The factors of production technology also include biological domestication technology, farming technology, tool manufacturing technology, handicraft technology, etc., which gradually increase their influence on labor industry with the deepening degree of settlement. Production area and cultural area are two different homogeneous Spaces. The former is based on the way of obtaining living materials, while the latter is based on the commonness of cultural features, which has certain intersections. Culture and employment are complementary to each other. The continuity of culture is the basis for the development and upgrading of production, which determines the accumulation of wealth and the driving force of class differentiation and outward expansion, thus affecting the evolution rate and trend of culture. On the basis of the increasing scale of settlement and labor force population, the development of culture and interregional communication are the most critical social factors. On the basis of the steady and sustainable development of culture, the factor of production technology is also an important factor that determines productivity.

In general, the following points should be paid attention to when using the location factor analysis method: The location factor of employment must carry out a comprehensive analysis of convergence and divergence under the same production system, and one-sided conclusions cannot be drawn from only one factor; Quantitative method is used to determine the primary and secondary location of each location factor in the same production system. The characteristics, functions and intensities of each location factor in different production systems are not the same. Therefore, the location factors of production should be quantitatively analyzed to determine the primary and secondary relationship, so as to determine the properties and forms of production; the factors of production technology show two kinds of properties: primary and secondary. The exploration of its nature is beneficial to the interpretation of the interrelationship between production and employment systems.

(2) Location factors of production and archaeological remains information

Table 1 Matching Table of location factors and archaeological remains information

location factors of production		archaeological remains information
natural factors	The geographical position	Scope of relics excavation
	terrain	The sedimentary facies, sediment pelletization and other methods were used to study the sediments and observe the surrounding topography of the site
	The sun's radiation	Palynology analysis, isotopic analysis, identification of vegetation and fauna remains, seabed core and ice core, grain mud, tree wheel, glacier and coastline analysis
	climate	
	water	Channel trace morphology, channel sediment analysis, channel erosion, silting and particle sorting
	Biological resources	Microsomal plant remains: sporopollen analysis, plant cuticle fossil, phytolithoid, diatom analysis, plant DNA; Large plant remains: flotation and screening methods, identification of fresh fruits and seeds, container plant remains, and carbonized wood; Animal remains: Identification of microbody animal remains and large animal remains by isotope analysis
	soil	Soil micromorphology
Human activity factors	Settlement scale	The number of important relics, such as house sites, cellar caves, tombs and manual workshops, the pattern of settlement distribution, settlement area and cultural layer thickness
	Population size and labor force	Molecular genetics of settlement, burial, human skeletal remains, social groups, and genealogy
	Interregional communication	Common characteristics of crop, pottery, and tool remains, molecular genetics of social groups and lineages, and state of river network connections
	Cultural development	Absolute dating of carbon 14, relative dating by stratigraphy and typology

	Biological domestication technique	The type, quantity, proportion, utilization and combination of plant and animal remains
	Farming technology	Farmland relic scale, crop type, irrigation, crop introduction
	Tool making technology	Shape, quantity, proportion, tool upgrade, tool degradation and extinction of mussels, stone tools and pottery
	Handicraft technique	The production techniques of houses, pits and tombs, pottery and stone tools, and the number, types and scale of pottery kilns and metallurgical workshops

Under the influence of both natural and human activities, the production areas with different characteristics were shaped. In order to better extract and utilize the information of archaeological remains as the service of geographical investigation, it is necessary to realize the match between geographical factors and archaeological remains in the study of prehistoric biology by means of geographical factors analysis.

(3) Division of production area

The neolithic age of China can be divided into five geographical units, namely the northeast production area, the north and south production area of Yanshan, the production area of The Yellow River, the production area of the Yangtze River and the production area of the Pearl River.

Due to the high latitude, low temperature, low precipitation and large undulating terrain, there are no suitable geographical conditions for agricultural development in the north and northeast regions of Yanshan. Therefore, agriculture started late and developed slowly. In prehistoric times, gathering-fishing and hunting were the main forms of production. Hetao region includes northern Shaanxi and central and southern Inner Mongolia. The selection of farming and animal husbandry is always related to the migration of the semi-humid and semi-arid boundary. The main reason for the emergence and development of agriculture was the spread of crops and technologies in the middle reaches of the Yellow River to the west and north during the warm Atlantic period. The propagation path extends from the hequ zone to the West Lamulun River basin, then through the West Liaohe River basin into the Liaohe plain, and then to the Songnen Plain and sanjiang Plain, which is a process of gradually spreading to the northeast. Therefore, in northeast China, the factors of gathering, hunting and fishing increased from southwest to northeast while the factors of agriculture decreased.

The upper reaches of the Yellow River are dominated by plateaus and mountains, with high altitude. Drought and less rain, poor hydrothermal conditions, the existence of natural vegetation or environment is more suitable for the development of animal husbandry. At the same time, cultural exchange and crowd migration promoted the spread of herbivorous animals, dry and cold resistant crops and planting technologies. [12] The middle and lower reaches of the Yellow River are dominated by the Loess Plateau and alluvial plain, with flat terrain, low precipitation in the early period, dry climate, and relatively wet in the middle and late periods. Most of the area of the soil for loess, loess sediment deep, soft soil, easy to cultivate. The soil has strong water permeability and high water table, which is suitable for the growth of millet, millet and other dry farming crops. Therefore, the upper reaches of the Yellow River are characterized by the combination of agriculture and animal husbandry, while the middle and upper reaches are characterized by dry farming. From west to east in the Yellow River basin, the factors of animal husbandry were decreasing while the factors of agriculture were increasing. The agricultural area of the Yellow River can be divided into four agricultural zones: the middle and upper reaches of The Wei River, reaches the Tao River Basin and the eastern Qinghai in the west, reaches the lower reaches of the Yellow River in the east, reaches the southern Part of Inner Mongolia in the north, and reaches the Han River Basin and the Western Han River basin in the south. Second, the central Henan agricultural area, east to the east of Henan, west to The West of Henan, South to Dabie Mountains, north to Taihang Mountains; Third, from the western margin of the north China plain to the northern henan and Southern Hebei region expansion, the northern boundary has reached the southern

foothills of Yanshan henan and Southern Hebei agricultural area; The fourth is mainly distributed in the north of The Taiyi Mountains and the northwest of Changbai Mountains, taiyi mountains south and west of the Hudong piedmont plain area of southwest Shandong agricultural area. The agricultural origins of the Yellow River basin are the earliest in the agricultural areas of Central Henan and northern Hebei, and the agricultural areas of northern Henan and southern Hebei are the most developed.

The growing area of the Yangtze River has a warm and humid climate, high temperature and abundant precipitation. Numerous water systems and lakes, densely covered water network. High vegetation coverage rate, high soil viscosity, poor infiltration capacity, low water table, suitable for rice growth. However, the growing area of the Yangtze River has a large span from east to west, and the terrain is undulant. There are various growing forms, which can be roughly divided into four categories: fishing and hunting area, hunting and animal husbandry area, farming and animal husbandry mixed growing area and rice farming area. The terrain in the Three Gorges area of the Yangtze River is very undulating. Most of the human beings live in the Piedmont platform, gentle slope, level ground, mouth and island along the main and tributaries of the Yangtze River. The planting industry is underdeveloped, and fishing and hunting activities are more dominant. [13] Hunter-animal husbandry is the main production form in the subfrigid zone and alpine zone from Aba to Ganzi prefecture in western Sichuan plateau. The agricultural and animal husbandry mixed production is mainly distributed in the Middle reaches of Dadu River from Hanyuan to Qingyi River. [14] The lowlands and slopes of the upper river valley of the Minjiang River in the upper reaches of the Yangtze River, the Liyang Plain in the northwest of Dongting Lake, the Yangtze River in the western Mountains of Hubei and the transition zone between the Yangtze River and Jianghan Plain, and other hilly plains and coastal terraces suitable for rice cultivation with gentle terrain and developed water systems. Since the beginning of agriculture, the middle and lower reaches of the Yangtze River have been the center of rice-growing agriculture, which has experienced a process from Dongting Lake to Jianghan Plain. Out of the need for agricultural production, people further into the hinterland of the plain. In addition, due to climate, hydrology and other factors, the lake area shrank and flood water level decreased, and human beings obtained greater living space in the plain. [15]

The Pearl River has a warm and humid climate with many rivers. Aquatic and terrestrial animal and plant resources are the most abundant, so the life industry is mainly gathering, fishing and hunting activities, and there is no dynamic mechanism to actively broaden food sources. Although the history of edible cereal plants is very early, agriculture has only just started in the late prehistoric period. On the contrary, due to the frequent collection activities, the domestication of rhizome and fruit crops such as taro, melon and beans is more mature, forming the agricultural production space dominated by tuber crops. In the early prehistoric period, most people lived in caves by the sea. In the middle period, they moved inland. In the late period, they moved to the low mountains and hills, alluvial plain and river network plain to form settled agriculture. It shows a geographical pattern of radial distribution on both sides and all around with Wuyishan Mountain as its axis and rivers as its spokes.

4. Location level and spatial evolution law of prehistoric industries

The classical location theory originated from Germany, and has put forward agricultural location theory, industrial location theory, central location theory and market location theory. On this basis, the scholars at home and abroad combined with their own research purposes, derived from a variety of regional spatial structure evolution theory, new economic geography theory and regional spatial structure research model. [16] In essence, the research path of location theory is to reveal the spatial

distribution law of human social activities and the action mechanism of location factors in the formation and development of geographic space from the perspective of geographic space and through the spatial deduction of points, lines and planes. The concept of "location" includes two meanings: one is to emphasize spatial location; the other is to emphasize regional spatial character. The spatial position of generative area influences its generative form and transformation, and promotes the spatial evolution of generative area. Therefore, it is a scientific method to explore the location level and spatial evolution law of prehistoric industries by using the research path of location theory.

(1) Nature of production area

Through the division of production area and the induction of production evolution, it can be found that production area has two properties: the geographical space where a livelihood model first occurred and played a role can be called primary area (of production) or original area; The geographical space radiated and affected by the primary area is called the secondary area (of production).

The spatial location of the original area is relatively superior and the natural environment conditions are good. Generally in low latitude, warm and humid climate, numerous water systems, dense water network, high vegetation coverage, good soil properties. Agriculture came into being earlier, developed at a higher level, and transformed and transformed rapidly. The middle reaches of the Yellow River and the Middle reaches of the Yangtze River, where there are signs of agricultural germination in the early prehistoric times, are typical native areas. Secondary zones can be divided into two categories: secondary area in the transition zone, the primary and marginal areas of the reproductive media. The spatial location of the primary area is generally related to the main stream, tributaries and adjacent basins. The secondary area of the transition zone has a strong spontaneity, and its production form is similar to that of the adjacent primary area, but its own production characteristics are obvious. The radiation effect of the primary area is mainly reflected in the upgrading of production technology and the diversity of crops. The Xiliao River basin is a typical secondary area of transition zone. The secondary area in the marginal zone is relatively closed in geographical space, the human activity is sensitive to the natural environment, and the ecology is relatively fragile. So the development of production mode is relatively slow, production form is relatively low. The primary area has little influence, and the production form is similar to the secondary area of the transition zone, the most significant manifestation of which is the introduction of crops and the spread of agricultural technology. The northeast part of northeast China is a typical marginal secondary area.

(2) Location level and evolution law of production industry

Based on the nature of the production area, the production zone level of "Primary area-Secondary area of transition zone - Secondary area of marginal zone" is basically clarified, which reflects the systematisms, periodicity and incomplete synchronization. In the early prehistoric period, the original area was in an independent state, each with its own characteristics of production, and the location level of production had not been formed. The emergence and development of agriculture deepened the degree of human settlement, the scale of settlement increased, the pressure of population and a large number of labor forces drove the expansion of the production space, thus resulting in the transition zone secondary area. "Primary area - Secondary area of transition zone" has become the main production location hierarchy. The secondary area of the transition zone relies on the local natural environment, natural resources and manpower, adapts to local conditions and uses the production technology introduced from the primary area, and basically realizes the optimal combination of production modes. The scale of settlements and population has driven the expansion of production space. Marginal areas have been unable to meet the needs of survival due to the

long-term primary mode of production. Under the joint action of internal and external factors, the production hierarchy of "Secondary area of transition zone - Secondary area of marginal zone" was formed. The radiation and influence of the primary area were weakened at this stage, and the secondary area of transition zone became the main production technology export place.

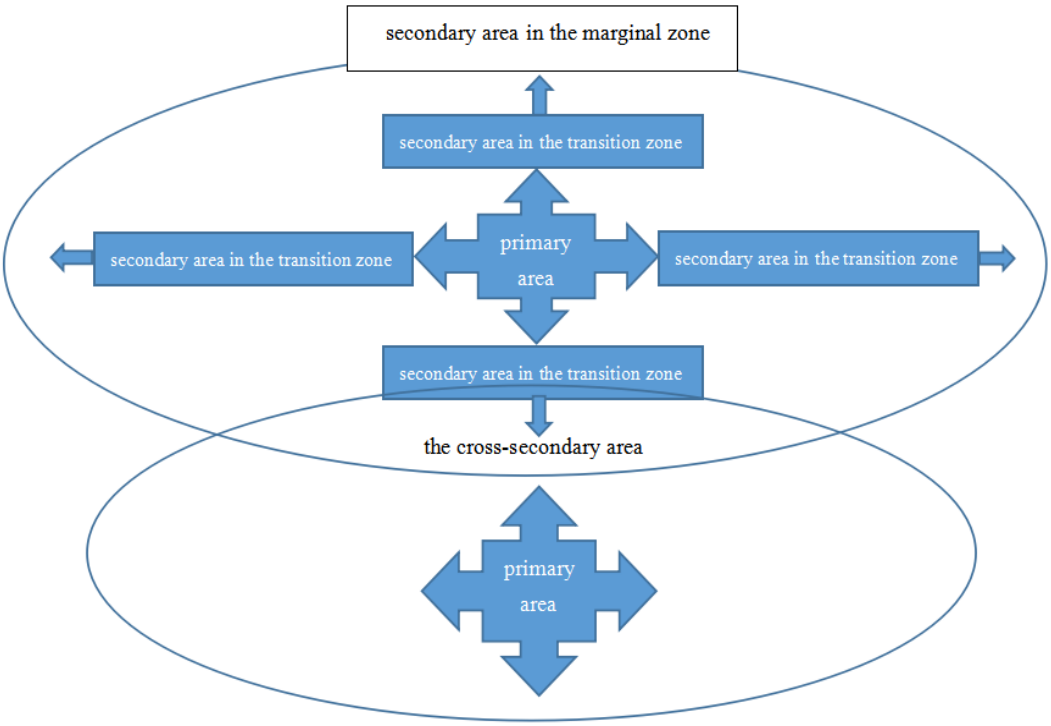

Figure. 1 Schematic diagram of spatial evolution of production area

It can be seen from Figure 1 that the secondary area of the transition zone between two or more primary areas will form an intersection zone, which can be called the cross-secondary area. This area will be radiated and affected by the two primary zones, which not only have their own biological characteristics, but also can be seen from the secondary zones of the two primary zones and the transition zone. The nanyang basin, Chengdu Plain and the lower reaches of Huaihe River are all typical cross secondary zones.

Nanyang basin is located in the central plains and the connection of jianghan plain area, by “the primary area in the middle reaches of the Yellow River - secondary area of transition region in Southwestern Henan province " and "the original area in the middle reach of Yangtze river -secondary area of jianghan plain transition zone " two production hierarchy of radiation, and dry land farming period corresponds to the central plains region of south expansion, millet as the decline of agriculture corresponding profession technology of jianghan plain northward. [17]

Chengdu Plain is located in the intersection area of South and north water systems, and the production shows the form of rice millet mixed cropping. Rice farming originated from the middle and lower reaches of the Yangtze River and was introduced into the eastern Sichuan region along the river. Millet cropping agriculture first occurred in the Yellow River basin and spread to The Chengdu Plain along the Ganqing region and the western Sichuan plateau and through Dadu River and Minjiang River basins. [18]

The production area of the lower Reaches of huaihe River is located at the intersection of the Yangtze River and the Yellow River, the geographical boundary between the north and the south

and the climate transition zone. Prehistoric north of huaihe river region for rice or corn intercropping area, or for rice cultivation area, always as a pure corn, millet, at the end of the cultivated area and exist. [19] Some scholars believe that Huaihe River farming area is the boundary of rice millet agriculture.

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