

Research on the Ecological Mechanism of the Industrial Culture of Nantong City's Specialty Agriculture

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Abstract: This study probed into the mechanism of the cultural ecosystem behind specialty agriculture in Nantong City, Jiangsu Province, as well as the interactive and synergistic relationship among various elements through the fieldwork and investigation of six agricultural science and technology parks, four universities, and 15 leading agricultural science and technology enterprises. Nantong's specialty agriculture is characterized by the distinctive features of leading industries, the beginning of the effectiveness of enterprise clusters, and the deepening of the cooperation between industry, academia, and research. Based on this fact, the study proposes to construct an incentive mechanism to strengthen the cooperation of the "specialty agriculture—cultural ecology" mechanism, which aims to maintain the healthy development of Nantong's specialty agricultural industry and cultural ecosystem as well as provide experience and an ideal model for other areas of the same type.

Keywords: Nantong, Specialty agriculture, Industrial culture, Ecological mechanism.

1. Introduction

Located in the geographic center of the Yangtze River Delta, Nantong, Jiangsu Province plays a significant role in the integrated development of the Yangtze River Delta and the fast development of Jiangsu's coastal region. The modernization of agriculture in Jiangsu is now becoming a mainstay of Jiangsu's economic development. To be more specific, Jiangsu's distinctive agricultural clusters are a kind of economic organization with a unique geographic environment and historical background, which provides strong support for Jiangsu's sustainable development and injects new vitality and impetus for economic development. It is worth noting that its development is influenced by various aspects of local culture, society, and economy. Cultural ecology is a unique regional human condition, influenced by numerous local cultural qualities. Because qualities in the cultural ecology form a complex and diverse cultural environment with close links and interactions between each other, it makes this cultural environment more colorful.

Therefore, this study examines the ecological transformation of the characteristic agricultural industry types in Nantong from the perspective of cultural ecology. Since regional culture facilitates agricultural industry culture and ultimately promotes regional culture, an in-depth discussion of the integration, evolution, and vitality of the characteristic agricultural culture and regional and foreign cultures will be conducive to a more in-depth understanding of the types of characteristic agricultural industry clusters in Nantong, as well as its reforming mechanism. In addition, based on continuing traditional agricultural culture, it is also conducive to strengthening local farmers' understanding of cooperative relationships within the modern enterprise system, accelerating the integration of the local culture with the advanced culture from outside, and maintaining the healthy development of the cultural ecological environment. Consequently, it is expected that the sustainable development of the local characteristic agricultural industry cluster would

be promoted, and would become an economic entity with strong competitiveness and the capability of realizing the local sustainable growth.

2. The Formation of Specialty Agriculture in Nantong City from the perspective of Cultural Ecological Perspective

2.1. The Connotation of Cultural Ecology

Cultural ecology is a complex system that covers all aspects of nature, human activities, and social development, which not only provides a favorable soft environment (compared to the infrastructure construction) for cultural construction but also provides people with rich material and spiritual wealth. Because of its richness and complexity, culture must be carefully protected, just as the way the natural environment is protected. Scholars have probed into the importance of culture and generated abundant results. In the 1870s, German biologist E. H. Haeckel conducted an in-depth study of the complexity of cultural and natural environments, and his findings contributed greatly to the development of human society [1]. In the 1950s, Steward published a landmark masterpiece, *The Theory of Cultural Change*, which attracted widespread attention [2]. Besides, Sima Yunjie also proposed a new concept of "cultural ecology" in his book *Cultural Sociology* to explore how culture interacts with the natural and social environments and its profound impact on the latter two [3].

2.2. Theoretical Development of the Cultural-ecological Perspective

This study has systematically researched and distilled a new and unique concept of cultural ecology from a variety of fields, including geography, human, biology, and society. According to Jiang Jinbo, the theoretical development of modern cultural ecology can be divided into the following three main stages [4].

First, by introducing the concept of system structure, ecological culture can be regarded as a complex and comprehensive system influenced by the interaction of many factors. With the development of society, the relationship between culture and the ecological environment has undergone great changes, and the importance of culture has become increasingly prominent. Therefore, it is believed that a complete cultural ecosystem can be established to realize overall effective operation through an in-depth study of culture and other factors.

Next, the theory of ecological functioning emphasizes the circulation of matter, the flow of energy, and the transmission of information, all of which are indispensable important factors affecting ecosystems. During this process, the flow of cultural information plays an important role in various ways, including promoting development, regulating behavior, and moderating society.

Third, Landscape Perception and Mapping Theory aims to explore the connections between cultural landscapes and human perception, as well as their interactions. The theory holds that there is an interdependent relationship between landscapes and culture and that their cultural qualities and characteristics can be reflected through observation and evaluation.

From the cultural ecology perspective, the cultural ecosystem is a complex structure composed of the natural

environment, social structure, and cultural factors. In addition to its influence on human beings, cultural landscapes are also capable of profoundly changing people's perceptions, together constituting a complete ecosystem.

2.3. Construction of Cultural Interaction among Specialty Agriculture in Nantong City

Thanks to Nantong's unique and favorable natural environment and its profound industrial heritage, the integration and upgrading of the local primary, secondary, and tertiary industries have been greatly promoted, laying a solid foundation for realizing the sustainable development of modern agriculture. Meanwhile, around the high-quality grain, modern seed industry, specialty industries, and other areas, Nantong is accelerating the construction of eight municipal modern agricultural industrial parks, the development, and expansion of the county characteristics of industrial clusters, and is consequently promoting the whole industry chain value-added efficiency. Therefore, the present study explores the synergistic effect between the "cultural ecology—specialty agriculture" mechanism in Nantong's traditional local culture, modern commercial culture, and cluster culture, which is shown in Figure 1.

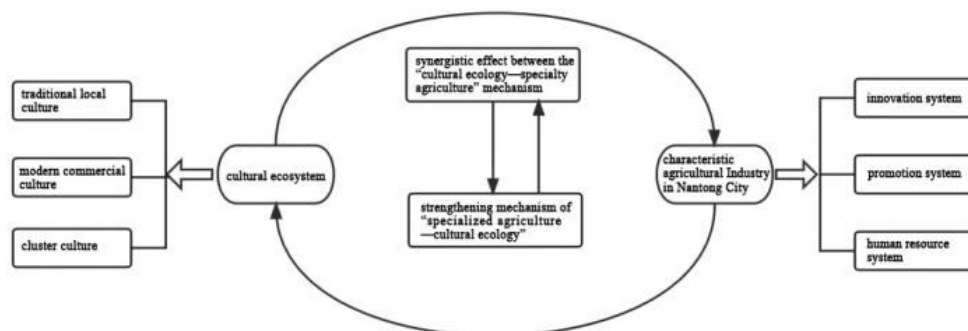


Figure 1. Logic diagram of the synergistic effect of "culture and ecology - specialty agriculture"

2.3.1. Traditional local culture in Nantong

Local culture is the soul of a region, which not only carries the cultural spirit of a place but also records the footsteps of urban development. Therefore, Nantong has fully considered the influence of regional culture in the process of developing specialty agriculture. For example, in promoting farming, Nantong attaches great importance to inheriting local traditional crop varieties, such as rice, wheat, and corn; and in fishery farming, local specialty fish are more favorable. Another example is that Nantong also actively carries out traditional cultural activities, such as temple fairs and folkloric shows to promote local traditional culture. Thanks to the above measure, the seven administrative districts in Nantong have also formed their own unique regional cultural characteristics. For example, Qidong City, located in the easternmost part of Nantong, north of the mouth of the Yangtze River, has been completely formed for only one or two hundred years and is now the earliest place to see the sunrise every day in Jiangsu Province. It has been enjoying its name of "Qiwudongjiang", which means the easternmost land at the Northern Yangtze River coast. Thanks to the overall pattern of development, Qidong's distinctive and colorful cultures include but are not limited to, its dialects, customs,

architectural styles, and so on. Therefore, it is a consensus that the development of characteristic agriculture in Nantong relies on its distinctive local culture.

2.3.2. Modern commercial culture

To establish enterprises or intermediary organizations focusing on special agricultural products, it is necessary to take full advantage of modern business culture to achieve sustainable development. Business culture from all over the world is now having a profound impact on the rural areas of Jiangsu with the advancement of reform and opening up so that the original rural economic model that relied on tradition is being gradually replaced by the market-oriented economy [5]. With the deepening of reform and opening up, the protection of farmers' economic interests has become increasingly important. And farmers in some regions have come together to form a close, organic, and cooperative economic system for their common development due to the deeper integration of traditional and modern commercial cultures. Meanwhile, the rise of rural cooperative economic organizations has kicked off the process of industrialization officially. This is because the demand for specialty agricultural products has been increasing since the reform and opening up, and consequently many service intermediaries

have come into being to meet the diversified needs of consumers. In addition, some enterprises from the local community have established ties with local rural cooperatives and also relocated to local farming areas for better development opportunities.

2.3.3. Cluster culture

Cluster culture can effectively reduce transaction costs and foster community development. Granovetter points out that the influence of various social relationships on economic behavior is extremely important, if not decisive in today's market [7]. Basically, cluster culture benefits community development in two aspects. First, establishing a cluster culture can not only reduce transaction costs but also give play to its unique advantages so that neither farmers nor enterprises can be easily replaced. This synergistic effect will bring rich income to the clustered farmers, thus achieving a win-win situation. Second, by establishing a mutual trust relationship based on a common cultural background, the traditional administrative management model can be replaced, thus promoting various economic activities and transactions. To sum up, when farmers established such relationships, they could form a complex social network, which includes family-based family relationships and social relationships centered on rural elites, constituting a diversified relationship ecosystem [8].

3. Current Situation of the Construction of Nantong's Characteristic Agricultural Industry

Through a comprehensive understanding of the current situation of the basic construction of Nantong's characteristic agricultural industry, it is found that its development cannot be divorced from three major system platforms, i.e., the innovation system, the promotion system, and the human resource system. The present study intends to focus on the above three systems to carry out research on Nantong's agricultural innovation system including Nantong's research institutes, colleges and universities, leading enterprises and professional and technical associations, etc., to fully understand Nantong's independent innovation ability to develop its local agricultural technology system which is led by the government of Nantong characteristic agriculture with the participation of all parties and multiple investors. This study summarizes the following three major characteristics of Nantong's characteristic agricultural innovation system through a field trip to four agricultural science and technology parks, three universities, and five agricultural science and technology leading enterprises:

3.1. Innovation system: leading industries with distinctive features

The study has found that Nantong's agricultural science and technology parks have initially established their operation mechanism and are gradually improving various supporting facilities, such as research and development centers, experimental and demonstration bases, training and education institutions, etc., and their professional teams to provide strong support for the featured agricultural industry have been successfully formed. The dominant industries of each park have distinctive characteristics and the sizes of them are relatively large. By 2022, the core area of the six parks in Nantong will total 7,370 hectares, and the demonstration area will be up to 31,800 hectares, forming an industrial layout of

the parks with advantageous dominant industries such as flowers, trees and bonsai, silk, marine biology, high-quality rice and wheat, and livestock and poultry breeding. In addition, the Scientific and Technological Service Effectiveness Index in Nantong has been largely improved in recent years. The Scientific and Technological Service Effectiveness Index is an important measure of the quality of scientific and technological services as well as the efficiency of scientific and technological services. Relying on their advantages, the six provincial agricultural science and technology parks in Nantong actively explored their innovative models based on their distinctive advantages. As a result, the measurement has improved the efforts and effect of their science and technology services and promoted the construction of their brands. For example, Yazhou Agricultural Park in Haian, Nantong is Jiangsu Province's demonstration park of intelligent agriculture. It is a national agricultural tourism scenic spot, with rice, sericulture, and local fruits and vegetables as the leading industries. To meet the needs of local agricultural development, it cooperated with China Mobile Communications Group Jiangsu Co., Ltd. Nantong Branch and built the first unmanned farm demonstration park with the integration of "technology plus service" (which integrates the primary, secondary, and tertiary industries). Therefore, it has built an "unmanned" farm in a modern agricultural industry demonstration park to realize the transformation from traditional manual management to remote wireless intelligent management.

3.2. Promotion system: clusters of enterprises are showing results

Among the six provincial agricultural science and technology parks surveyed, 1,106 enterprises have settled down, of which the proportion of high-tech enterprises reached 43%, the proportion of agricultural science and technology enterprises was 19%, and the proportion of leading agricultural processing enterprises was 31%, including a group of local leading agricultural industrialization enterprises with national popularity such as Xinyuan Cocoon Silk Group Co., Ltd, Jiangsu Zhongyang Group Co., Ltd, Jiangsu Jinghai Poultry Industry Group Co., Ltd, Jiangsu Shuanglin Marine Biological Pharmaceutical Co., Ltd, etc. Each park has formed a cluster culture and has obtained some economic benefits. For example, Nantong Flower and Horticultural Park, whose main business is flowers and tree gardening, has become one of the largest flower seedling breeding bases in China, with several high-level professional teams, and has become an important base of China's flower industry. Nantong Sericulture Park, whose main business is cocoon and silk, has become the mainstream for the domestic sericulture and silk industry, with a group of excellent experts, scholars, and technicians. And Nantong Seaweed Industrial Park, whose main business is sea farming, has built a series of supporting facilities and has become an important product development and industrialization base for marine farming in China.

3.3. Promotion system: clusters of enterprises are showing results

Nantong's 6 provincial agricultural science and technology parks and 41 domestic and foreign universities have established a lasting and stable industry-university-research alliance, including 25 R&D platforms and 73 achievement transformation platforms, with an investment of more than

263 million RMB. In terms of personnel training, the six parks have trained a total of 119 postgraduates, 127 post-doctoral students, 152 graduates, 270 undergraduates, 1,810 professional farmers training personnel, and a total of 137,600 students in various training courses. Combined with the strategic alliance of agricultural industry technology innovation, rural science and technology service supermarket, “star creation” project (a platform for rural grassroots to encourage scientific and technological innovation), and other service projects, have worked together to strengthen the think tank’s role of production, research, and development in agricultural production. Besides, agricultural science and technology expert service teams helped local farmers to solve the actual production technology problems through a series of face-to-face professional guidance. In 2022, the local government carried out 8 activities using the slogan “supporting agriculture, strengthening agriculture and rich farmers” to bring high-tech agriculture to the countryside. During this period, more than 30 field technical services were organized, which received more than 1,000 consultations from farmers, solved more than 60 technical problems, and distributed more than 2,500 copies of various technical manuals, publicity materials, and agricultural materials. According to the survey, when encountering problems in the production process, 68.8% of the respondents chose to consult the industry departments (such as the agricultural bureau, agricultural technology promotion station, etc.), 76.8% of the respondents contacted various agricultural science and technology promotion through the township agricultural science and technology promotion station, and 66.2% of the respondents were very satisfied with the local agricultural science and technology social service industry, which has clearly shown the benefits of available services provided to local farmers.

4. Suggestions on Constructing Nantong’s Characteristic Agricultural Industry Culture

4.1. Establishment of a comprehensive agricultural science and innovation management system

To better facilitate local agricultural science and technology innovation, it is necessary to establish an efficient agricultural science and technology service system. Therefore, in building a cultural and ecological mechanism for Nantong’s characteristic agricultural industry, it is firstly necessary to construct reliable teams of agricultural researchers and innovative talents. Secondly, government investment ought to be increased, providing more financial support and policy support to encourage enterprises to participate in agricultural science and technology innovation activities. Thirdly, the government should pay attention to talent training and introduction, and attract more domestic and foreign outstanding talents to take part. In addition to the above measures, it is also necessary to pay attention to the transformation and application of achieved results to practical products or technical solutions to improve the value of agricultural products and their competitiveness. These measures can not only promote the development process of the local agricultural industry but also drive the development of related industry chains.

In order to better promote agricultural science and

technology innovation, the existing operation and management mode needs to be improved. At present, most of the approved national-level agricultural high-tech industrial demonstration zones in China have already set up specialized operation and management institutions. Therefore, this study suggests Nantong set up a specialized operation and management institution for the agricultural high-tech industrial demonstration zone and explore various possible operation methods. First, a flexible and effective development and operation mechanism is supposed to be established, such as “management committee plus company”, “platform plus company”, and “park plus company”. An ideal mechanism should be jointly managed by its management committee, platform, and park, with the company undertaking the specific operational work. Secondly, it is also necessary to explore the industrial park development and operation mode of “government-led, company operation, the third-party agency providing services”. By making full use of the favorable service provided by the third-party service agencies such as offering comprehensive and personalized solutions for all kinds of customers, including introduction of industrial resources, promotion of investment, construction of public platforms, investment and financing, improvement of infrastructure, and convergence of scientific and technological resources to meet the needs of various types of subjects. To sum up, innovative operation modes such as “experts plus entrepreneurs”, “research institutes plus enterprises” and “technology plus industry” are encouraged.

4.2. Cluster development under the optimization of cultural and ecological outreach structures

The Jiangsu Action Plan for Promoting the Integrated Development of the Yangtze River Delta Cultural Industry clearly states: By 2025, the growth of Jiangsu’s cultural industry is expected to exceed 40%; Nantong, Suzhou, Changzhou, and other places will form a cross-river integration of cultural industry development pilot zone; Taihu cultural science and technology innovation circle will also get a major breakthrough; the development of Jiangsu’s cultural industry is suspected to achieve a faster speed; and two cross-regional cultural industry cluster with a scale of 100 billion are expected to be constructed. It can be deduced that in promoting the development of Nantong’s characteristic agricultural industry culture, cross-regional linkage is of vital importance. Therefore, the establishment of cross-regional agricultural industry cooperation parks, the construction of cultural and agricultural science and technology innovation communities, the construction of a digital agricultural cultural industry new highland, and the promotion of regional cooperation in the agricultural market are four major tasks for the realization of cultural industry. Detailed suggestions are illustrated as follows:

First, to promote the innovation of the characteristic agricultural industry culture, the agricultural data in the region should be integrated into the Yancheng National Big Data Industrial Base. Second, it is suggested that the agricultural data be connected to the National Cultural Big Data East China Regional Center. Lastly, it is necessary to build a data center for Nantong’s characteristic agricultural industry culture, and then explore the impact of new Internet technologies on Nantong’s characteristic agricultural industry culture as well as closely combine the experiences and practices of Shanghai, Jiangsu, Zhejiang, and other provinces

in the fields of agricultural socialization service, agricultural science and technology, and agricultural product circulation.

In promoting the development of characteristic agricultural industry culture and ecology and cross-regional linkage, Nantong has proposed the construction of the “Nantong characteristic agricultural industry culture and ecology demonstration belt”, aiming to promote the leap-forward development of Nantong’s characteristic agricultural industry cultural ecology by integrating its resource advantage and innovation ability. The goal of the measurement is to build several highly competitive cultural and ecological brand enterprises in the agricultural industry by 2025 and to realize an output value of more than 10 billion RMB. For agriculture, this model can help it better integrate into the modern economic system and improve its market share and profitability. Meanwhile, it can also inject new impetus into local economic and social development. To achieve this goal, it is necessary to strengthen cooperation and communication with neighboring regions [9]. For example, a cross-regional cultural tourism product promotion alliance can be established to expand its scope of publicity and attract more tourists. In addition, Internet technology can also be used for online and offline interactive marketing to further enhance its product reputation. It is obvious that the development of Nantong’s characteristic agricultural industry cultural ecology cannot be separated from the support and cooperation of the external environment. Only by constantly improving its internal mechanism and strengthening the connection and cooperation with other places can the advantages and development potential of the characteristic agricultural industry cultural ecology be brought into play.

4.3. The enhancement of the supply of distinctive regional cultural industry clusters

The ecological development of the cultural industry depends highly on the ecologicalization of the industrial system, therefore, the key to realizing the ecologicalization of the industry lies in the establishment of a healthy and sustainable cultural industry system, which includes a variety of factors, such as the protection of cultural heritage, government policies and regulations, and the combination and application of industrial elements. These factors influence each other and form a mutually beneficial and win-win relationship.

As pointed out in the Implementation Plan for the Construction of Jiangsu Province’s Coastal Cultural Industry Cluster, it is necessary to make full use of the natural resources, historical and cultural heritage, and industrial development foundation of Nantong, Yancheng, Lianyungang, and other coastal areas to promote the unique, large-scale, clustered, high-end, integrated and international development of the cultural industry. Jiangsu Province is making efforts to promote the development of its cultural industries and has established many unique cultural icons in the coastal areas. Nantong has its river and sea culture and ethnic commercial culture, each of which contains the unique history and cultural heritage of Jiangsu. To better utilize its available resources, the Nantong Municipal government should actively take measures to strengthen the top-level design, take solving practical problems as guidance, and actively promote policy support. To be more specific, it is necessary to improve the agglomeration support of characteristic agricultural industry elements, combine the endowment of local cultural resources

with the existing foundation of the cultural industry, and guide the development of Nantong rural characteristic cultural industry cluster scientifically and rationally, to promote the sustainable development of rural economy and society [10].

5. Conclusion

In conclusion, the important task of Nantong to facilitate the development of its characteristic agriculture industry culture is to promote the integration of local culture and society by inheriting its distinctive features and maintaining the current cultural ecological structure and the healthy development of local economic clusters. To promote the healthy development of local cultural ecology, it is necessary to integrate local policies, resources, and social environment to achieve an intimate clustering effect. There are clustered farms in Nantong growing characteristic agricultural products, but due to the imbalance of cultural and ecological structure, the development of local industrial clusters is full of twists and turns. To solve this problem, it is encouraged to cooperate with modern enterprises and absorb external enterprises and talents. However, it is also necessary to objectively view the mechanism of culture in the formation of the characteristic agricultural industry without exaggerating its advantages. Therefore, it is necessary to give full play to the government’s role to take measures to enhance local farmers’ modern market awareness and organizational capacity, which will consequently maintain the healthy development of Nantong’s characteristic agricultural industry and cultural ecosystem.

Acknowledgment

We thank Nantong Social Science Federation. This study was supported by the 2023 Nantong Social Science Hot Topic Funding Project: Research on the cultural-ecological mechanism of Nantong’s Characteristic Agricultural Industry (No.: RB22-72).

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