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# Present Situation and Development Countermeasures of Modern Agriculture Industrial Clusters of 100 Billion Output in Nanchong City

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**Abstract** Industrial clusters have an obvious role in promoting regional economic development and can enhance region core competitiveness. In order to rapidly promote the economic development of Nanchong, from the aspects of agricultural resources, brand advantages, modern agricultural demonstration zones, deep processing of agricultural products and cold chain logistics, the development status of modern agricultural industrial clusters of 100 billion output in Nanchong City is summarized in this article. For existing problems, resolution strategies are proposed from the aspects of focuses, work paths and safeguards.

**Key words** Modern agriculture, Industrial clusters, Development status, Countermeasures, Sichuan, Nanchong

## 1 Introduction

In today's world, industrial clusters are increasingly becoming an important source of regional competitive advantages. The changing market environment and increasingly fierce competition pose challenges to traditional production organization<sup>[1]</sup>. In the process of accelerating economic globalization and regional economic integration, market competition subjects develop from enterprises to enterprise supply chains, and today's competition is mainly at the level of industrial clusters<sup>[2]</sup>. Michael Porter<sup>[3]</sup> pointed out that the key to a county or region's competitive advantages in the world is the competitive advantages of the industry. The competitive advantages of the industry come from the related industrial clusters. Especially since the 1980s, the world economy presents significant regional characteristics, and a large number of enterprises and related institutions are concentrated in a certain regional space. They participate in market competition in the form of clusters, forming strong and sustainable competitive advantages, and gaining the benefits of agglomeration development. As a result, the area has become a shrinking highlight in many areas<sup>[4]</sup>. In the mid-1990s, 60% of the total US output comes from 380 industrial clusters; 60% of India's exports come from 350 industrial clusters; and Germany's Baden-Württemberg, Italy's Emilia-Romagna, China's Zhejiang industrial cluster, *etc.* all play an absolutely important role in promoting local

economic growth. Industrial clusters cannot only reduce transaction costs, improve efficiency, but also improve incentives, create collective wealth such as information, professionalism, and reputation<sup>[5]</sup>. More importantly, industrial clusters can improve innovation conditions, accelerate productivity growth, and are more conducive to the formation of new enterprises<sup>[6]</sup>. The general development and the remarkable success of the global industrial clusters have aroused strong interest from relevant international organizations, national and regional government departments. The United Nations Industrial Development Organization and the Organization for Economic Co-operation and Development have vigorously promoted industrial cluster strategies around the world. Industrial clusters have become the global fashion term<sup>[7]</sup>.

After the 1990s, with the introduction of industrial cluster economic theory and the appearance of a large number of characteristic industries in Beijing Zhongguancun, Jiangsu, Zhejiang, Guangdong and other places, Chinese scholars' research on industrial clusters has emerged along with the emergence of these industrial agglomerations. Industrial clusters have an obvious role in promoting regional economic development and can bring regional core competitiveness<sup>[8]</sup>. Huang Jixiang *et al.*<sup>[9-12]</sup> studied the development of industrial clusters and considered that Zhejiang Province is one of the most prominent areas for the development of industrial clusters. Each district (city, county) in Wenzhou has different industrial clusters. Liushi Town of Yueqing City is known as "China's largest low-voltage electrical city". The low-voltage electrical appliances produced account for more than 25% of the total output value of the same industry in China. Qiaotou Town, Yongjia County, Zhejiang Province is known as the "national largest button market"<sup>[13]</sup>. In recent years, many regions in China have proposed the development of 100-billion-yuan output industri-

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al clusters. For example, in 2012, Hunan Province planned ten 100-billion-yuan output industrial clusters<sup>[14]</sup>. The grassroots industries developed to industrial clusters with an output value of 100 billion yuan<sup>[15]</sup>. Guangzhou built ten 100-billion-yuan output industrial clusters<sup>[16]</sup>. Taizhou built five 100-billion-scale industrial clusters<sup>[17]</sup>. Henan Province identified 13 key industries and 22 100-billion-scale industrial clusters<sup>[18]</sup>. Urumqi built six 100-billion-scale industrial clusters<sup>[19]</sup>.

Nanchong City is located in the northeastern part of the Sichuan Basin, in the middle reaches of the Jialing River, in the hilly area around the basin. It belongs to subtropical humid monsoon climate zone with four distinct seasons, mild climate, and abundant rainfall. It is rich in biological resources, enjoying the reputation of "fruit city" and "silk capital". It is rich in crops such as grain and oil, fruits and vegetables and sericulture and livestock and poultry such as pigs, cattle, sheep and rabbits. In addition, Nanchong City is located in the triangular economic zone of Chengdu, Chongqing and Xi'an, and is located at an important node of the Chengdu - Chongqing Economic Zone. It is listed as the first batch of modern logistics demonstration cities in Sichuan Province, with convenient transportation conditions, and agricultural products can be directly sealed for customs declaration and export. The access rate of rural roads in the city is 95%, and the smooth rate is 85%. The red culture, the silk culture and the Jialing River culture blend together in Nanchong, and the rural tourist has a profound heritage. The city's air quality, surface water quality, and soil quality have reached the national level II and above standards. It is one of the most suitable areas for the development of organic agriculture, ecological agriculture and brand agriculture. In order to rapidly promote the economic development of Nanchong, drawing on the planning and experience of building 100-billion-scale industrial clusters at home and abroad, the CPC Nanchong Municipal Committee clearly stated at the Sixth Party Congress in 2016 that creating new future of Nanchong, building a second largest city in Chengdu - Chongqing Economic Zone, and vigorously implementing the "155 Development Strategy"<sup>[20-21]</sup>. In this article, the modern agricultural 100-billion-yuan output industrial clusters in Nanchong City are investigated, and their current development status and existing problems are summarized. In addition, development strategies are proposed from the aspects of focuses, work paths and safeguards in order to provide reference for Nanchong City to build modern agricultural 100-billion-scale industrial clusters.

## 2 Status of agricultural industrial clusters with an output of 100 billion yuan

### 2.1 Rich agricultural resources, obvious brand advantages

According to the statistics of Nanchong City Statistics Bureau, in 2016, Nanchong City built a total of 157 900 ha of well-facilitated farmland. The effective irrigation area of farmland was 206 800 ha, and the comprehensive mechanization rate of agricultural cultivation and harvesting was 45.3%. The National Modern Agricul-

ture Demonstration Zone, the National Modern Agricultural Reform and Construction Pilot Demonstration Zone, the National Agricultural Science and Technology Park and the Sino-French Agricultural Science and Technology Park have been built successfully. Gaoping, Jialing, Langzhong, Nanbu, Xichong, Yilong, Yingshan and Peng'an counties (cities, districts) are listed in the national key counties for 100-billion-ton grain production, the national strategic support bases of live pigs and the province's key counties of modern agriculture and animal husbandry. Yingshan and Nanbu are listed as key provinces of modern forestry in the province. Three-district-and-one-county (Shunqing District, Gaoping District, Jialing District and Xichong County) thousand-kilometer modern circular agricultural demonstration zone has been built. The city has built a characteristic agricultural industrial base of 366 700 ha. The large-scale breeding rate of live pigs has exceeded 75%. The city's total grain and oil production was 3 152 300 and 395 300 t, respectively, ranking first in cities (prefectures) in Sichuan Province. The output of vegetables and edible fungi was 3 573 200 t. The fruit yield was 880 000 t (the output of citrus was 650 000 t). The fattened pigs reached 5 890 600 heads, ranking second in cities (prefectures) of Sichuan Province. The yield of silkworm cocoons was 15 300 000 kg, ranking third in Sichuan province. The area of forest resources was 500 000 ha, and the forest reserves amount reached 39 000 000 m<sup>3</sup>, ranking fourth in Sichuan Province. The total output value of agriculture, forestry, animal husbandry and fishery in the city was 59.88 billion yuan, and the per capita disposable income of farmers was 11 273 yuan. The number of registered agricultural-related trademarks was more than 2 800, including 18 national geographical indication protection products, 48 municipal level and above well-known trademarks, and 8 patented agricultural products.

### 2.2 The modern agricultural demonstration zone has begun to take shape, and the "300 Demonstration Project" has led the development

The National Modern Agriculture Demonstration Zone of Nanchong City is centered on Shunqing District, Jialing District, Gaoping District and Xichong County. The "300 demonstration project" has been implemented vigorously. According to the statistics of the Management Committee of the National Modern Agriculture Demonstration Zone of Nanchong City, as of the end of 2016, the industrial belt of the 100 km suburban vegetable sightseeing tourism industry, covering an area of 6 666.7 ha had been completed. The 100 km suburban citrus industry belt of 16 700 ha in Gaoping District, the hometown of Chinese sweet oranges, had been consolidated and upgraded. In Jialing District, the 100 km suburban citrus industry belt of 13 300 ha had been constructed. In Xichong County, 100 km suburban organic peach industry sightseeing tourism corridor of 6 666.7 ha, and 100 km suburban Xifeng navel orange industrial belt of 6 666.7 ha had been created. Thus, the demonstration zone has formed a favorable pattern of distinctive industries and matching development. Langzhong, Nanbu, Yilong, Yingshan and Peng'an have developed their own citrus, peach, vegetable, sericulture and Chinese

herbal medicine industry demonstration zones and demonstration belts.

### **2.3 The intensive processing of agricultural products has achieved initial results and continuously increased the added value of agricultural products**

Yigeer, Liuhe and Fuanna silk clothing factories and deep processing of agricultural products such as Zhang Fei beef, Baoning Vinegar, Huiyuan juice, Yanjing beer, North Sichuan bean jelly, Nanchong preserved vegetable, Yingshan black goat, Gaoping sweet orange, Xichong peach, Erjingtiao capsicum, Shanghao sang tea, Hanglixiang rice and Xinghuo Biotechnology have developed vigorously. Some high-quality agricultural products and processed products are directly supplied to Hong Kong, Macao and exported. According to the statistics of the Nanchong Economic and Information Committee, by the end of 2016, the city had carefully planned to promote the construction of seven agricultural product processing parks, and 61 large-scale agricultural product processing enterprises have been built, with annual processing value increased by 10 billion yuan.

### **2.4 Cold chain logistics has formed with good marketing**

In the scale bases of vegetables and citrus, 13 air conditioning-logistics-warehouse integrated demonstration bases, 27 air-conditioned refrigerators and 151 warehouses have been built. The marketing logistics foundation is constantly consolidated. The Nanchong National Modern Logistics Demonstration park has been basically completed, and six industrial base markets have been built. A total of 42 flagship stores for high-quality agricultural products in first- and second-tier cities have been built, and the annual sales of agricultural products exceeds 6 billion yuan. The "Internet +" marketing model is deepened and promoted; the logistics distribution network system is improved; the e-commerce of agricultural products in scale bases, special industrial bases, and livestock and poultry breeding bases is supported; the cooperation with domestic leading e-commerce platforms such as Supply and Marketing Co., Taobao, Jingdong Mall and China Post is expanded; and e-commerce demonstration bases for Xichong peach and Gaoping citrus have been created. The annual sales of agricultural products reach 350 million yuan. Agricultural order production has been fully expanded. The agricultural product purchase-sale cooperation between industrial bases, agricultural processing enterprises, marketing groups and distribution companies has been strengthened. The order rate of agricultural product has been over 60%. Nanchong Yanshan Preserved Vegetable Company and Nanchong Tianguan Preserved Vegetable Company have expanded the order base of preserved vegetables by 1 333.3 ha.

### **2.5 Development opportunities and regional advantages co-exist**

China has implemented the strategies of "the Belt and Road", the second round of western development and the formation of Chengdu - Chongqing urban agglomeration, bringing new opportunities to Nanchong's modern agricultural development. According to the statistics of Nanchong City Statistics Bureau, Nanchong's GDP in 2016 was 165.14 billion yuan, ranking fifth in Sichuan Province and the first in northeastern Sichuan. The total

grain output had ranked first in the province for 14 consecutive years. It is basically a central city in northeastern Sichuan. The industry in Nanchong City is moving towards intensification. The Geely new energy commercial vehicle project with a total investment of 7 billion yuan has been settled. The Xinda New Materials with an initial investment of 3 billion yuan has been completed and put into production. The built-up area of the industrial park has exceeded 100 km<sup>2</sup> and the industrial concentration has reached 78%. The development of agriculture has become more refined. The city has become the only pilot demonstration area for national agricultural reform and construction in the province. The scale of organic agricultural products base ranks first in West China. The three-dimensional transportation network has been basically formed. The Nanchong section of Lanzhou - Chongqing Railway has been completed and opened to traffic. The number of completed highway increased to 10, and the mileage ranked second in the province. The opening of the Gaoping Airport has increased to 12, and the "one port, three terminals" has opened for operation. The construction of water conservancy infrastructure has been accelerated. The Jieyuan Reservoir, the Youfanggou Reservoir and the Jiulongtan Reservoir have been fully completed. The communications infrastructure is getting better and better. "Optical Network of Nanchong" has been fully completed. Nanchong Rural Commercial Bank has been opened for business. The investment and financing systems, new urbanization and supply-side structural reform have been solidly promoted. The innovation and entrepreneurial vitality has been stimulated. The Science and Technology Park of Xihua Normal University has successfully established the first province-level university science park in northeastern Sichuan. The influence of Nanchong Venture Town has continued to expand. The number of entities of the private economy market in the city has exceeded 200 000. Open cooperation has achieved remarkable results. Activities such as China Sichuan International Cultural Tourism Festival, China Nanchong International Puppet Art Week and C21 Forum have been successfully held. The activities of the West Expo and Rongyu Investment Promotion have been effective. The city's investment in place has accumulated more than 230 billion yuan<sup>[22]</sup>. The structural reform of the agricultural supply side and the fight against poverty have taken the lead in China and the first in Sichuan. The goal of building a well-off society in an all-round way has added new impetus to the development of modern agriculture in Nanchong. The economic and social development has entered a new normal, and capital and human resources seek new ways out, injecting new vitality into the development of modern agriculture in Nanchong. People's consumption is increasingly diversified, and the demands for high-end agricultural products and rural leisure and health and the consumption pattern of "Internet +" are changing with each passing day, opening up new markets for modern agricultural development in Nanchong.

## **3 Existing problems**

The agricultural development of Nanchong City still faces three

challenges; whoever comes to farm and how to farm, the double pressure of rising costs and price peaking, resource tightening and environmental pressure. Structural adjustment pressure is high. Product value-added competition is strong. Environmental resources are limited. The "three short boards" of agricultural infrastructure, modern technology equipment and agricultural industrialization are still prominent. Local financial resources are insufficient. Financial credit threshold is high. The application rate of agricultural machinery is still low. The agricultural industry chain is incomplete. The total processing volume of agricultural products is small, the grade of finished products is low, and the social service capacity is obviously insufficient.

**3.1 Agricultural infrastructure is weak and modern technology and equipment is insufficient** According to the statistics of Nanchong Agriculture and Animal Husbandry Bureau, as of 2016, the areas of well-facilitated farmland and effectively-irrigated farmland in Nanchong City accounted for 52.2% and 68.3%, respectively of the total area of cultivated land. The length of village roads had reached 23 200 km; the length of machine-farming roads had reached 36 000 km; and there were still 5% of administrative villages that had not been connected to highways, far away from the production requirements. The comprehensive mechanization rate of agricultural cultivation and harvest was 9.7 percentage points and 20.7 percentage points lower than those of the provincial and national levels, respectively.

**3.2 High-quality brand base is small, and the overall level of agricultural industrialization is low** According to the statistics of Nanchong Agriculture and Animal Husbandry Bureau, as of 2016, the area of bases that had passed the overall certification and green and organic certification was only 45 900 ha (only 15.2% of cultivated land area), involving 52 units. There were 146 pollution-free, green and organic products, with output of only 408 000 t, far from meeting market demand. In addition to the complete chain of sericulture and silk industry from mulberry planting and silkworm breeding to silk processing and sales, the rest of the industries were incomplete from planting, breeding, processing and sales. The overall level of agricultural industrialization was low.

**3.3 The overall quality of agricultural product processing enterprises is low** First, there is a big gap between the processing level of agricultural products and technical equipment compared with the advanced level of foreign countries. Enterprises have weak technological innovation capabilities, low management levels, and low industrial concentration. The processing technology of agricultural products is backward, the processing level is low, and the sales channels are not smooth, so the market competitiveness is not strong. In 2016, the ratio of total output value of agricultural product processing industry to total agricultural output value in Nanchong City was only 1.7:1, much lower than the national (2.2:1) and provincial (2.1:1) levels, equivalent to the national level in 2007. Most agricultural products still enter the consumer market in the form of primary products. The varieties of

deeply-processed agricultural products are few and the added value is low, which cannot meet the diverse market needs. For example, shuttleless rapier looms have been popular in coastal developed areas, but there are only 400 sets of shuttleless rapier looms in silk enterprises of Nanchong City, accounting for 13.0% of the total number of industrial weaving machines. Second, there is a lack of division of labor and cooperation between enterprises. Instead, they develop by themselves. Third, there is no balanced interest distribution mechanism between leading enterprises and farmers. It is also rare to form a community of interests that share risks and interests. When there is a situation that is unfavorable to the economic interests of enterprises, they will focus on their own interests, and it is often difficult to automatically perform the contract. As a result, the links between pre-production, mid-production and post-production of agriculture are separated from each other, and the integrated operation mechanism is difficult to form. Farmers are unable to obtain some of the profits from post-production processing and sales, and the economic benefits of agricultural production are low.

**3.4 Cold chain logistics is relatively insufficient, and the marketing system needs to be strengthened** First, the pre-cooling link is lacking. The loss rate of fruits and vegetables that have not been pre-cooled during long-distance transportation and high-temperature seasons can reach 20% or more. Second, the operation is scattered. Cold chain facilities are mainly concentrated in large-scale industrial bases of fruits and vegetables. The scale of operation is small. New agricultural business entities basically have no cold chain facilities and equipment. The producing areas are generally not equipped with cold chain storage facilities, and off-peak sales are extremely difficult. Third, management is backward. Information on cold chain logistics inventory data, sales data, etc. has not been established. As a result, cold chain logistics management cannot be fully utilized, and the loss rate of agricultural products is high. Fourth, the brands are not popular. The city's regional public brands have only completed planning. Most of the featured brands are not popular, and their sense of use is weak. The premium of the company's own brand is not strong. The number of well-known trademarks accounts for less than 2% of the total trademarks of the city. Agricultural products produced by Nanchong are mostly at the low end of the market, and the increase in efficiency and income is not strong. Fifth, e-commerce is backward. Few new business entities have been connected to the Internet, and the sales ratio of fresh agricultural products on the Internet is less than 5%.

**3.5 Agricultural technology services are weak, sericulture silk management is chaotic** Around the 21st century, due to the reform of the township agricultural technology system, many township offices and facilities have been sold out. Many towns and villages of sericulture and fruit tree bases do not have corresponding technical personnel. Even if the corresponding technicians are equipped, half of them are non-agricultural professionals. In addition, the management of the sericulture and silk system is confu-

sing. Many sectors are involved in the management, but the coordination between sectors is poor. As a result, the market of silkworm eggs, silkworm drugs and silkworm purchase is chaotic in Nanchong City. Even worse, some silkworm farmers sell immature cocoons. This has certain influence on the restoration of sericulture industry in Nanchong.

**3.6 Farmers' cultural and technological quality is low** Due to the backwardness of the economy and the lag of education, the education level in rural areas of Nanchong City is lower than that of the whole province. In addition, most of the elite laborers go out to work and do business, resulting in low quality of agricultural workers. They lack the ability to accept new knowledge, new information, new technologies and new equipment for production and processing of agricultural products, lack market awareness and pioneering innovation, and lack scientific management knowledge and capabilities. Coupled with small farmer mentality, the scale of the industry is difficult to form, and the cultivation technology is difficult to improve, unable to cope with the ever-changing big market.

**3.7 Local capital investment is insufficient, and financial credit threshold is high** According to the statistics of Nanchong City Finance Bureau, People's Bank and Agricultural Finance Investment Guarantee Co., Ltd., in 2016, the Nanchong Municipal Finance Bureau allocated 50 million yuan to support the development of modern agriculture, and the finance bureaus of nine counties (cities, district) allocated 80 million yuan to support the development of modern agriculture, far from meeting the development requirements of 100-billion-scale industrial clusters in the modern agricultural industry. In addition, agricultural leading enterprises have insufficient financial credit collateral, the credit interest rate is relatively high, and the total amount of loans is far from the total amount of financing demand by agricultural projects. In 2016, the city's agriculture-related loan balance was 74.663 billion yuan. The total amount of guarantee principal and guarantee credit for agricultural financing credit was small. The city's guarantee principal was less than 150 million yuan. The number of households involved in agriculture-related financing guarantee was only 103, and the guarantee amount was only 264 million yuan. The rural small and micro enterprise loans were only 342 million yuan. The farmer's professional cooperative loans were 342 million yuan. These could not meet the production needs.

## 4 Development strategies

### 4.1 Focusing on key points

**4.1.1** Highlighting the cultivation of "six major industries" and building a thousand-kilometer modern circular agricultural base. Nanchong City should focus on the implementation of 72 large-scale breeding base construction projects, strive to promote the construction of the "five hundred and one thousand" six major industrial projects the "poverty alleviation industrial park", vigorously develop ecological grain and oil, speciality fruit industry, vegetable and Chinese herbal medicine, modern sericulture, mod-

ern forestry, planting industry and modern animal husbandry dominated by more than 10 million pigs, consolidate and upgrade thousand kilometers of modern circular agricultural industrial belt in the three districts and one county, and speed up the construction one 100 km modern circular agricultural demonstration belt in the remaining five counties (cities). By 2020, a large-scale industrial base with a focus on the 1 000-km modern circular agriculture demonstration zone will be built.

**4.1.2** Focusing on the promotion of "three major capabilities" and cultivating two major agricultural enterprise groups. Nanchong City should focus on the implementation of 46 agricultural, forestry, and livestock products process, ecological agricultural production, foreign cooperation and scientific and technological cooperation projects, improve the three capabilities of agricultural inputs and agricultural machinery production and processing, primary processing of agricultural products and intensive processing of agricultural products. By recruiting the world's top 500 and domestic top 500 companies and well-known agricultural products processing enterprises at home and abroad, Nanchong will support agricultural enterprises to list financing, integrate project funds and discount loans. One hundred agricultural leading enterprises with an output value of over 100 million yuan and ten agricultural enterprise groups with an output value of over 1 billion yuan will be cultivated to drive the development of modern agriculture.

**4.1.3** Focusing on creating "three major business cards" and building three modern agricultural service industry centers. Nanchong City should focus on the agricultural format, expand the integration and interaction with agriculture, agro-processing industry and rural tourism, focus on the implementation of 74 agricultural, forestry, and livestock products marketing, ancillary services and agricultural tourism combined projects, accelerate the establishment of a national organic agricultural product price index platform, a national leisure agricultural model, and a western agricultural product logistics hub, and strive to build a national organic agricultural product trading center, the most beautiful hilly rural tourism center in the west, and a Chengdu - Chongqing agricultural product logistics distribution center.

### 4.2 Working paths

**4.2.1** Adhering to planning first and strengthening the overall implementation. Nanchong City should stand high and see far, scientifically plan the city's modern agriculture development plan during the 13th Five-Year Plan period; carefully plan and reserve a number of major projects, and strive to invest 8 billion yuan in the agriculture-related projects by the 13th Five-Year Plan; adhere to the development of the whole region, the linkage between the upper and lower, and the overall promotion; and ensure the continuity of projects, the implementation of the measures and the realization of the goals.

**4.2.2** Doing a good regional brand around organic Nanchong. Nanchong City should implement agricultural product quality improvement projects, build more than 20 national and provincial standardized demonstration zones, more than 1 000 demonstration

bases for quality and safety of agricultural (livestock) products, and more than three "National Agricultural Product Quality and Safety Supervision Demonstration Counties", implement the "three products and one standard" creation project, deeply explore local unique resources, give play to the basic advantages of Nanchong organic agriculture, actively strive for an organic agricultural product base of 33 300 ha, 300 organic agricultural products, and 20 geographical indication protection products, implement a regional public brand building project for agricultural products, and quickly form a cluster of Nanchong famous agricultural product brands dominated by local brands, supplemented by regional brands and supported by corporate brands.

**4.2.3** Paying close attention to technology support and strengthening innovation drive. Nanchong City should do a good job in building a scientific and technological innovation platform, strengthen the construction of national and provincial agricultural science and technology parks, deepen Sino-foreign cooperation, school-enterprise cooperation, and effectively enhance the ability of agricultural science and technology research and development and transformation of results. In this regard, the Nanchong Municipal Government issued the *Implementation Measures for Promoting the Transformation of Science and Technological Achievements (Trial)* (Nan Fu Ban Fa [2015]44) and the *Implementation Measures on Supporting the Construction of Technology Business Incubators* (Nan Fu Ban Fa[2016]11), and the Municipal Finance Bureau issued the *Management Measures for Municipal-level Financial Special Funds for Innovation-driven Development*, providing policy and financial support for technological innovation. Nanchong City should strengthen independent innovation, and introduce, absorb and digest for innovation. Targeting at the common technology, key technologies and bottlenecks of the city's industrial development and social progress, Nanchong City should carry out technical public relations, encourage creation and inventions, and promote the city's scientific and technological progress and economic and social development. Simultaneously, at the city and county levels, the agricultural science and technology service expert team and the university student agricultural entrepreneurship park will be built to solve related technical problems, broaden the employment channels of college students and support socialized services, industry alliances and technology alliances. Nanchong should introduce and cultivate a number of agricultural science and technology service agencies, actively built a modern agricultural service system that combines public welfare and sociality, strengthen Internet resource integration and data sharing, and vigorously develop smart agriculture, big data agriculture and agricultural and rural e-commerce.

**4.2.4** Deepening rural reform to activate resource elements. Nanchong City will make a fuss about the three key resources of land, capital and talent, promote the construction of characteristic advantageous industrial bases and industrial integration bases in a contiguous manner, adhere to the combination of public welfare and business, special services and comprehensive services, build

a technology, production and market socialization service platform, and make efforts to crack the bottlenecks in the development and growth of new business entities.

(i) Nanchong City should promote the orderly circulation of the land in an appropriate scale, and realize the land transfer area of the city to more than 1/3. By revitalizing rural property rights resources, Nanchong will expand the scope of loans and pledges, scientifically prevent bank loan risks, and fully tap the potential of rural resources to become capital and asset. In addition, Nanchong can introduce and cultivate a large number of large enterprises and large groups with a production value of over 100 million to promote the concentration of leading enterprises in clusters. Government departments can guide the establishment of various types of farmer cooperatives, support the creation of a number of model cooperatives, and encourage the development of family farms and specialized households. At the same time, it is necessary to establish and improve the agricultural insurance system to effectively improve the risk prevention capability.

(ii) According to model of "great park + agricultural leading enterprise (farmers' specialized society) + farmers' industrial park", the farmer's industrial park will be gathered, which will not only play the overall scale advantage of the park, but also stimulate the enthusiasm of the participants in modern agriculture. The "Da Lin Model"<sup>[23]</sup> and the "Pioneer Model"<sup>[24-25]</sup> will be promoted. In accordance with the principle of "government guidance, peasant autonomy, leading, financial support and association organization", the five parties will work together to develop the industry.

(iii) Nanchong City should establish scientific and technological services in the form of party members and agricultural and animal husbandry cadres' pairing services, production services based on custody management and farming substituting, and market service platforms led by industrial alliances, establish "12316" as the agricultural service hotline to connect thousands of households, set up 10 expert service teams at the city and county levels. With professional cooperatives as the link, the business models such as "labor contracting", "farming substituting" and "land custody" will be innovated, 678 service organizations of agricultural technology, agricultural machinery, and plant protection will be cultivated, and diversified package services will be supported, such as "full tray", "nanny" and "order". Nanchong should guide the new agricultural management entities to form a number of industrial alliances for citrus, vegetables, etc., establish party branches for the industrial alliances, make full use of the advantages of alliance scale, buy agricultural materials and agricultural technology services, reduce production and operation costs, carry out standardized production and brand creation and maintenance, promote marketing, and expand market discourse and game power.

**4.2.5** Increasing opening up to promote exchanges and cooperation. Around the requirements of construction of the 100-billion-yuan output industrial cluster, Nanchong should continue to quick-

ly promote the special investment promotion activities of modern agriculture, strive to introduce more than 50 flagship enterprises in the industry within 5 years, sign the promote funding of more than 10 billion yuan, actively promote the construction of the Sino-French Agricultural Science and Technology Park and Taiwan Agricultural Pioneer Park, strive to built a platform for Nanchong agriculture's foreign exchanges and cooperation, support the opening of flagship stores and direct sales of Nanchong speciality agricultural products in large and medium-sized cities in China, encourage the export of organic agricultural products to the EU, Japan, South Korea, Hong Kong and Macao, and increase the comprehensive output value of Nanchong's characteristic agricultural products.

**4.2.6 Consolidating the agricultural base and improving production conditions.** Nanchong should promote the matching of the four networks of farmland, canal, road and electricity to promote the balanced development of the city's agricultural infrastructure, support the purchase of advanced and applicable agricultural machinery, activity establish agricultural machinery cooperatives, increase the total amount of agricultural machinery and equipment, vigorously improve the social service capabilities of agricultural machinery, vigorously develop smart agriculture and facility agriculture, and actively improve the agricultural Internet of Things system. By 2020, Nanchong will strive to build well-facilitated farmland of 2 667 000 ha, make comprehensive mechanization level of major crops reach more than 65% and build more than 50 agricultural meteorological technology application demonstration parks based on Internet of things.

### 4.3 Safeguards

**4.3.1 Strengthening organizational leadership.** Nanchong should establish a leading group for the construction of a modern agricultural 100-billion-scale industrial cluster led by the main leaders of the municipal government. The lading group has a promotion effect and joint meeting system. The municipal government should issue guidance on cultivating the modern agricultural 100-billion-scale industrial cluster, refine the target tasks, and implement work responsibilities. The county (city, district) and municipal-level relevant departments should establish corresponding institutions and incorporate the modern agricultural 100-billion-scale industrial cluster into the core work of the 13th Five-Year Plan. The inspectorate office of the municipal party committee and the municipal government can conduct a single assessment of the modern agricultural 100-billion-scale industrial cluster, set certain assessment indicators, strengthen supervision and assessment, and cash in punishments and rewards.

**4.3.2 Strengthening investment guarantee.** According to the budget estimates, the construction of the modern agricultural 100-billion-scale industrial cluster in Nanchong City requires an investment of more than 350 billion yuan. The cities and counties (cities, districts) strive to win more than 8 billion yuan of funds in the province within five years, integrate the funds for agriculture-related projects, and invest the agricultural reward funds into the

development of the agricultural industry. The finances at the municipal and county (city, district) levels should increase the budget for supporting agricultural funds year by year, invest more than 500 million yuan each year and ensure that the construction of 100-billion-sclae industrial cluster is fully invested.

**4.3.3 Strengthening policy incentives.** (i) Land use. According to the spirit of *Opinions on Further Guiding the Scalized, Standardized and Orderly Transfer of Rural Land Contractual Management Rights and the Development of Appropriate Scale Management of Agriculture and Special Reform Plan for the Construction of a New Agricultural Management System*, the municipal party committee and the municipal government will support the orderly and scalized transfer of land, actively explore the mechanism of paid exist of rural property rights, rationally adjust land use planning and support the construction of agricultural development.

(ii) Financial award. According to the spirit of *Notice on Printing and Implementing the "155 Development Strategy" of Nanchong City to Promote the Supporting Policies for the Development of Modern Agricultural 100-billion-scale Industrial Clusters*, the municipal government plans to allocate more than 100 million yuan of special funds for listing and financing, key agricultural projects, development of new business entities, brand creation of agricultural products, integration of project funds, loan subsidy guarantee, special agricultural insurance, agricultural construction land, *etc.* of agricultural enterprises. For the extra-large projects introduced by modern agricultural special investment, the award-compensation policy implements "one-on-one discussion".

(iii) Financial support. Nanchong should accelerate the construction of an agricultural guarantee system, dominated by city's agricultural financing guarantee company + district and county branch and supplemented by small and medium-sized guarantees, providing financing guarantee business for agricultural leading enterprises, agriculture-related business entities, small and medium-sized enterprises, explore the financing methods such as production facilities and equipment, ground fixtures, live objects, insurance policies, orders, and expected land revenues (*e. g.*, Tianzhao Pig Industry obtains a loan of 6.88 million yuan with breeding pigs as the mortgage; Lvke Poultry Industry loans 9.25 million yuan with orders as the pledge; and Baike Company pledges 6 million yuan with the expected land revenue), make pilot study on loan interest rate 0.6 percentage points lower than the interest rate for the same period to effectively solve the difficulties in loans, increase the amount of credit lines, implement one-on-one and peer-to-peer services for major loan implementation projects, solve specific problems in the implementation of loan projects, and make suggestions for the development of new business entities to facilitate the full-procedure supervision of funds. At the same time, the municipal government can set up a special fund for agriculture-related financial risks.

(iv) Cultivation of new agricultural talents. The first is to add a new agricultural major in Nanchong Vocation and Technical College to comply with Nanchong's new ideas for modern agricul-



tural development. While running traditional advantageous majors, facility agriculture and equipment, ecological agriculture technology, leisure agriculture, green food production and inspection and other related majors that follow the new ideas of circular agriculture, ecological agriculture, and organic agriculture development can be opened. The second is to optimize the talent training program for higher vocational colleges. In accordance with the new requirements of modern agricultural development in Nanchong and the new needs of structural reform of the agricultural supply side, the curriculum of specialization should be optimized, and the courses such as Internet agriculture, creative agriculture, smart agriculture, tourism agriculture and circular agriculture will be added. The third is to promote the construction of experimental training and the construction of productive training bases for production-education integration in vocational colleges, built a high-level skill training platform, strengthen student skills training, and vigorously improve students' modern agricultural production skills. The fourth is to form a modern agricultural industry technical college to train a large number of new modern professional farmers and professional managers for modern agriculture. The fifth is to make full use of relevant national and provincial training programs and to do a good job in vocational skills training for new professional farmers and migrant workers.

(v) Strengthening the construction of agricultural service systems. First, the reform and construction of grassroots agricultural technology extension system will be deepened to rationalize the management system, improve the work system, and strengthen work security. The second is to strengthen the construction of a team of agricultural technology professionals, strengthen personnel continuing education, agricultural industrial poverty alleviation technology training, and implement the "special lost plan" for grassroots agricultural technicians. The third is to innovate the agricultural technology promotion operation mechanism, strengthen the construction of experimental demonstration bases, cultivate agricultural science and technology demonstration households, and establish a team of technical instructors according to the ratio of 10:1 to make the township agricultural technicians no less than 70%. The fourth is to enhance the function of agricultural technology services, do a good job in technology extension services for new business entities and poverty alleviation actions in agricultural industry. The fifth is to implement subsidy funds, do a good job in subsidies for agricultural technology extension services and test bases and agricultural science and technology demonstration households and agricultural technology promotion capacity building expenditure, such as the cost of training and continuing education for grassroots agricultural technicians, the subsidies for agricultural technology extension services of students of "Special Post Program" to townships and towns, and the expenditures for training and technical services of agricultural technicians and capacity building of grassroots agricultural technology extension institutions around the poverty alleviation of agricultural industrial technology in the seven poverty-stricken counties. Through the award and

compensation method, the towns and villages with solid foundation work and a certain foundation in conditional construction will be supported. Funds are mainly used for technology promotion and equipment purchase.

(vi) Strengthening the introduction and cultivation of talents. A high-quality talent recruitment mechanism will be established, and the Jialing River Talent Project will be implemented in depth. A one-time award will be implemented for doctoral and master's degree students who work in Nanchong. A set of turnover houses will be provided to that that has not housing, thereby focusing on the introduction of high-end agricultural talents. Graduates will be encouraged to return home to start a business. A humanistic environment will be created for graduates from colleges and universities to return to their hometowns. The entrepreneurial preferential policies will be implemented. The financing channels will be expanded. A training platform for graduates to return to their hometowns will be built. Migrant workers and farmer entrepreneurs will be supported to return home to start business. According to the spirit of the *Implementation Opinions on Supporting Migrant Workers and Farmer Entrepreneurs to Return to Home Business* issued by the municipal government office, the municipal finance raises relevant funds every year, and the county (city, district) finances set up special funds according to their financial resources and subsidy needs to support migrant workers and peasant entrepreneurs to return to their hometowns. The funds will be mainly used for the construction of migrant workers' returning hometown entrepreneurship park, entrepreneurship subsidies, employment subsidies, land transfer subsidies, entrepreneurial activities, service expenditures and training. For city-level migrant workers' returning hometown entrepreneurship parks, a certain amount of subsidy funds will be given to each park by the municipal finance at one time. For the construction of migrant workers and farmer entrepreneurs' returning hometown entrepreneurship parks in the form of land lease, the formed fixed assets are owned by the constructor. The property operating income will be allocated according to the contract of the relevant parties. For the integration and development of migrant workers and peasant entrepreneurs' returning hometown entrepreneurship parks, local governments can rationally adjust the expenditure structure, arrange the corresponding financial guidance funds, and provide policy support in the forms of investment subsidies, loan interest subsidies, and rewards for construction of entrepreneurship parks without changing the total scale of fiscal budget expenditures and the use of special funds. The system of full-scale transfer of migrant workers' pensions will be explored and improved.

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the first commitment period of 2008 – 2012, China is the country with the greenhouse gas emission only second to the United States of America, so China faces greater and greater pressure. In the face of the current climate situation, the Chinese government first announced the clear target of greenhouse gas emission reduction at the Copenhagen Climate Change Summit in December 2009. The target is reduction of greenhouse gas emission by 40% – 50% by 2020 compared with 2005. Through actively developing the forest carbon sequestration project, Guangdong Province can raise the forestry development funds. More importantly, the forest carbon sequestration project can provide a new and cheaper approach for China participating in the international community to respond to climate changes.

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