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# Ideas for Accelerating Development of Deep Processing Industry of Agricultural Products——A Case Study of Nanchong City

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**Abstract** In order to provide certain references for further deepening the development of processing industry of agricultural products, this paper analyzed and elaborated the basic principles, construction priorities and safeguard measures of the development of deep processing industry of agricultural products in Nanchong City of Sichuan Province. Besides, it made a scientific planning for accelerating the deep processing of agricultural products in Nanchong City in 2018–2020, to ensure the full implementation of fine and deep processing of agricultural products.

**Key words** Agricultural products, Fine and deep processing, Nanchong City

## 1 Introduction

The processing industry of agricultural products is an important industry concerning the national economy and the people's livelihood, and also an important source of economic growth. Since the entry into the 21st century, more than 80% of the grain and more than 50% of the fruits and vegetables in developed countries have realized industrialization, and the output value of industrial food accounted for 80%–90% of the total food output value<sup>[1–3]</sup>. Now, all developed countries are attaching great importance to the innovation of agricultural product processing technology. Especially, they place the post-production agricultural product storage and processing industry in the first place of agriculture. Besides, from the strategic point of view, they stress the development of processing and deep utilization technology of agricultural products, showing increasingly high and new technologies and equipment<sup>[4]</sup>. Since the reform and opening up of China, with the rapid economic and agricultural development, the role of fine and deep processing of agricultural products has become more and more important in agricultural production, and its development status symbolizes the modernization level of agricultural development<sup>[5–9]</sup>. Besides, the State Council of China also attached great importance to the development of processing industry of agricultural products. In 2002 and 2016, the State Council issued the *Opinions on Promoting the Development of Processing Industry of Agricultural Products*

and the *Opinions on Further Promoting the Development of Processing Industry of Agricultural Products*, many domestic experts and scholars studied the development of processing industry of agricultural products<sup>[10–19]</sup>. In 2017, the processing industry of agricultural product showed a steady increase in growth rate and continuous improvement in quality and efficiency. It plays an important role in promoting the sustainable and stable development of the agricultural and rural economy and increasing farmers' income. According to statistics, in 2017, the growth rate of the added value of processing industry of agricultural products above designated size was 6.5% (excluding the price factor), increasing by 0.7 percentage points over the same period of the previous year. It realized main business income of 194 000 billion yuan, increasing by 6.5% compared with the same period of the previous year, the growth rate increased by 1.2 percentage points compared with that in 2016, which continued the stabilizing trend since the beginning of 2016<sup>[20]</sup>. Nevertheless, the overall technical level of China's agricultural product processing is not high, the contribution rate of science and technology is low, the level of technical equipment is low, the deep processing capability is insufficient, the variety of processed products is few, the homogenous competition is vicious, the processing ratio of agricultural products is low, the value added is small, the comprehensive utilization rate is low, but the material consumption is high. The overall technical level of China's agricultural product processing industry is 10–20 years behind that of developed countries, and the overall contribution rate of science and technology is 30%–40% lower (the contribution rate in feed industry is 45%), which is 30%–40% lower than that of developed countries. The level of technical equipment of only 5% processing enterprises reaches the current international advanced level, about 15% is in the 1990s, and 80% is in the world average in the 1970s and 1980s. In the United States, there are more than 3 500 kinds of maize and maize by-products, including more than 3 000 kinds of maize deep-processing products, which are

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widely used in chemical, textile, printing and dyeing, paper making and other fields. By contrast, in China, there are only 20 kinds of deep processing products of maize, the processing rate of agricultural products in developed countries is generally higher than 90%, but it is only 40%–50% in China. Especially, the secondary processing is only 20%, and the comprehensive utilization rate of agricultural products in developed countries is up to 90%, while it is only 45% in China. China produces 5 million t of soybean meal and 2 million t of cottonseed cake per year, but the food conversion rate is only 1%; 3 million t of wheat germ can refine 360 000 t of oil, but it has not been further developed; 13 million t of maize germ can refine 2.7 million t of oil, but the annual output of maize germ oil is only 3–4 million t; 10 million t of rice noodles can refine 1.8 million t of oil, but the annual output of rice bran oil is only 4–5 million t. Besides, 99% maize germ, 97% rice bran, 300 000 t maize protein powder, nearly 1 million t rice bran protein, nearly 1 million t wheat bran protein, 12 million wheat bran, 10 million t corn cob, 7 million bagasse, 500–600 million t of straw, and 20 million t of rice husks have not been utilized or developed in depth<sup>[21–22]</sup>. In the United States, the starch sugar manufacturing equipment has no waste residue, waste water or waste gas when processing starch sugar. By comparison, in China, most of the waste materials and by-products of most agricultural product processing enterprises are buried, flowed away or piled up, making agricultural product processing industry becoming "pollution-intensive" industry. Some processing enterprises of agricultural products consume high energy. In China, the grain loss after harvest is 14.8%, grain storage loss is 9%, fruit and vegetable loss after harvest is 20%–40%, while the post-harvest loss of fruits and vegetables in developed countries is only 5%<sup>[19, 22]</sup>. Therefore, it is of great significance to undertake fine and deep processing of agricultural products, to increase the premium rate of agricultural products and their by-products, reduce the loss of energy consumption, and promote the transformation of traditional agriculture to modern agriculture.

Nanchong City is a large agricultural city and the largest grain-producing city in Sichuan Province. Although the processing industry of agricultural products has shown a good development trend, the processing of agricultural products is relatively low, in terms of both the primary processing and deep processing, as well as in processing equipment and technology. In view of this, according to the requirement of General Secretary Xi Jinping in his visit to Sichuan "the implementation of the rural revitalization strategy as the new era should be the total gripper of the "three rural issue" work, and the development of modern agriculture as the top priority"<sup>[23]</sup>, and earnestly implementing the spirit of the 19th National Congress of the Communist Party of China, it is required to further deepen the development of processing industry of agricultural products, accelerate the development of agricultural and rural modernization, fully implement the rural revitalization strategy, and promote the transformation of Nanchong City from primary processing to fine and deep processing to strong agricultural mar-

ket, so as to provide a reference for making a scientific plan for Nanchong City (2018–2020) for accelerating the development of fine and deep processing of agricultural products, accordingly promoting the fine and deep processing of agricultural products in Nanchong City and underdeveloped areas.

According to statistics, in 2017, the total grain yield of Nanchong City was 3.178 million t, ranking first in the Sichuan Province for 15 consecutive years. The total output of oil was 401 500 t, the total output of vegetables was 3 670 200 t, and the total output of citrus was 585 000 t; it produced 15 million kg of silkworm cocoon, and 5 598 800 live pigs for sale, 143 100 beef cattle, 1.968 million sheep, 57 081 200 small poultry, and a total of 112 000 t of aquatic products. In recent years, Nanchong City has seriously implemented the "155 Development Strategy" of the Municipal Party Committee and the Municipal Government to accelerate the construction of the great goal of "Second City of Chengdu". Nanchong City has promoted the construction of modern agricultural industrial clusters with output value of 100 billion yuan, built an organic agricultural product processing industry framework based on grain, oil, fruits, vegetables and livestock, 61 large-scale agricultural product processing enterprises in the city, realized an annual processing value of 12.5 billion yuan, and made detailed plan to promote the construction of 7 processing parks of agricultural products, the agricultural product processing industry shows a good development trend. However, the processing of agricultural products is relatively low, in terms of both the primary processing and deep processing, as well as in processing equipment and technology. In 2017, the ratio of agricultural product processing industry to total agricultural output value of Nanchong City was only 1.9:1, lower than the national level (2.2:1) and the provincial level (2.1:1), equivalent to the national level in 2007<sup>[24–25]</sup>.

## 2 Basic principles for the development of fine and deep processing industries of agricultural products

**2.1 Taking the market as leader and the government as support** Nanchong City should follow the laws of the market economy, bring into full play the status and function of new agricultural business entities, and achieve rational allocation of resources. Besides, it is required to strengthen quality services of the government, support agricultural product processing parks, and solve such difficult problems as bottlenecks and lagging nodes in agricultural product processing industry.

**2.2 Gathering resources and integrating development** Nanchong City should actively guide the scale industrial bases, industrial superior areas, logistics node areas and other resources to gather in the processing park, attract agricultural product processing enterprises to gather in the processing park, and build a cluster of agricultural product processing industry that integrates raw materials, processing, logistics and marketing.

**2.3 Strengthening innovation and recycling use** Nanchong City should strengthen the research and development of agricultur-

al processing technology, comprehensively improve the processing capacity and technology level, enhance the market competitiveness of agricultural processing products, develop organic green food and production and processing industry chain extension products, and achieve efficient recycling of resources.

**2.4 Orienting towards agriculture and increasing efficiency through processing industry** Nanchong City should bring into play the potential of regional characteristics, focus on building a whole agricultural industry chain and a full value chain, enrich the agricultural processing products, improve quality, make the brand more well-known, increase the added value of agricultural products, and realize the increase in agricultural production, income, and efficiency.

### 3 Key projects for the development of fine and deep processing industries of agricultural products

#### 3.1 Concentrating on building fine and deep processing industrial park for agricultural products in northeast Sichuan

In order to do well in and provide references and reproducible and extensible experience for the fine and deep processing of agricultural products in the whole city, the municipal party committee and municipal government of Nanchong City have decided to build a city-level fine and deep processing industrial park for agricultural products in Yixing Town, Xichong County in northeast Sichuan. The park is intended to achieve high-level positioning, high-end breakthroughs, and high-level advancement, to become an environmentally friendly, resource-intensive, market-oriented boutique park and focusing on the fine and deep processing of agricultural products, promoting the demonstration base of the integration of the three industries and building a demonstration park for fine and deep processing of agricultural products covering the northeast Sichuan and even the west of Sichuan, and concentrating on the processing of organic foods such as fruits, vegetables, grain and oil, aviation food and meat products. The park mainly plans to build "one belt, two axes and five zones": one belt is the 20 m wide riverside ecological green belt along the river; the two axes are two 24 m wide roads for protective green spaces on both sides of the north-south and east-west, forming a green axis along the road; the five zones refer to fruit and vegetable processing zone, livestock and poultry processing zone, grain and oil processing zone, agricultural and sideline products storage and logistics zone, and organic agricultural product research and development demonstration zone. Closely concentrating on the characteristics of organic agriculture, the park plans to develop organic food processing such as fruits, vegetables, grain and oil, aviation food, meat products, *etc.*, and build the park into a model for Nanchong's agricultural product processing park, leading the development of agricultural processing industry. By 2020, the park area will reach 133.3 ha, hold more than 30 enterprises, the annual processing output value will be more than 10 billion yuan, and the

annual profit and tax will be 500 million yuan.

**3.2 Building a county-level fine and deep processing park for agricultural products** All areas make an overall arrangement for the development of fine and deep processing park for agricultural products, focus on leading industries and characteristic agriculture, adopt independent construction or industrial parks, and strive to build county-level fine and deep processing park for agricultural products. Counties (cities and districts) should strengthen the construction of infrastructure and public service platforms in the park, and support infrastructures such as water, electricity, roads, and gas, and at least concentrate on building one agricultural product processing park to promote the development of modern agriculture through large enterprises and large groups. Relying on processing brands such as Zhangfei Beef, Baoning Vinegar, Jiajia Soy Sauce and Yang's Fruits, Langzhong County concentrates on the construction of processing parks with the processing of fruits, meat products and vinegar products as main parts. Relying on leading enterprises such as Jianmin and Jiamei, Peng'an County focuses on the construction of agricultural product processing parks for fruit and vegetable processing and processing of livestock products. Relying on the traditional advantages of Sichuan Jinchen Food Co., Ltd. and Guojianglong Beef, Gaoping District focuses on the construction of animal product processing parks, mainly live pig slaughtering and meat processing, and expand and strengthen the Xintiantai dairy industry to develop towards six provinces and connect with Yili Group. In the south, taking Jilin Forest Industry Group and Yihua Timber Industry Co., Ltd. as the leaders, it focuses on the construction of the forestry comprehensive processing park, mainly sheet production and furniture manufacturing. Relying on Yanjing Brewery, Tujiu Wine, Huiyuan Juice, Shanghao Tea and other leading enterprises, Jialing District focuses on the construction of food processing park based on wine and tea. Yilong County focuses on the construction of a food industrial park based on cooking wine, vinegar, soy sauce, hot pot seasoning, seasoning oil, seasoning package and other condiments. Besides, relying on Hengyang Food, Baifeng Food and other enterprises, Yingshan County should focus on building a food industry park, accelerate the construction of Yingshan Black Goat Processing Park with the processing of "Yingshan Black Goat". Shunqing District should use time-honored brand North Sichuan Clear Noodles in Chili Sauce to build North Sichuan Clear Noodles in Chili Sauce Cultural and Creative Park.

**3.3 Giving prominence to the development of fine and deep processing of agricultural products** Nanchong City should develop the grain and oil deep processing industry chain, and encourage leading enterprises such as Xichong Hangjingxiang Rice and North Sichuan Clear Noodles in Chili Sauce to carry out deep processing of grain and oil, guide the development of high value-added products, and strengthen the comprehensive utilization of by-products. Besides, Nanchong City should develop the deep processing industry chain of animal products, relying on leading

enterprises such as Yurun Group and Jianmin, foster and expand, attract and introduce a group of deep processing enterprises of animal products, concentrate on the fine and deep processing of meat and eggs, and promote the meat and egg products to pre-cooled meat and small packaging, fine segmentation, portable development, and strengthen the development and production of bio-functional products. Also, Nanchong City should develop fine and deep processing industry chain for fruits and vegetables, promote the transformation and upgrading project of vegetable processing production line, cultivate a batch of fruit processing leading enterprises such as Benwei Fruit, develop convenience foods such as aviation and leisure, and support Haiyue Group to carry out in-depth research and development production of juice, pectin and essential oil. Relying on leading enterprises such as EAG-SK and Liuhe Silk, Nanchong City should develop the silk-spinning and weaving garment processing industry chain and create a silk-spinning garment industry cluster. In addition, Nanchong City should develop the fine and deep processing industry chain of wine and beverage, and accelerate the development of beer drinks, low-calorie beverages, concentrated juices, refrigerated juice drinks, vegetable juice drinks and new products of mulberry tea. Further, Nanchong City should develop fine and deep processing industry chain of seasoning, promote the Shuncheng Salification Environmental Protection and Energy-saving Relocation and Reconstruction Project, and promote Zhongwei and Jiajia Soy Source to become leading enterprises. Moreover, Nanchong City should implement forestry comprehensive park construction project, and promote processing enterprises such as high-grade sheet production, fine furniture manufacturing, and rare woody medicines to gather in the park. Nanchong City plans to realize agricultural product intensive processing capacity higher than 2 million t by 2020.

**3.4 Vigorously developing primary processing of agricultural products** Nanchong City should implement project for increasing the grain storage capacity, accelerate the construction of granary modern logistics storage facilities and first-line storage. Specifically, Nanchong City should focus on agricultural products with special advantages such as grain and oil, fruits, vegetables, traditional Chinese herbal medicines, mulberry and livestock products, aquatic products, *etc.*, promote the implementation of construction projects for agricultural product sorting and packaging, and carry out cleaning, selection, drying, preservation, packaging, OEM, storage, slaughtering and processing. Nanchong City should make effort to build primary processing bases for citrus products in Gaoping, Jialing, Yilong and Langzhong, and focus on the development of Shunqing and Jialing clean vegetable distribution bases. Nanchong City should support family farms and farmer cooperatives to carry out primary processing in the original place, so that farmers can obtain direct benefits at the beginning of the processing industry chain, and realize the initial processing rate of agricultural products higher than 55%.

**3.5 Actively developing agricultural inputs and agricultural machinery production and processing** Nanchong City should

implement the industrial feed production capacity upgrading project, introduce and support the investment of New Hope, Maling Aquaria and other enterprises, expand the production and processing of feed, and guide the breeding enterprises such as Tequ Group and Da Bei Nong Group to increase the production capacity of self-use feed. Nanchong City should improve the utilization level of livestock and poultry manure resources, continuously expand the production and supply capacity of organic fertilizers, and support the production of organic bio-fertilizers by using the culture conditions of Green Technologies Group and Sichuan Tianzhao Animal Farming Technology Co., Ltd. In addition, it is necessary to support the establishment of the agricultural machinery production base in Qiuqu County, with the support of the Municipal Agricultural Machinery Research Institute, and promote the upgrading of Nanchong Nanmu Machinery Equipment Company, Gaoping Fupai Agricultural Machinery Company, Langzhong Jinyuan Machinery Company and Peng'an Huinong Machinery Company, enhance the ability of agricultural machinery to innovate and develop new mechanical products suitable for the special terrain of hilly areas. Nanchong City plans to realize the industrial feed capacity greater than 300 000 t, organic fertilizer of 100 000 t, and annual production of agricultural machinery will be 50 000 sets or more.

**3.6 Accelerating introduction and cultivation of agricultural leading enterprises** Nanchong City should attract large and strong, excellent enterprises, closely focus on the dominant characteristic industries, processing parks, *etc.*, carefully plan and package a batch of agricultural products processing investment projects, use projects to attract enterprises to invest in development, and vigorously attract investment to introduce "three Classes of top 500 strong, large central enterprises, provincial enterprises, listed companies, leading enterprises and other large enterprises, large groups, build a group of fine and deep processing enterprises of agricultural products. Nanchong City should support and strengthen large-scale enterprises, including large-scale enterprise groups with large development potential, strong market competitiveness and local characteristics, support the development of large-scale enterprise groups through mergers, reorganizations, acquisitions and share holding, focus on cultivating a number of large scale-driven provincial-level and export-oriented agricultural leading enterprises with advantageous characteristics, technological innovation. Nanchong City should encourage enterprises to develop new circulation formats such as order purchase and sale, futures trading, centralized distribution, chain operation, support the reciprocal cooperation between leading agricultural enterprises and base farmers or professional cooperatives and family farms, build a whole industry chain, and explore new development path for the integration of the primary, secondary, and tertiary industries. Nanchong City should guide leading enterprises and upstream and downstream medium and small sized enterprises and micro enterprises and agricultural operation entities to establish industrial alliances, strengthen the industrial cooperation, give prominence to the dual leading function, and cultivate "top 10 demonstration en-

terprises of industrial integration". Nanchong City should encourage and support leading enterprises to implement cross-regional operation, improve product research and development, improve the fine and deep processing technology, and improve processing and transformation ability.

**3.7 Speeding up the research and development of agricultural product processing technology** Setting foot on the new demands of green, intelligent, safe, healthy and convenient industrial development, Nanchong City should focus on Sichuan-honored brands and time-honored brands, undertake staple food industrialization technology, high value-added processing technology, by-product comprehensive utilization technology and non-thermal sterilization technology and equipment, solid wood integrated materials and scrimber wood deep processing technology. Nanchong City should strengthen the full-scale utilization of agricultural products and processing by-products, introduce advanced equipment and technology for classifying, extraction, separation and preparation, and promote the full use of by-products such as crop straw, fruit and vegetable skin residue, livestock and poultry fur, bone, blood and internal organs to develop new energy, new materials and new products. Besides, Nanchong City should enhance the introduction and transformation of processing technology, introduce, screen, upgrade and promote key technologies, processes and equipment for processing agricultural products, and comprehensively raise the technical level of processing industry for agricultural products. Also, Nanchong City should strengthen the independent innovation of processing technology, guide enterprises to set up scientific and technological innovation teams, independently research and develop new technologies, new processes and new equipment, and comprehensively raise the market competitiveness of agricultural product processing. In addition, Nanchong City should strengthen the research and development of processing technology orders, and guide enterprises to connect with universities and research institutes on the principle of "supplementing the technologies as required", to undertake research and development cooperation, so as to promote accurate updating of processing technologies of enterprises. Nanchong City should strengthen the research and development of processing science and technology projects, and encourage leading enterprises to strive for key national and provincial agricultural product processing projects, to make up for the shortage of research and development funds. Moreover, Nanchong City should stress the innovation of processing technology, promote the implementation of the "Bring in" and "Go out" talent cultivation project, build a platform for the promotion and application of leading enterprises as the main body, study and research, and accelerate the upgrading and transformation of processing technologies.

**3.8 Exploring and making innovation in new business forms of agricultural product processing** Firstly, relying on modern information technology platforms such as "big data, Internet of Things, cloud computing, mobile network", Nanchong City should promote the innovation of the "Internet + agricultural prod-

uct processing" development model, and promote the development of modern agricultural processing industry towards network-based, intelligent and fine development. Besides, Nanchong City should vigorously guide the development of new products that integrate deep processing of agricultural products with culture, customs, popular science education, and health care. In addition, with the aid of the scenic spots, forest parks, agricultural parks and suburban villages, Nanchong City should deepen innovation and expand the integration model of "agricultural products + fine and deep processing + leisure tourism", and develop characteristic products with agritainment, leisure farms and industrial scenic spots as the main forms. Finally, Nanchong City should guide and support developing the new forms such as e-commerce, direct supply of agricultural products, processing experience, and central kitchen, *etc.*

**3.9 Enhancing the building of marketing brands of agricultural product processing industry** Nanchong should accelerate the promotion of the brand value of agricultural products processing industry, guide agricultural product processing enterprises to enhance the quality management, food safety control, traceability system certification, *etc.*, and promote quality and safety supervision of key links such as raw material production, product processing and logistics marketing, and build a whole-process supervision and traceability system for production, processing, packaging, storage, transportation, consumption, *etc.*, to comprehensively improve the quality of fine and deep processing of agricultural products. Besides, Nanchong City should guide and encourage to integrate similar brands, vigorously promote integrated brands, and create a catalogue of agricultural product processing brands. Nanchong City should promote the integration of regional public brand "Nanchong Jiazuo" and enterprise product brand, create a comprehensive eco-agricultural regional image brand and "time-honored brand" brand, enhance the brand awareness and credibility of agricultural products, and expand the brand influence. Nanchong City should undertake the three kinds of agricultural products and one indication, strengthen the registration and protection of agricultural product trade market and geographical indication, and strictly crack down on infringement of intellectual property rights and the production and sale of counterfeit and shoddy goods.

## **4 Safeguard measures for the development of fine and deep processing industries of agricultural products**

**4.1 Strengthening organization and leadership** It is recommended to establish and improve the department coordination mechanism for the fine and deep processing of agricultural products with participation of the relevant departments, strengthen organization and leadership, communication and coordination, further make clear work responsibilities and task division, and form joint force of departments. All areas should focus on the target tasks, make overall plan, strengthen cooperation, and actively promote the implementation of major tasks and the key projects in accordance with the "13th Five-Year" agricultural indus-

trialization development plan, to guarantee the implementation of the plan.

**4.2 Strengthening the fiscal support** It is recommended to strengthen all levels of fiscal support for fine and deep processing of agricultural products in accordance with the current financial system, and focus on supporting the construction of processing parks, technological transformation and expansion of enterprises, scientific and technological research and development innovation, industrial chain extension, and industrial integration development. The municipal and county-level finances will reward the successfully built national and provincial agricultural product processing parks according to the principle of territory. Each park will be awarded a prize of 3 – 5 million yuan, and the municipal finance will only bear 50% of the funds for the successful construction of the national and provincial agricultural product processing park in the three districts. Besides, it is recommended to reward areas that introduce agricultural product processing enterprises according to the industrial policy of inviting outside investment. Nanchong City should make effort to strive for national and provincial financial agricultural product processing projects, and integrate project funds into agricultural product processing parks. It is recommended to implement the interest subsidy method for agricultural product processing industry, and greatly reduce the financing cost. In addition, it proposes implementing preferential policies such as taxation, water and electricity, and land use, and implement "one policy for one enterprise," and "one topic for one case" for key projects.

**4.3 Enhancing the input innovation** Firstly, it is recommended to encourage the introduction of financial capital, industrial and commercial capital, and social capital flow to the agricultural product processing industry, focusing on investment in agricultural product processing enterprise cultivation, processing system construction, scientific and technological research and development innovation, and modern logistics marketing, and build a diversified input support mechanism. Secondly, the priority should be given to supporting leading enterprises to integrate into the capital market, actively cultivate enterprises to raise finance through listing, and encourage leading enterprises to expand their sources of funds by using foreign capital, issuing corporate bonds and stocks, so as to promote the development of agricultural product processing parks to a higher level.

**4.4 Strengthening financial support** It is recommended to strengthen the support of financial institutions for the agricultural processing industry, expand the total amount of credit, preferential loan interest rates, lower the threshold for loans, simplify the examination and approval procedures, and issue loans in a timely fashion. Besides, Nanchong City should support the establishment of financial service outlets in agricultural product processing parks, increase the loan efficiency, promote information communication, and reinforce the credit supervision. In addition, it is recommended to explore innovative development of warehouse receipts, orders, facilities, equipment and other quality mortgage

products, and expand the loan channels for processing enterprises of agricultural products. Moreover, it is recommended to establish and improve the credit rating system, and give priority to meeting the loan demand of well-reputed enterprises.

**4.5 Strengthening functions of talents** It is recommended to optimize the talent structure of the agricultural processing industry and establish a reasonable talent system according to age, profession, education, and job type. Nanchong City should encourage and support the introduction of high-level talents from large enterprises and large groups, especially high-level management, innovative research and development, and product marketing talents. Nanchong City should also support enterprises to select backbone forces to study in "three Classes of top 500 strong and large central enterprises to raise their core competitiveness. Nanchong City should support enterprises to set up science and technology research and development teams, and promote independent innovation in processing technology. Enterprises could establish industrial research institutes, academician workstations, postdoctoral workstations, engineering technology research centers and other platforms, to realize the sharing of top talents in China.

## 5 Conclusions

In order to earnestly implement the spirit of the 19th National Congress of the Communist Party of China, make an in-depth study and implement Xi Jinping's theory of socialism with Chinese characteristics in the new era, and taking the promotion of the structural reform of the supply front of agriculture as the main line, Nanchong should promote the construction of modern agricultural industrial cluster with output value of 100 billion yuan, cultivate agricultural product processing leading enterprises and upgrade the processing and transformation of agricultural products, build agricultural product processing park as a platform to promote the transformation of agricultural product processing industry from primary processing to fine and deep processing, and promote Nanchong City's transformation from large agricultural city to strong agricultural city. In order to ensure the implementation of the above-mentioned safeguard measures, Nanchong Municipal People's Government has specifically refined each individual item to the relevant municipal departments and people's governments of each county (city and district), and made detailed plan for fine and deep processing parks of various agricultural products. By 2020, the level of intensive processing of agricultural products in Nanchong will be significantly improved, 9 agricultural product processing parks will be built, more than 120 agricultural product processing enterprises above designated size will be cultivated, and the increase of output value of agricultural products processing will exceed 20 billion yuan; the ratio of the total output value of agricultural products processing industry to the total agricultural output value will be 2.4:1, among which, there will be 70 agricultural product processing enterprises above designated size in the park, 50 agricultural leading enterprises above the provincial level, 100 leading enterprises with an annual output value exceeding 100 million

yuan, and 10 enterprise groups with output value higher than one billion yuan. It is recommended to build a cluster of agricultural product processing parks in an all-round way with unique industrial characteristics, perfect industrial chain, high quality processing products and smooth marketing market, and make effort to build Nanchong into a "technical, brand, and profitable" agricultural product processing city in the western mountainous area. It is expected to promote Nanchong City to become the leading western and national first-class agricultural product deep processing center, warehousing logistics distribution center, and agricultural product processing research and development center by 2021. It is also intended to provide reproducible and expandable experience references for fine and deep processing of agricultural products in Sichuan and western hilly areas, warehousing and logistics distribution, and agricultural product processing and research and development.

## References

- [1] YANG XM. The status and direction of domestic and foreign agricultural product processing industry development[J]. *Charming China*,2010, 6(4):8-9. (in Chinese).
- [2] LU DS. Development trend of foreign agricultural products processing technology and equipment[J]. *Agricultural Science & Technology and Equipment*,2011,203(5):39-40. (in Chinese).
- [3] GONG HJ, CHEN KJ. Development trend of agricultural product processing technology in the 21st century[A]. *Opportunities, challenges and innovations—Collection of BBS Papers of Agricultural Engineering Youth Science and Technology in 2002*. Beijing: China Agricultural Science and Technology Press,2002: 184-187. (in Chinese).
- [4] CHEN JY. Research on technological innovation of agricultural product processing industry in developed countries[J]. *China Science and Technology Information*,2011, 23(2):98-99. (in Chinese).
- [5] LU LC, HUANG ZH. An empirical study on the impact of foreign direct investment on China's agricultural processing industry—growth, domestic investment and employment[J]. *Chinese Rural Economy*,2006,45(5):18-24. (in Chinese).
- [6] LIAO CH, ZHU TF, HUANG ZR. Development trend of agricultural products deep processing technologies and countermeasures in the 21st century[J]. *Transactions of the Chinese Society of Agricultural Engineering*,2004,20(2):288-291. (in Chinese).
- [7] CHEN KJ, LI S. Current situation and development trend of agricultural product processing technology[J]. *Grain and Oil Processing and Food Machinery*,2002(9):9-11. (in Chinese).
- [8] TONG L, LI CH. Analysis of development trend and status of agricultural product processing industry in China[J]. *Journal of Agricultural Mechanization Research*,2005, 27(5):11-15. (in Chinese).
- [9] CHEN G. Discussing of the current processing technology and development trend of the main agricultural production in China[J]. *Sichuan Food and Fermentation*,2002,38(1):4-11. (in Chinese).
- [10] PENG CJ, CAI BC, DU XY. A strategic study on pushing agriculture vertical integration forward of the devoted major efforts to farm products processing industry in Sichuan Province[A]. *Association of Agricultural Science Societies[C]. The 17th Session of the 10th Annual Conference of the Chinese Association for Science and Technology—Proceedings of the Symposium on Biotechnology and Modern Agriculture*, 2008:166-172. (in Chinese).
- [11] ZHANG SD, WU XL, WANG YN, *et al.* Study on development strategy of grain and oil processing industry in Sichuan Province[J]. *Grain Issues Research*,2013 30(4):13-21. (in Chinese).
- [12] LI X. A tentative analysis on the development trend of agricultural product deep processing industry[J]. *Rural Economy and Science-Technology*, 2017, 28(22):116-117. (in Chinese).
- [13] WANG HY, LI QZ. Status and trends of researches and development of deep processing of farm products[J]. *Food Science*,2008,29(8):655-658. (in Chinese).
- [14] LIAO ST, XU YJ. Research on the present situation, gap and development countermeasures of agricultural products processing technology in Guangdong Province [J]. *Science and Technology Management Research*,2008,28(6):145-147. (in Chinese).
- [15] WANG YW, CHEN Z, WANG R. Present situation and countermeasures research of Henan agricultural produce processing industry [J]. *Guangdong Agricultural Sciences*,2012,39(17):210-213. (in Chinese).
- [16] LIANG YX, DONG YJ, ZENG ZH, *et al.* Research on the development status and countermeasures of agricultural products processing industry in Chongqing[J]. *Southwest Horticulture*,2017,11(31):1-4. (in Chinese).
- [17] ZHENG P. Analysis on current situation of agricultural products processing industry and development countermeasures in Fujian Province[J]. *Science Technology and Industrial*, 2011, 11(1):16-19. (in Chinese).
- [18] ZHU SS. A brief discussion on the present situation and countermeasures of agricultural product processing trade in China[J]. *Agricultural Technical Services*, 2017, 34(2):189. (in Chinese).
- [19] LU DY. The gap and the policy of processing technology of agricultural products in China[J]. *Scientific Management Research*,2005,23(6):93-96. (in Chinese).
- [20] Press Office, Ministry of Agriculture of the People's Republic of China. The development of the agricultural product processing industry continually became better steadily[EB/OL]. [http://www.moa.gov.cn/xw/zwdt/201802/t20180224\\_6137419.htm](http://www.moa.gov.cn/xw/zwdt/201802/t20180224_6137419.htm), 2018-04-26. (in Chinese).
- [21] WANG Q. On the present situation and prospect of agricultural product processing industry in China[J]. *China Agricultural Technology Extension*,2002,18(2):56-57. (in Chinese).
- [22] GAO LW, XU SW, LI ZM, *et al.* Main grain crop postharvest losses and its reducing potential in China[J]. *Transactions of the Chinese Society of Agricultural Engineering*,2016,32(23):1-11. (in Chinese).
- [23] ZHANG HP. To continually study the spirit of the important speech delivered by General Secretary Xi Jinping during his visit to Sichuan[N]. *Sichuan Daily*,2018-02-23. (in Chinese).
- [24] LI F. The National Urban Modern Agriculture Exchange Conference was held in Tianjin[N]. *Farmers' Daily*,2018-05-04. (in Chinese).
- [25] Agro-Processing Bureau, The Ministry of Agriculture of the People's Republic of China. Report on the development of China's agricultural processing industry in 2007[M]. Beijing: China Agricultural Science and Technology Press,2008. (in Chinese).