Optimizing the Allocation of Agricultural Resources and Developing an Advanced and Productive Agricultural System
---A Study on Agricultural Specialized Cooperatives Model

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Abstract: With the needs of modernization, the model of agricultural specialized cooperatives is gradually emerging as a prominent approach. This article explores the historical evolution, promotional value, and development prospects of China's agricultural professional cooperatives, delving into their advantages in promoting agricultural production, supporting farmers' income growth, and driving rural construction. Using case analysis methods and supported by numerous cases, this article provides insights for the development of modern agriculture.

Keywords: agricultural specialized cooperatives, agricultural production and management models, modern agriculture.

I. Overview of the Development of Agricultural Professional Cooperatives

(I) Research Background and Purpose

China, a vast country with a mammoth population and rich agricultural heritage, faces significant challenges in ensuring food security for its people. Despite its vast agricultural resources, China is constrained by a low per capita share of these resources and often unfavorable production conditions. The question of how to safeguard China's ability to feed itself, with the rice bowl firmly in its own hands, is not just a domestic concern; it holds immense significance for global food stability. The answer lies, in part, with a robust agricultural management model that can not only protect farmers' incomes and incentivize them to continue farming, but it can also promote the efficient utilization of agricultural resources and facilitate the transition to modern, sustainable agriculture, which is crucial for China to achieve food security and contribute to global food stability. Therefore, the agricultural management model is a topic worthy of in-depth research.

Land is the most important foundation of agriculture and the source of farmers' wealth creation. Historically, traditional Chinese agriculture was mainly self-sufficient and individually operated by households. After the founding of the People's Republic of China, we have experienced various agricultural production and management models, such as mutual-aid groups, primary cooperatives,

advanced cooperatives, and people's communes. Among them, the commune system, which featured a single collective management style and an average distribution method, greatly dampened farmers' enthusiasm for production and had a negative impact on agricultural production, seriously affecting China's food security. In the 1980s, China began the reform of the household contract responsibility system, abolishing the people's commune system. This reform greatly enhanced farmers' enthusiasm for production, unleashed agricultural productivity, and allowed China to successfully address the issue of food self-sufficiency while its population grew almost explosively, ensuring that 1.4 billion Chinese people are well-fed and well-nourished.

However, with the development of industrialization and urbanization in China, phenomena, such as relatively declining agricultural production income, reduced enthusiasm for agricultural production among farmers, and abandoned farmland, have emerged, threatening agriculture security. If we continue to adhere to the single model of household contract management without timely innovation in the management model, it will inevitably endanger China's food self-sufficiency. Therefore, it is urgent to improve the agricultural production and management model, increase farmers' planting income and production enthusiasm, and thus ensure the food security of the Chinese people.

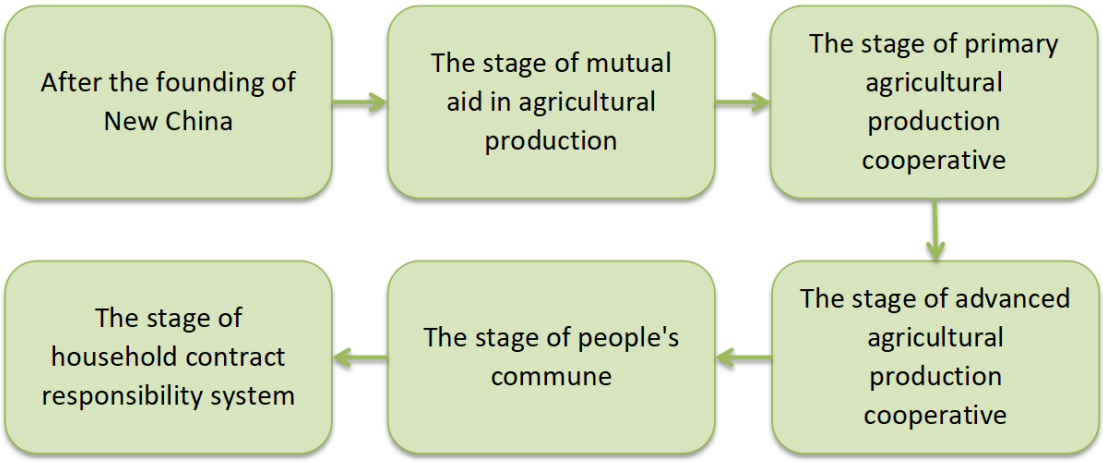

Figure 1. Modern Agricultural Model in China

Looking back at China's modern history, we can find a model worthy of reference: agricultural cooperatives. Since its inception, the Communist Party of China has regarded the development of cooperatives as an important part of the revolutionary movement of the workers and peasants, as well as a crucial means to support and improve their lives and resist exploitation. From the War of

Resistance Against Japan, the War of Liberation to the Reform and Opening-up, agricultural cooperatives have undergone continuous reforms and are now on a sound path of development. The government is constantly guiding, and legally regulating the cooperatives, promoting their diverse development and quality improvement. However, we must not merely adhere to the narrow concept of cooperation in the past but instead integrate agriculture with modernization.

(II) The Meaning and Characteristics of Agricultural Specialized Cooperatives

Agricultural specialized cooperatives are mutual economic organizations voluntarily formed by producers of similar agricultural products or providers and users of similar agricultural production and operation services on the basis of household contract management in rural areas [1]. They are jointly operated in a democratic way. Their significance lies in optimizing agricultural resource allocation, reducing the unit cost of agricultural production, improving the efficiency of agricultural production, jointly resisting disasters, reducing production costs and market risks, and increasing farmers' income from farming, thereby enhancing farmers' production enthusiasm and ensuring China's food security. Therefore, agricultural specialized cooperatives are neither traditional simple cooperatives nor large communes, but specialized cooperation under modern agriculture.

Compared to the various drawbacks of small-scale household family-contract farming, including lags, blindness, and spontaneity, the implementation of specialized cooperatives with collective, unified, large-scale, and mechanized production and operation can not only conserve human and natural resources but also significantly reduce production and operation costs for farmers. Currently, some government-organized agricultural cooperatives, urban companies, and large-scale grain farmers have leased land through various forms, achieving centralized land transfer, which has facilitated mechanized, professional, and scientific planting management, greatly enhancing production efficiency. Consequently, these groups demonstrate a higher enthusiasm for grain production. In contrast, decentralized household-based farming, due to its limited area, poor cultivation conditions, inability to mechanize fragmented plots, lack of professional scientific planting and management, and limited ability to respond to pests, diseases, and weather disasters, results in increased production costs, reduced benefits, dampened enthusiasm, and decreased grain income. Therefore, promoting agricultural specialized cooperatives with reasonable division of labor as a new agricultural management model following family contracting, and integrating family

contracting with collective unified management of specialized cooperatives, is the optimal choice for improving agricultural management methods and promoting agricultural development.

The reason why agricultural specialized cooperatives have broad prospects for development ultimately lies in their ability to increase farmers' income from farming, which is closely related to the safety of agricultural production. The mainstay of agricultural production is farmers, and whether farmers can receive benefits and how much they can receive determines their enthusiasm for agricultural production. Agricultural specialized cooperatives can provide farmers with the greatest benefits, thus enhancing their enthusiasm for production and providing the most reliable guarantee for the safe development of agricultural production.

(III) Current status of agricultural cooperatives

Currently, China's agricultural specialized cooperatives are showing an increasingly robust trend. By the end of 2022, a total of 2.2436 million agricultural specialized cooperatives had been established across the country, with a total scale exceeding 400 billion yuan. Among them, planting cooperatives accounted for the largest proportion, reaching 77.9%; livestock and fishery cooperatives accounted for 11.6% and 7.3% respectively. The scale of cooperatives tends to be small and medium-sized, with cooperatives with fewer than 50 members accounting for up to 93.7%. The coverage of cooperatives is expanding year by year, involving multiple fields such as rural planting, breeding, agricultural machinery services, and agricultural product processing [2]. (As shown in the figure below)

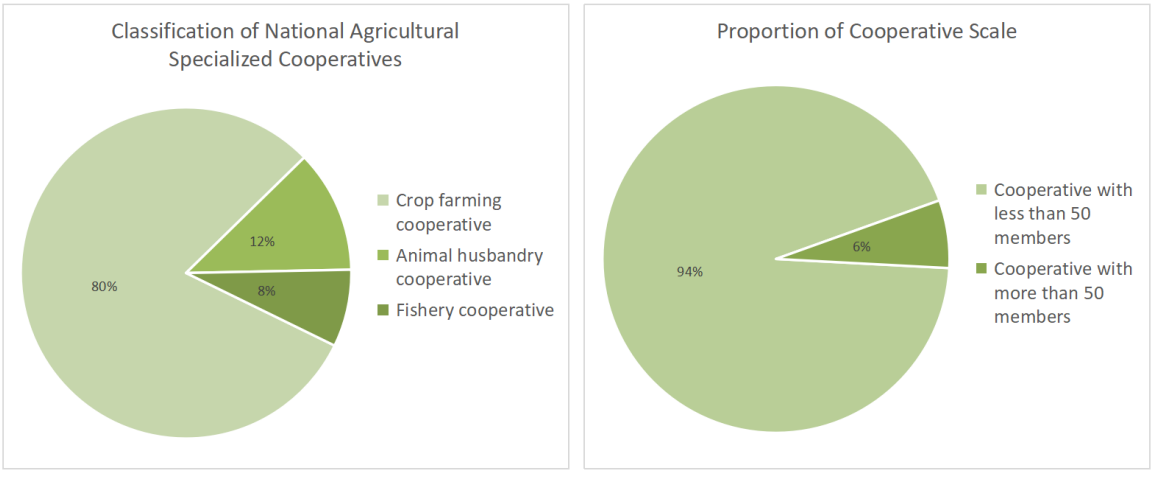

Figure 2. Classification of National Agricultural Specialized Cooperatives & Proportion of Cooperative Scale

As can be seen from the figure below, the growth momentum of China's farmer cooperatives is strong.

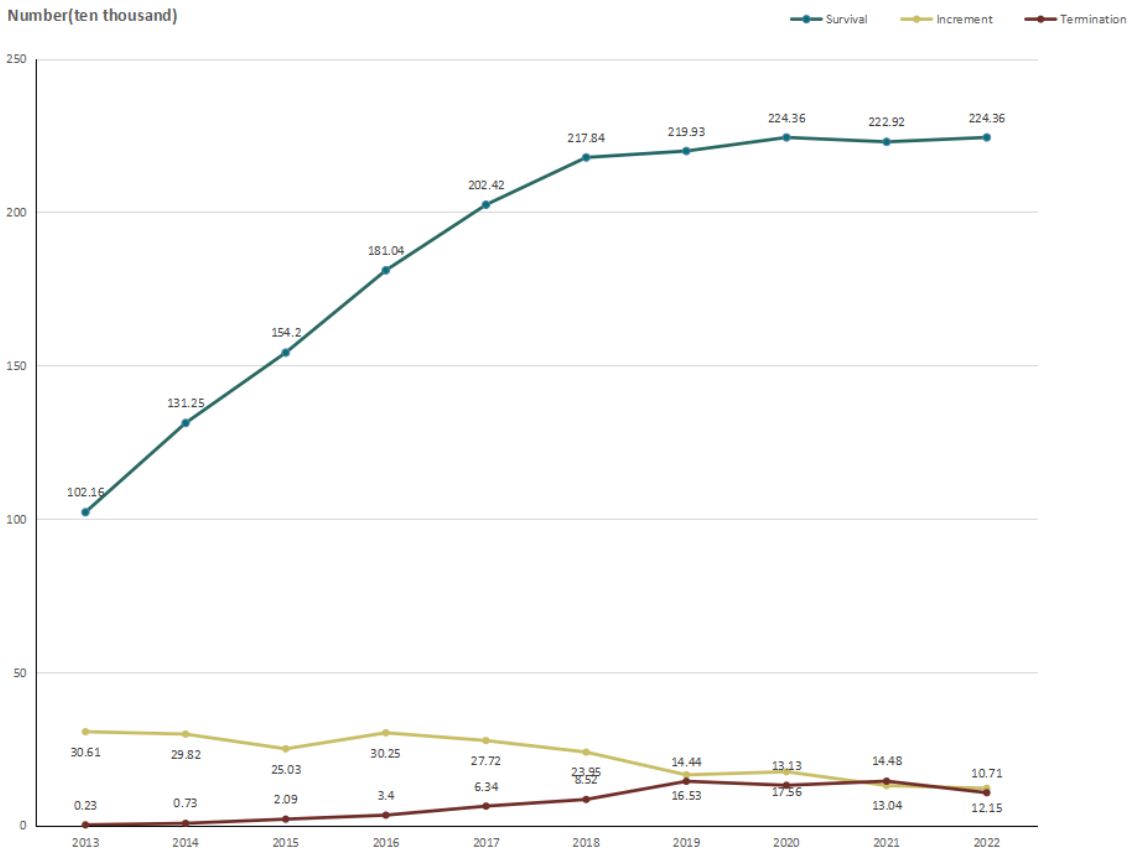

Figure 3. Growth of Agricultural Specialized Cooperatives in China over the Past Decade

Cooperatives are mainly distributed in traditional agricultural provinces. Regionally, the existing farmer cooperatives in China at the end of 2022 were mainly distributed in traditional agricultural provinces such as Shandong, Henan, Hunan, and Anhui. Only Shandong and Henan provinces have more than 200,000 farmer cooperatives, among which Shandong Province ranks first in the country with 243,600 existing farmer cooperatives.

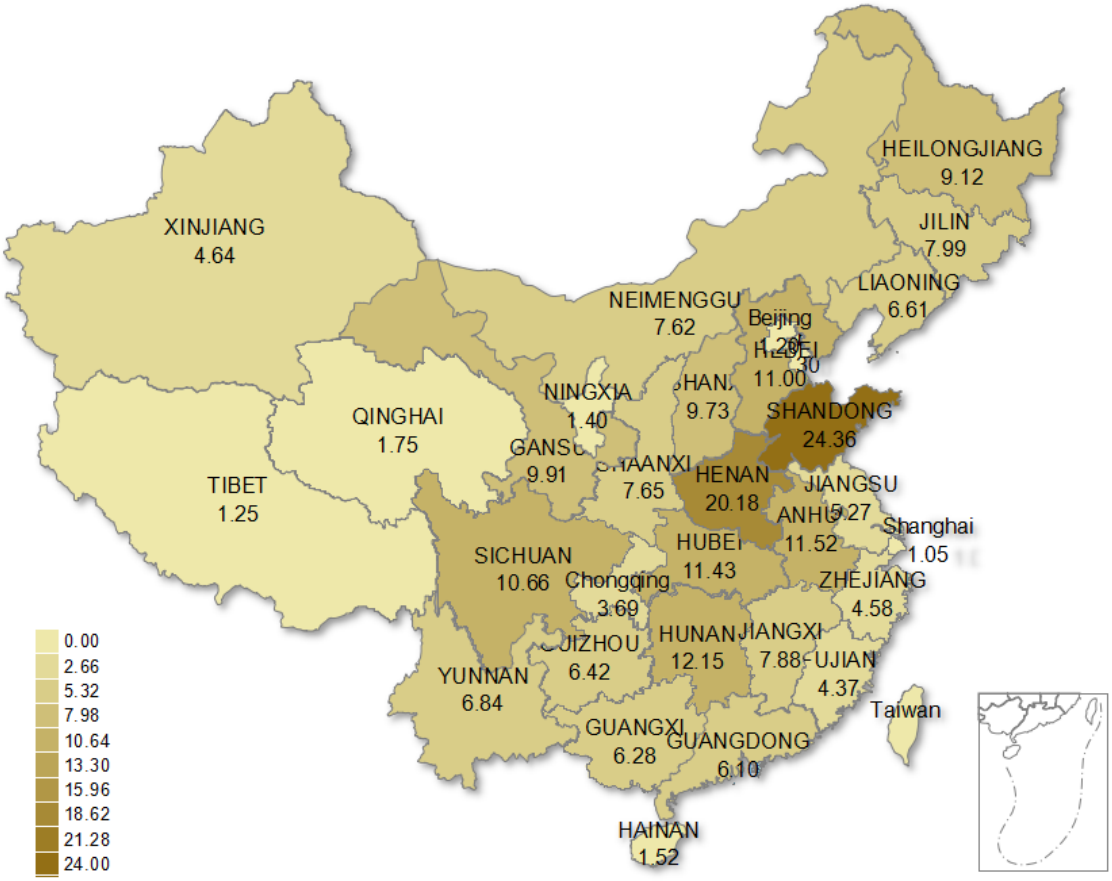

Figure 4. Regional Distribution of Agricultural Specialized Cooperatives in China in 2022

Agriculture, forestry, animal husbandry and fishery are the main industries in which cooperatives are distributed. From the perspective of industry distribution, nearly 95% of China's farmer cooperatives were distributed in agriculture, forestry, animal husbandry, and fishery in 2022, which obviously aligns with practical experience. Further analysis shows that cooperatives in agriculture, forestry, animal husbandry, and fishery are mainly distributed in agriculture, accounting for 58.8%, while those in forestry and fishery are relatively few.

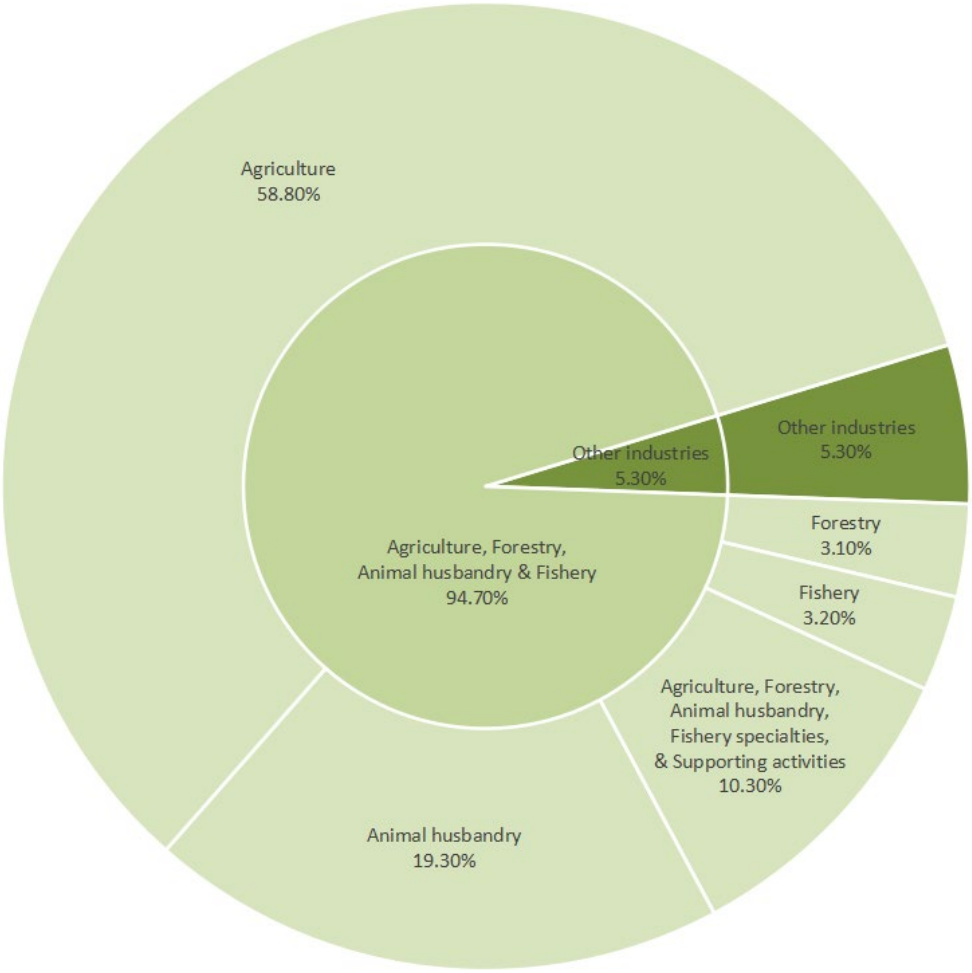

Figure 5. Sectoral Distribution of Agricultural Specialized Cooperatives in China in 2022

The distribution of industries among provinces has its own characteristics. The agricultural cooperatives in most provinces are predominantly focused on agriculture, with Shandong and Henan provinces boasting significantly higher numbers compared to other regions. The farmer cooperatives in Qinghai, Inner Mongolia, and Xinjiang are mainly distributed in animal husbandry, and the number of animal husbandry cooperatives in Gansu, Inner Mongolia, and Sichuan ranks the top three [3]. The geographical distribution of different types of specialized cooperatives mainly depends on the local agricultural types.

In recent years, Hebei Province, where the author is located, has insisted on fostering and strengthening new agricultural business entities as an important measure to promote high-quality agricultural development and achieve rural revitalization. It has launched the action to standardize and upgrade farmer cooperatives and implemented the family farm cultivation plan. By the end of

2022, there were 111,100 registered farmer cooperatives and 77,000 family farms in the province, ranking among the top in the country. Among the members of farmer cooperatives, there are 1,091,700 households, including 1,066,500 farmer households, accounting for 97.69%; 19,300 non-farmer members, accounting for 1.8%; 4,800 enterprise members, accounting for 0.4%; and 1,037 public institutions and social organizations. Farmer cooperatives have radiated and driven 68% of farmers and covered 94% of administrative villages in the province, fully playing the role of organizing farmers, serving farmers, and enriching farmers. The province now has 443 national demonstration cooperatives, 1,788 provincial demonstration cooperatives, 21 pilot counties for improving the quality of farmer cooperatives, and 4 ministerial observation points for farmer cooperatives. Family farms have developed rapidly and healthily, with further improved benefits.

II Value of Agricultural Specialized Cooperatives

After investigating the research overview of agricultural specialized cooperatives, their value can be summarized in three key aspects: boosting agricultural production, enhancing farmers' income, and driving rural development.

(I) Promoting Agricultural Production

1. Higher level of technical expertise

Agricultural cooperatives can pool resources to achieve greater achievements, promote the upgrading and improvement of rural infrastructure, and contribute to the widespread popularization of various advanced agricultural production technologies, truly embodying the concept of "storing grain in technology." For instance, modern technologies such as agricultural irrigation technology, water conservancy construction technology, and greenhouse technology have been extensively applied, enhancing the specialization of agricultural production, promoting the widespread application of advanced agricultural technologies, and effectively promoting the development of agricultural production, and ensuring food security.

Beijing Xinchengyuan Fruit Products Specialized Cooperative has four patents for strawberry vertical cultivation racks. In addition, with the support of Beijing Agricultural Technology Extension Station, Changping District Agricultural and Rural Bureau, and other organizations, the cooperative has also conducted over 60 experimental demonstrations on techniques such as organic

fertilizer cultivation of soil fertility, soil testing and formula fertilization, strawberry water and fertilizer integration, and strawberry-vegetable rotation. In total, 11 mature technologies have been promoted, and one patent for strawberry slow-release fertilizer seedling has been applied for. The cooperative organizes more than 50 technology promotion events annually [4].

The Jinshahe Crop Planting Specialized Cooperative in Nanhe District, Xingtai City, Hebei Province has learned and mastered key technologies, focusing on the key links of soybean-corn strip intercropping, including variety selection, planting mode, chemical weeding, seedling growth control, and harvesting, and made full preparations. Based on comprehensive factors such as plot conditions, maturity cycle, and yield of corn and soybeans, high-yield varieties with compact plant type, suitable for dense planting and mechanized harvesting are selected. The cooperative scientifically identifies the most suitable planting mode and variety combination for the local area, and controls the growth period of soybeans and corn to be around 102 days to ensure simultaneous harvesting.

Figure 6. Soybean-corn Strip Intercropping in The Jinshahe Crop Planting Specialized Cooperative

These two specialized agricultural cooperatives have effectively promoted the growth of agricultural production through technical improvement and specialization.

2. Reducing agricultural production costs and improving agricultural production efficiency by

promoting large-scale and mechanized farming.

With the development of specialized cooperatives, land has gradually shifted from fragmentation to centralization, making it easier to conduct large-scale and mechanized production. This makes it possible to scientifically manage farmland in a unified manner, improve product quality, and boost agricultural development.

The Jinshahe Crop Farming Specialized Cooperative in Nanhe District, Xingtai City, Hebei Province, insists on developing large-scale grain operations. The planting scale has expanded from 3,766 acres 10 years ago to nearly 30,000 acres now, forming multiple large-scale land contract professional cooperative operations. To ensure mechanized operations in the middle and late stages of soybean-corn strip intercropping, the cooperative installed navigation devices during planting to ensure uniform spacing between soybean and corn rows. Under the guidance of local agricultural and rural department technicians, the cooperative collaborated with agricultural machinery enterprises to modify pesticide spraying machines, creating a configuration with "long partitions, multiple nozzles, and dual pesticide buckets," which allows simultaneous pesticide application for soybeans and corn without affecting each other, achieving "one operation with two effects."

3. Resisting market risks and natural disasters

In a market economy, farmers operating individually often face significant risks due to market fluctuations. Without a precise grasp of market information, farmers tend to plant blindly, failing to adapt to changing market conditions. This frequently leads to a severe imbalance between supply and demand of agricultural products, resulting in "low grain prices that harm farmers" and significant agricultural losses. Additionally, farmers expend vast amounts of energy but are unable to withstand the immense risks posed by market fluctuations (including natural disasters), greatly dampening their enthusiasm for production. However, joining agricultural cooperatives can provide farmers with significant benefits. With unified planning and organization, cooperatives avoid vicious competition and possess a more precise understanding of market trends. Moreover, through value-added activities such as deep processing, cooperatives extend the agricultural value chain, thereby effectively reducing market risks. This not only alleviates farmers' concerns but also serves as a strong support for them to engage in agricultural production with confidence.

In the past, farmers from Beijing Xinchengyuan Fruit Specialized Cooperative cultivated strawberries individually. Whether it was the selection of strawberry varieties or market sales, farmers made their own decisions independently. The price was often determined by the purchasing vendors. After the Spring Festival every year, farmers would start to worry about sales channels. However, since joining the cooperative, farmers have access to unified seedlings and regular expert guidance in the greenhouse, teaching them hands-on how to manage their crops. Farmers now only need to follow the guidance, feeling relaxed and assured while ensuring their income. Based on this, farmers have also established the Xinchengyuan Plant Protection Specialized Service Organization and the Strawberry Water and Fertilizer Integration Specialized Service Organization, providing a one-stop service covering pre-production, in-production, and post-production stages for strawberry cultivation. These services include providing quality seedlings to farmers before production, technical guidance, green prevention and control of diseases, pests, and poisonings, and standardized fruit management during production, as well as unified sales and environmentally friendly disposal of plant residues after production, forming a complete industry chain.

Figure 7. Strawberries in Beijing Xinchengyuan Fruit Products Specialized Cooperative

To encourage farmers' enthusiasm in investing with their land management rights, the agricultural cooperative has explored and implemented a "profit-sharing but loss-free" distribution mechanism. During years of natural disasters, a fixed land rent income is guaranteed, while during bumper crops, a second round of distribution is conducted to fully protect farmers' rights and interests.

(II) Boosting Farmers' Income

Farmers incorporate their diverse resources, including land, labor, capital, technology, and other production factors, into specialized cooperatives as shares, achieving the fullest and most optimal utilization of resources, thereby constantly enhancing agricultural productivity and significantly improving production efficiency. This effectively helps farmers increase their income and achieve prosperity.

The Beijing Xinchengyuan Fruit Product Specialized Cooperative, adopting the "cooperative + farmer" cultivation model, has led 243 members to gradually establish an operational model integrating "scientific and technological innovation and technology demonstration, comprehensive socialized services, cultivation of new-type professional farmers, and integration of agriculture, culture, and tourism." It has driven more than 500 households in the surrounding areas, covering an area of over 1,000 mu (around 66.7 hectares) and generating an annual output value of over 15 million yuan. Each member's average income from a greenhouse is 40,000 to 50,000 yuan. Among the 243 members of the cooperative, tomatoes are currently the most widely intercropped crop, earning an additional income of 8,000 to 12,000 yuan per greenhouse through intercropping alone. The 'strawberry +' intercropping model has improved the utilization efficiency of land and significantly enhanced productivity.

The agricultural greenhouse facilities of a cooperative in Shunping, Hebei Province, cover an area of 48,900 mu (3,260 hectares). It annually attracts nearly 300,000 visitors for fruit picking, generating an income of more than 12 million yuan in the leisure agriculture sector, and contributing to the income growth and prosperity of over 40,000 people. Currently, the cooperative boasts 340 members and over 700 greenhouse facilities, cultivating various out-of-season fruits and vegetables like cherries, fresh peaches, nectarines, strawberries, cucumbers, and tomatoes. Every year, the cooperative organizes 3 to 5 technical training sessions, inviting agricultural experts from

the city to deliver lectures and provide a platform for farmers to exchange technical know-how, thereby enhancing their professional expertise. Furthermore, the cooperative also employs impoverished households and unemployed individuals from neighboring villages to work on-site, enabling them to participate in the daily management of the greenhouses. This not only allows them to learn fruit and vegetable cultivation techniques but also opens up a new path for villagers to increase their income and achieve prosperity.

Figure 8. Cucumbers grown in a greenhouse in Shunping

(III) Promoting Rural Construction

Agricultural cooperatives play a pivotal role in elevating farmers' income, which subsequently fuels rural development. This augmentation not only enables rural areas to secure funding for critical infrastructure projects but also fosters the establishment of cultural and recreational centers, as well as specialized medical clinics. These advancements cater to farmers' evolving needs for a more fulfilling lifestyle. Moreover, the enhanced level of rural infrastructure, coupled with the development and prosperity of rural communities, triggers a reverse migration of agricultural labor, providing ample opportunities for the growth of modern agricultural practices. This, in turn, expands the scope for agricultural innovation and productivity, further propelling the urbanization process in rural areas. Ultimately, these positive developments contribute to bridging the income

gap between urban and rural residents, aligning rural development with urban standards, and advancing the modernization of agriculture, rural areas, and farmers, thereby fostering a more equitable and sustainable future for all.

III. The Development Prospect of Agricultural Specialized Cooperatives

(I) Prospects for China's Agricultural Development

Agricultural cooperatives are the inevitable path for the transition from traditional agriculture to modern agriculture, ultimately evolving into agricultural modernization farms. Not only does this evolution facilitate the realization of technological modernization, agricultural specialization, and mechanized production, but it also allows the further development of specialized cooperatives into nationwide agricultural alliance associations. These associations will coordinate unified operations on a broader scale, promoting a more concentrated and professional agricultural development, which is the future direction of modern agriculture. Only by doing so can we better ensure China's food self-sufficiency and contribute significantly to global food security.

(II) Reference Significance for Other Countries in the World

1. Better addressing resource constraints in agricultural development in developing countries: Issues such as resource scarcity, backward infrastructure construction, low agricultural technology levels, and inefficient production can be resolved through agricultural specialized cooperatives, allowing farmers to directly experience significant benefits. Imagine a farmer cultivating five acres of apples. If they operate independently in a family-based manner, understanding market information, obtaining advanced cultivation techniques, and mastering scientific pest and disease control would undoubtedly result in high unit costs. However, if ten or dozens of such fruit farmers cooperate, unit costs will inevitably decrease significantly, and profits will increase significantly.

2. Enhancing farmers' income and safeguarding their living standards: The essence and core of agricultural specialized cooperatives are to improve agricultural production efficiency, increase farmers' income, and thus safeguard food security. Therefore, the development of agricultural specialized cooperatives in developing countries with a large population but harsh natural environments and relatively backward technology is conducive to promoting agricultural production,

greatly increasing yields, and resisting natural disasters, thereby continuously increasing farmers' income.

3. Ensuring national food security: The most basic security for a country is food security. However, in some countries with relatively low development levels, agricultural food production still mainly relies on natural conditions. Large natural disasters pose a severe threat to food security. Agricultural specialized cooperatives provide the best solution to reduce the threat of natural disasters to agriculture. Through professional agricultural cooperation, farmers' ability to jointly resist disasters is enhanced, shifting from a complete reliance on nature to a reliance on both nature and humanity. Simultaneously, agricultural specialized cooperatives do not require significant government investment and intervention. They can be established and function through farmers' self-directed cooperative operations.

In conclusion, the agricultural specialized cooperative model stands as a powerful solution for developing countries to boost their food production, attain food security, and ultimately address hunger and poverty. This model is especially relevant for those countries with vast populations but relatively underdeveloped agricultural sectors. The agricultural specialized cooperatives not only empower farmers through shared resources, knowledge, and support, but they also strengthen their resilience to natural disasters and market volatility. In China's case, despite facing severe limitations in agricultural resources per capita, the agricultural specialized cooperative model has proven remarkably successful. It has not only safeguarded China's own food security but has also offered an exemplary blueprint for other countries to emulate. This model embodies China's commitment to global food security and poverty reduction, aligning with the United Nations' Sustainable Development Goals. Therefore, the agricultural specialized cooperative model is not just a business approach; it is a strategic tool for development, poverty reduction, and sustainable agriculture. It is a testament to China's global leadership and commitment to sharing its wisdom and experiences with the world to build a more prosperous and equitable future.

REFERENCES

[1] Law of the People's Republic of China on Specialized Farmer Cooperatives, 2017.

[2] Tian Li and He Siyi. The Development of New Types of Agricultural Business Entities in Hebei Province. Journal of Chinese Farmer Cooperatives, December, 2023.

[3] Illustrated Data on Agriculture, Rural Areas, and Farmers (Issue 12) - Latest Data: Regional and Industry Distribution of Farmer Cooperatives in China, Qiyan Digital Science and Technology. Data on Agriculture, Rural Areas, and Farmers, March, 2023.

[4] Zhang Qinghua and Liu Jingyue. A "Wealth Creation Strategy" of a Farmer Cooperative in the Suburbs of Beijing. China Agriculture Network, March, 2024.

[5] Composite Planting Paints a Prosperous Landscape, Stabilizes Grain Production, Expands Oilseed Crops, and Ensures Food Security -- The Jinshahe Crop Farming Specialized Cooperative in Nanhe District. China Network, June, 2023.

[6] Wang Xinyu and Jia Yiwei. Shunping, Hebei Province: Cherry Blossoms Herald a Promising Future for Rural Prosperity. Hebei News Network, February, 2022.