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Review

A Rural Land Share Cooperative System for Alleviating the Small, Scattered, and Weak Dilemma in Agricultural Development: The Cases of Tangyue, Zhouchong, and Chongzhou

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Abstract: "Small, scattered and weak", i.e., small-scale arable land holdings, decentralized operation, and weak effectiveness are common agricultural development problems that most developing countries face. Promoting the moderate-scale operation and modernization development of agriculture under the premise of protecting social stability is a complex and systemic process. In the evolution of China's agricultural business model and land system reform, the Land Shareholding Cooperative System (LSCS) emerged. However, few studies have focused on the relationship between rural land institution innovation and agricultural economic development. We found great potential in this approach in solving the dilemma of "small, scattered, weak" in agricultural development, while protecting farmers' land property rights. We described the cases of Tangyue, Zhouchong, and Chongzhou in rural China through the research method to illustrate how this occurred. This approach takes full advantage of the combination of "cooperative" and "shareholding" while alleviating the incompatibility of the historical allocation of arable land with urbanization and agricultural development. Balancing the development of factor markets and protecting the welfare of members contributes to its effective implementation. This study provides valuable examples of agricultural development in similar areas and countries.

Keywords: agricultural land; land share cooperative system; agricultural development; property rights; fragmentation; scattered operation; efficiency

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1. Introduction

Small-scale arable land holdings, decentralized operation, and weak effectiveness are common agricultural development problems that most developing countries face [1–3], including large parts of Africa [4–7], some countries in Europe [8], economies in southern Asia [9], and China, which is currently in a critical stage of socioeconomic transformation [10,11]. The typical characteristics of this production system and farm structure can be summarized as "small, scattered, and weak (SSW)". It often leads to high production and transaction costs and low profits [12] and lacks market-oriented information and services [13], making the rural household economy both vulnerable and difficult to secure an effective supply of agricultural products with [14]. How to break through the bottleneck of "small, scattered and weak" that constrains agricultural development and realize the moderate-scale operation and modernization of agriculture is of great significance to promoting agricultural and rural development.

Specifically, "small" means that the arable land holding of a farm household is small. According to the World Bank's definition, an area of less than 2 hectares is considered to

be a smallholder [15]. In China, the limited agricultural land resources are distributed among 203 million smallholder farmers, resulting in an average household arable land area of only 0.63 hectares, and even such small farms are usually scattered among several separate plots (data source: The Third National Land Survey published by the Ministry of Natural Resources of China in 2021). The per capita and per household arable land area in China over the past 70 years is shown in Figure 1. Secondly, "scattered" refers to the scattered operation mainly characterized by smallholder production, which is manifested by unorganized production and a lack of participation in the socialized division of labor [16]. "Weak" refers to the weak production and management capacity of farmers, who rely on factor self-sufficiency and follow traditional production methods resulting in low-quality products and market competitiveness [17]. It is worth noting that these problems do not exist alone or in isolation, but are often intertwined. Meanwhile, solving these problems involves the dual pressure of securing the effective supply of agricultural products and the shortage of rural labor due to large-scale urban–rural migration [18,19]. Therefore, it is an urgent and difficult task to find a solution that can take into account multiple factors.

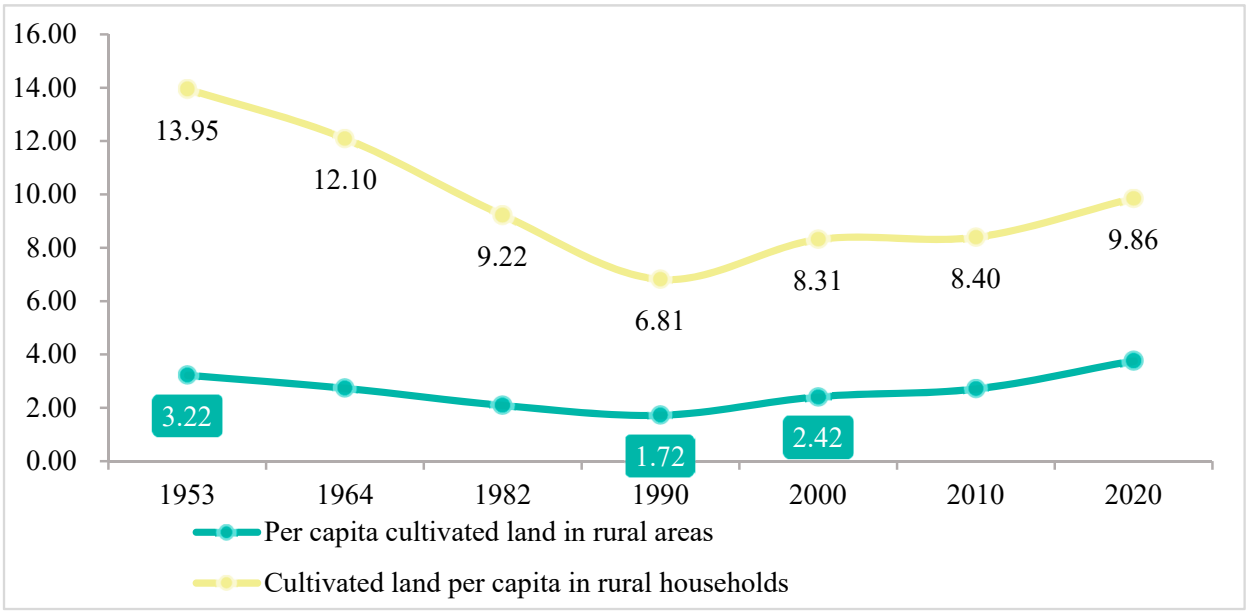

Figure 1. Changes in arable land per capita and per household (data source: The Third National Land Survey published by the Ministry of Natural Resources of China in 2021).

To solve the problem of "SSW" in agricultural development, governments, agricultural development or resource sectors, and researchers around the world have conducted in-depth analyses of possible solutions. These studies have generally focused on two main aspects. First, researchers have adopted a perspective of innovation in agricultural business organization. It focuses on improving the organizational management and business operations of independent smallholder farmers. Countries around the world have adopted management regimes that are fit-for-purpose. The United States has implemented the private farm system under the conditions of a highly socialized division of labor [20]. Europe has adopted the cooperative system of integrating farming, raising, processing, and marketing [21]. Japan has promoted the system of individual farmers in addition to farmers' associations [22]. In China, policies have been implemented that support a new two-tier model unifying cooperatives and family farms [23]. These have proven to be typical measures enacted to trigger organizational changes in agriculture, provide socialized services [23], and help smallholder farmers access training, technology, and market opportunities [24]. Approaches such as these alleviate the drawbacks of small-scale agricultural development and promote the transformation of traditional agriculture toward modernization to some extent.

Second, researchers have adopted the perspective of land consolidation, who believe that land concentration maximizes the efficient use of land. Land consolidation facilitates an increase in arable land area, eliminates fragmentation, and renovates agricultural infrastructure, thus increasing land productivity [25–27]. Land use consolidation is seen as a profitable land management option, with advantages such as improvements in land use, ensured food security, and the promotion of rural development [28–30]. It has been used in many parts of Europe, Latin America, Asia, and sub-Saharan Africa as part of the options to address fragmented land use and diseconomies associated with scattered operations, and to improve infrastructure and technology related to agricultural production [29,31,32].

Although the above approaches provide useful empirical references and theoretical directions to some extent, they are not sustainable in helping to solve the dilemma of "SSW" in agricultural development. On the one hand, the advantages of the transformation and development of smallholder agriculture driven by agricultural cooperatives will disappear, once labor-intensive agricultural production is converted into capital-intensive production. Meanwhile, if the poor are not empowered in land shareholding arrangements, cooperatives may move towards private companies controlled by village cadres, and may even exacerbate the loss of arable land and rural poverty [23,33]. On the other hand, in China, where agriculture is undergoing rapid transformation, land transfer is considered promising for expanding the scale of operation, but the scale and speed clearly lag behind the objective demands for those of rural socioeconomic development [18]. Data showed that up to 2021, the area of family-contracted arable land transfer was 36.67 million hectares in China, only accounting for 30.56% of the total (data source: Ministry of Agriculture and Rural Development of the People's Republic of China). It is worth greater attention that these initiatives have not achieved all of the desired results as they have not only failed to significantly improve the diseconomies of scale in agricultural production and farmers' livelihoods in the target areas [34], but also failed to ensure that non-farm employed farmers do not experience a loss of their social security rights.

The rural Land Shareholding Cooperative System (LSCS) is a land system innovation based on induced institutional change and an expansion of the agricultural management system. It not only maintains the Household Responsibility System (HRS) of China, guarantees farmers' land rights, and expands the capacity and result ceiling of agricultural development through cooperation, but also promotes efficiency and equity through the shareholding system. This system, which combines shareholding and cooperative systems, provides a valuable direction for solving the problem of "SSW" in agricultural development. This system is considered to constitute a "Pareto improvement" [35]. However, little research has been conducted on the effectiveness of land share cooperatives in improving backward agricultural production and the more efficient use of productive resources [36,37].

To fill this gap, the objective of this study is to examine how China is currently working through the LSCS to escape the "SSW" dilemma in agricultural development. To illustrate how this has happened, we have provided three representative examples of Tangyue, Chongzhou, and Zhouchong from rural China that have explored different models of LSCS. We believe that the models described in this study will provide reference examples for other similar countries. The remainder of the paper is organized as follows. in Section 2, the theoretical background, methodology and data sources are described. Section 3 reports the solutions to the "SSW" dilemma in agricultural development. Section 4 discusses the results, and finally, Section 5 presents the conclusions and limitations.

2. Theoretical Background

In China, the land system is the so-called "three rights (ownership, right to contract land, and right to manage land) separation system" [38]. Ownership belongs to the village collective, the right to contract belongs to the members of the rural collective economic organization, and the right to manage land belongs to the person who is responsible for the management of the rural land after the land has been transferred [38,39]. This unique system is different from that of most rural areas abroad, where the land is either privately

owned or state-owned [9]. Within the framework of China's current rural land system, alleviating the dilemma of "SSW" in agricultural development inevitably comes with the constraint of market-based land transactions.

We believe that LSCS has considerable potential to address the "SSW" problem in agricultural development. The LSCS entails that on the basis of maintaining the collective ownership of land, farmers convert their contracted management right of land into shares and entrust collective economic organizations or agricultural management companies for the unified management of the land; they will receive dividends in proportion to their shareholdings. Contractors and operators of land in this model share the risks and benefits in the market economy, and its specific operation mechanism is shown in Figure 2. The demutualization of land in practice generally includes the following steps: converting land into shares, a reasonable setting of equity, the definition of property rights, a clarification of distribution methods, and the establishment of governance institutions [40,41].

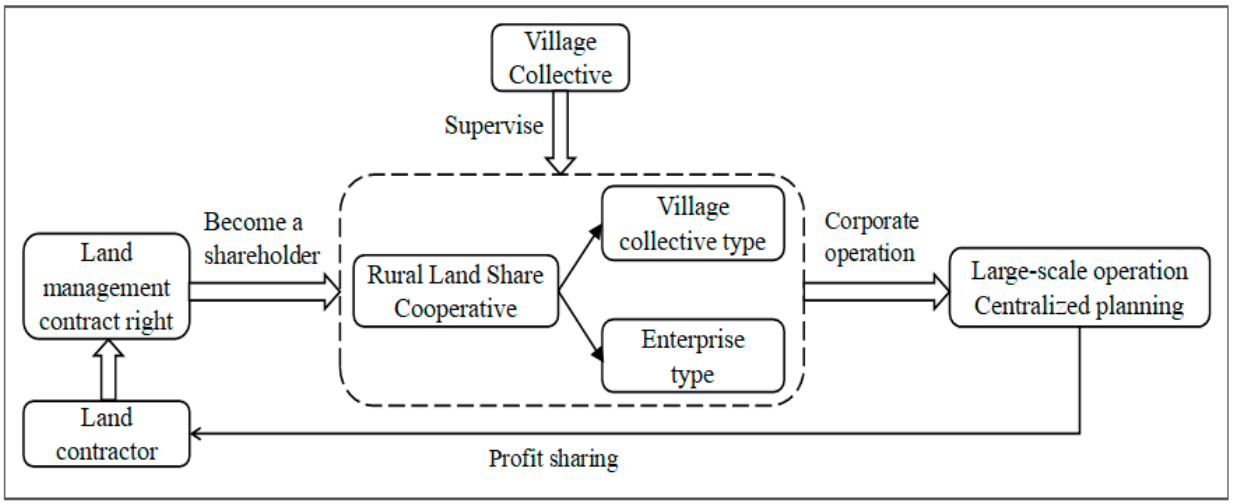

Figure 2. The operational mechanism of the LSCS (source: made by the authors).

LSCS solves the problem of unclear property rights to agricultural land while adhering to the premise of collective land ownership. LSCS divides land property rights into equity, management rights, and use rights. Under the LSCS, farmers experience equity in terms of the land; collective organizations own the land management rights, and tenants hold the land use rights. This powerful check-and-balance relationship can realize the combination of a shareholding system and a tenancy system. According to the theory of property rights, the LSCS can alleviate the problems caused by the separation of the "three rights" of land, such as the deficiency of the subjects, the incomplete power of land ownership, and the insufficiency of land marketization [38]. To a certain extent, the LSCS can prevent problems such as difficulties in the transfer of rural land, a lack of effective protection for farmers' land rights and interests, and the collusion between village collectives and enterprises to infringe on farmers' interests. Meanwhile, it also helps to improve the efficiency of land production and solve the problem of small-scale family contracting operations that are difficult to connect with large markets.

According to transaction cost theory, enterprises arise because of their ability to reduce transaction costs. The rural LSCS combines the land contracted by farmers or collective land with other factors of production (such as capital, technology, and equipment) to form a land shareholding cooperative organization for unified management and administration. This form of organization effectively reduces the costs to individual farmers in finding a transaction partner, negotiating the transaction, concluding the contract, executing the transaction, and supervising the transaction, and avoids risks in the transaction process, improving their negotiating power and the profitability of their land management. The solution to the dilemma of "SSW" in agricultural development through the LSCS is es-

sentially a restructuring of the land property rights structure, which then optimizes the form of realization of land property interests. In other words, it is not a fundamental change in ownership, but the formation of a collective land property rights subject that can effectively assume responsibility for land preservation and appreciation, and implement the integrated planning, rational use, and coordination of rural land (Figure 3).

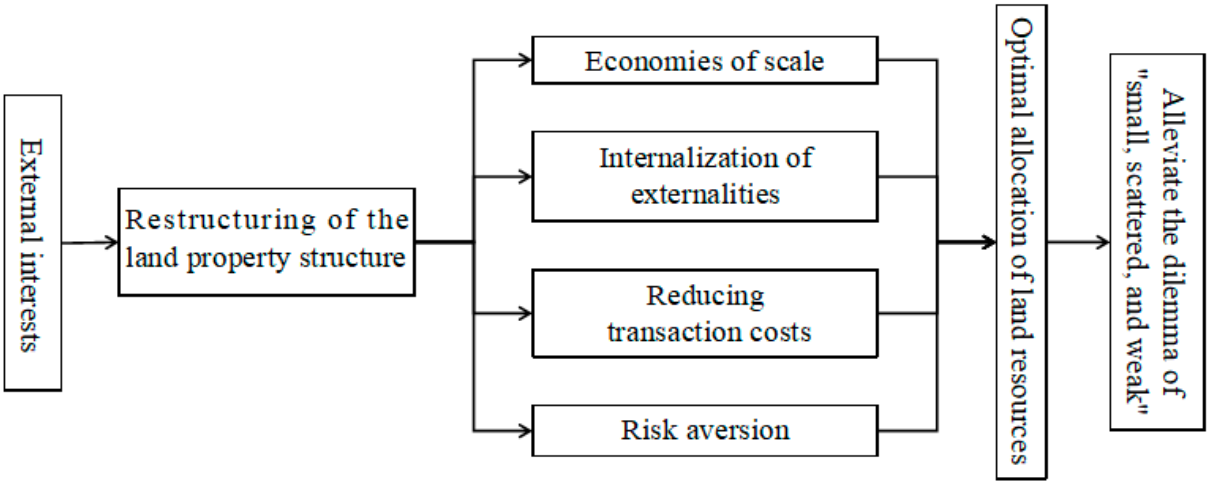

Figure 3. Theoretical framework for LSCS to alleviate the problem of "small, scattered and weak" in agricultural development (source: made by the authors).

3. Methodology

This study uses the overall research approach. In this approach, the detailed description of events allows us to obtain more transparent information and learn more details about the context and experience of the case. This approach lends itself to an in-depth dissection of the social phenomenon under study through actual observation [42,43]. More importantly, this approach allows not only to answer broader and more complex questions, but also to use text, images, and dialogue to convey a novel perspective [44]. The steps of this method are as follows:

Step 1: Define the research questions. In order to achieve the above key research goal, we define the following three questions: (1) What are the driving forces that have led to the emergence of land share cooperatives under the existing institutional constraints and in the specific socio-economic context in China? (2) How did the land share cooperative system address the problem of "SSW" in China's agricultural development? (3) What problems have arisen in the implementation process?

Step 2: Case selection. We present three cases of LSCS in different regions and models in China, including the village collective-led model, village and enterprise integration model, and multi-entity joint management model (Figure 4). Specifically, this study analyzes the background, process, contribution to agricultural development, and problems of the Tangyue, Zhouchong, and Chongzhou cases. These three cases were chosen because they are typical and represent the main patterns of the LSCS in China. These patterns are common practices in many areas of China and are not episodic or isolated. First, these practices have been recognized by the Chinese government and promoted by authoritative media, such as the Tangjiao model in Guizhou Province ((a) in Figure 4). Second, they are relatively mature, such as the Zhouchong model in Jiangsu Province ((b) in Figure 4). Last but not least, some cases are advanced and are well known in China, such as the Chongzhou model in Sichuan Province ((c) in Figure 4). In addition, they cover rural areas at different levels of development, and are also used to address specific issues in a large number of related studies, making them more academically valuable.

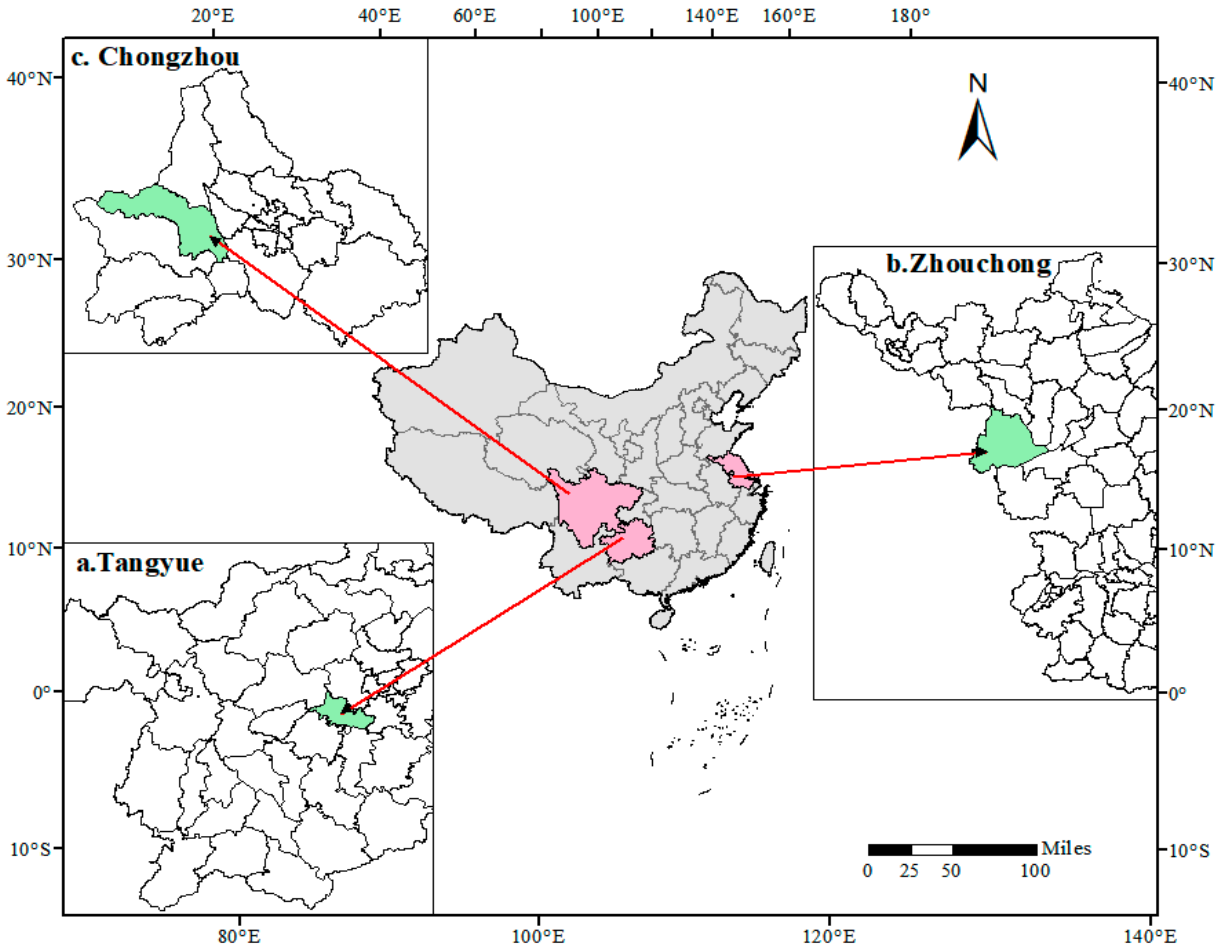

Figure 4. Locations of the three areas with different models of a land share cooperative system (source: made by the authors).

Step 3: Data collection. In brief, there were three main ways to collect data for this study. First, we mainly interviewed local farmers, village enterprise managers and local government officials through focus group interviews about the changes in shareholdings, operation patterns, agricultural production changes, yield levels, and income changes before and after participating in land shareholding. Focus groups usually consist of about 10 participants, including 2–3 village cadres and government personnel, 2 entrepreneurs, and 6–7 farmers. Second, secondary data were collected, mainly including local policy reform documents and statistical yearbook data, such as changes in the land transfer area and direction and employment proportions (Table 1). Third, the academic literature and government documents were compiled and summarized.

Step 4: Case studies. Based on the above data and materials, we first analyze the background and conditions of the LSCS, its mode of operation, and the effects of mitigating the problem of "SSW" in the three cases. Then, we analyzed the advantages and disadvantages of different LSCS models and the potential challenges that may arise in the promotion process. Finally, we compare the results of China's case studies with those in other parts of the world, and compare the LSCS with other land transfer models to objectively determine the feasibility and development potential of the LSCS.

Table 1. The background, driving forces and characteristics of targeted case model.

Case Model	Background	Main Driving Forces	Patterns of Land Conversion	Characteristics
Collectivization development model in Tangyue	Fragmentation of farmland operations Non-agricultural employment of farmers Poor infrastructural conditions	Village collectives	Transfer to share cooperatives by exchanging land contract rights for capital and shares	Village and community integration Joint stock management
Village and enterprise integration model in Zhonchong	Fragmentation of farmland operations Land abandonment Dependence on natural conditions	Agricultural industrialized enterprises	Transfer to enterprises by exchanging land contract rights for capital or shares	Cooperatives Dragonhead enterprise Family farms Farmers
Multi-entity joint management model in Chong zhou	Fragmentation of farmland Operations Labor shortage Weak production capacity	Government, enterprises, village collectives, agricultural professional managers, research and technology department	Transfer to share cooperatives by exchanging land contract rights for capital and shares	Land share cooperative agricultural professional manager comprehensive agricultural services

4. Solutions to "Small, Scattered, and Weak" Dilemma in Agricultural Development

4.1. Village Collective-Led Model in Tangyue

Tangyue Village is located in the northwestern part of Anshun City, Guizhou Province, with a relatively flat terrain. The total administrative area of the village is 1020 hectares, including 111.47 hectares of arable land. The total population is 3393, of which the agricultural population accounts for 97%. Tangyue Village is the epitome of many traditional small farmers' farming villages under the policy of dividing land into households in China. Before the LSCS reform, more than 70% of labor was lost, a large amount of farmland was abandoned, agricultural investment was low, and production methods were outdated, resulting in a low efficiency of agricultural operation. The per capita annual income is less than RMB 4000 RMB (USD 555.00).

In order to alleviate the "SSW" dilemma in agricultural development, and to provide social security for non-agricultural workers, Tangyue Village started to implement the LSCS in 2014. First of all, it fully leveraged the leadership of the village collective to measure all kinds of land, clarified property rights, and issued certificates. By doing so, the rights were clearly attributed, the land contracting relationship was stabilized, and the system of "three separate rights" was steadily implemented. A total of 325.40 hectares of arable land was identified and registered. Then, village collective organizations conducted propaganda campaigns on the advantages of moderate-scale operations. The villagers were encouraged to transfer the land-to-land share cooperative under the principle of "voluntary membership and free withdrawal". According to the standard of RMB 500 (USD 69.48)/share for land, RMB 700 (USD 97.14)/share for farmland and RMB 300 (USD 41.63)/share for sloping land, the land is converted into shares. By 2017, there were 921 shareholders in the cooperative, with a total of 5230 shares, leading to all the land in the village being in shares. Tangyue Village has realized the centralization of the most important resource of production in rural area, i.e., land, and has provisionally solved the problem of SSW in agricultural development.

Secondly, Tangyue Village encourages and develops collective management and establishes a management service platform, including a land transfer center, share cooperation center, financial service center, marketing information center, comprehensive training center and rights protection center, forming an integrated service system. This approach effectively solves the problems of unorganized agricultural operation, low performance, and difficult-to-resist market risks, and protects the rights and interests of villagers.

Thirdly and most importantly, Tangyue Village has adjusted and optimized its agricultural industry's structure. The village focuses on the development of high-quality and modern mountain specialty agriculture. It has established an agricultural industry demonstration zone and introduced new technologies. Through development, the area of the industrial park has reached more than 20 hectares, and a new seedling center, high-tech display area, picking experience area and high-yielding and high-efficiency demonstration planting area has been built, which can generate economic benefits of nearly

RMB 6,000,000 (USD 832,535.49) per year. Through these ways, the agricultural production capacity and industrialization level of Tangyue Village have been enhanced, and it has gradually moved from a backward agricultural area to the forefront of modern development.

Through the analysis of the case of Tangyue Village, we found that it is through the LSCS that the scattered human, financial and resources inside and outside the village are organized, and the problem of "SSW" is cleverly solved so as to achieve development. Through land measurement and the clarification of farmers' land contracting and management rights, Tangyue Village has been able to pool land resources, integrate production materials and unify management ideas by converting land contracting rights into shares. This is a relatively ideal solution without violating the principle of public ownership of land. In addition, along the path of collectivization, the most outstanding feature of the Tangyue Village land shareholding cooperative is that it attaches great importance to safeguarding the interests of villagers, especially focusing on fairness among members within the village collective. However, this model overly reinforces the dominant role of village collective cadres and lacks the participation of commercial enterprises, which restricts the market-oriented operation of land elements. In this regard, this study holds a conservative attitude towards its role in the rapid enhancement of the market competitiveness of the agricultural industry.

4.2. Village and Enterprise Integration Model in Zhouchong

Zhouchong Village is located in Sihong County, Jiangsu Province, a hilly and sloping area with an undulating terrain. The arable land of the village is 376 hectares, and most of the arable land can only be planted with dry land crops such as wheat and corn. In Zhouchong Village, agricultural production is overly dependent on natural conditions, with an average annual income of RMB 4500–7500 (USD 624.40–1040.67 USD) per hectare, and the phenomenon of land abandonment is increasingly common. In 2016, there were 724 farming households in the village, including 145 low-income households (with an annual net income per capita of RMB 3000 (USD 416.18)), accounting for 20% of the total.

The LSCS has played a crucial role in helping Zhouchong Village alleviate the problem of "SSW" in agricultural development, develop the collective economy and improve farmers' income. In 2016, the Jiangsu provincial government carried out village-wide land consolidation in Zhouchong Village, combining the small scattered plots into a strip of land and building water conservancy facilities. In the same year, Zhouchong Village officially implemented the LSCS. As of 2018, the number of shareholding households of the share cooperative reached 692, and the shareholding area reached 286.47 hectares. The problem of small-scale arable land holdings of farmers has been effectively solved.

The support and drive of large agribusiness enterprises has become an important opportunity for Zhouchong Village to change from scattered operation to organized operation. Under the coordination of the local government, Zhouchong Village started deep cooperation with an Agribusiness M, which focuses on sweet potato planting and deep processing, and landscape greening. The land that participates in the share cooperative is organized by the cooperative to plant sweet potatoes, with Agribusiness M providing seedlings and technical support, being responsible for all acquisitions at a guaranteed price of RMB 700/t (USD 97.10/t), and giving the land share cooperative a commission of RMB 25/t (USD 3.47/t). Meanwhile, the company also introduced sweet potato processing projects accordingly. In this way, sweet potatoes form a complete industrial chain from which both farmers and companies can benefit. In order to break through the efficiency or growth boundaries that may be caused by a single industrial model, the cooperative has further reconstructed its business model and industrial structure and has newly built 133.33 hectares of a pecan industrial zone for sweet potato hedging between forests or flowering clearings. In addition, about 70 hectares of peanuts have also been planted through the overgrowth model, and some greenhouse vegetables have been developed, etc. By doing so, the yield and output efficiency of agricultural products have been greatly improved.

The united cooperatives, 33 land share cooperatives and agricultural industrialization Agribusiness M have worked together to create an agricultural industrialization consortium that integrates sweet potato planting, processing and sales, promoting the formation of industrial clusters. At the end of 2017, led by the government and driven by Zhouchong Village, 32 villages in eight surrounding townships formed land share cooperatives and together with Zhouchong Village established the sweet potato planting land share cooperative association. Among them, the association is the organizing party, responsible for integrating resources and funds, building new sweet potato starch production lines, and establishing and improving the management system of the association and coordination among all parties; Agribusiness M is responsible for supplying seedlings and medicines, organizing training, and scientific guidance. In 2019, the united cooperatives led to a total planting area of 2133.33 hectares of sweet potatoes, and land share cooperatives involved in sweet potato planting realized secondary dividends amounting to RMB 5,100,000 (USD 707,449), including RMB 556,000 (USD 77,125.82) in Zhouchong Village.

Overall, the results of the LSCS in Zhouchong Village are not limited to the consolidation of land fragmentation, but define the mode and direction of large-scale operation. The typical feature of the Zhouchong Village model is the in-depth cooperation with agribusiness and the exploration of the business model of "cooperative + leading enterprises + family farms + farmers". Through the deep integration of the consortium, the cooperatives and the agricultural enterprises, the industrial chain is opened, the value chain is improved and the benefit chain is perfected. Compared with the Tangyue Village model, the Zhouchong Village model is more vital and sustainable. At the same time, the agricultural industrialization consortium with the cooperation of three parties and more subjects is also more able to guarantee fairness and avoid one party, especially the enterprise, using its dominant position to weaken the discourse of other parties, which leads to damage to farmers' interests. Therefore, for other countries or areas that intend to follow, although there may not be sufficient conditions to form industrial consortia, they must pay due attention to the balance of rights and interests between large enterprises and ordinary farmers.

4.3. Multi-Entity Joint Management Model in Chongzhou

Chongzhou City in Sichuan Province is located in the western part of the Chengdu Plain, with an arable land area of 34,760 hectares and a resident population of 782,000, of which 462,000 are engaged in agriculture. In recent years, Chongzhou City has faced many problems in food production, such as the same problem of land fragmentation and decentralized operation left by the HRS, low agricultural production capacity and efficiency due to the part-time occupation of farmers and a weak labor force.

In order to solve these problems, Chongzhou City explored the implementation of the LSCS, which effectively promoted the scale of the agricultural production and transformation of fragmented land, small farm operation and weak production capacity in the past. Firstly, farmers were guided to join the land share cooperative with their contracted land management rights as shares, and then to establish a "council+ professional manager + supervisory board" operation mechanism; finally, the benefit distribution and rights protection system were clarified and optimized. Before the reform, the average area of arable land held by each household was about 0.23 hectares, with an average of five to seven scattered plots, and the maximum area of the plots did not exceed 0.13 hectares. After the reform, the scale operation rate of land in the city was 76%, the scale operation rate of grain was 92%, and the coverage rate of agricultural standardization was 90%. The problem of small-scale land holdings and the inability to conduct large-scale operations has been solved.

Training professional agricultural managers and accelerating the specialization of agricultural production have solved the problem of "no one farming" and unorganized production. The main approach is to establish a selection and breeding mechanism, to carry out the cultivation of new professional farmers focusing on agricultural professional managers. They are managed through a system of competence rating, the dynamic management

of access and exit, and performance assessment, and are motivated by economic subsidies. After the reform, a number of 34,151 new professional farmers were trained, including 2461 agricultural professional managers. Moreover, 265 land share cooperatives have been established, with 21.07 hectares of arable land and 92,000 farmers enrolled, accounting for 61% of the arable land and the total number of farmers in the city. This approach appears promising in improving the degree of agricultural organization, alleviating the problems that traditional small farmers could not solve, and achieving the goals that were difficult to achieve individually.

Chongzhou City has solved the problem of weak agricultural production capacity by building a socialized service system and providing whole-industry-chain services. The following two innovative initiatives have been taken. First, it has built a socialized service platform for agriculture and rural areas by uniting universities, scientific research institutions and large agricultural enterprises. The platform provides comprehensive services such as modern production technology and advanced agricultural machinery for land share cooperatives, such as seed selection, fertilizer distribution, plant protection, testing, grain collection and storage. Second, it has built a financial ecosystem and product marketing operation platform, which provides credit financing and marketing services for land share cooperatives. In 2020, the yields of rice and wheat in the city were 8160 kg/ha and 4605 kg/ha, respectively, which are 210 kg and 705 kg more than those in 2010. Income in the form of land contract management rights converted into shares, i.e., in the form of property, increased significantly. Property income as a percentage of all income grew from 2.57% in 2013 to 9.07% in 2021.

Chongzhou City has explored and formed an agricultural development path of "land share cooperative + agricultural professional manager + agricultural comprehensive services". The concentration of fragmented land was realized, and the scale of agriculture was promoted through the LSCS. The introduction of entrepreneurial capabilities has enabled small farmers to participate in the division of the labor economy, promoting the transformation of scattered operations toward production specialization and raising the level of agricultural organization. The construction of a socialized service system and improvement of roundabout investment have induced the entry of modern production factors such as technology, capital and management, enhancing agricultural production capacity. Chongzhou's LSCS focuses on the role of socialized services in providing marketing channels, scientific and technological support and financial services for agricultural production. This means that it is an efficient means to rapidly enhance agricultural production capacity and efficiency based on solving the problems of small land holdings and scattered operations. However, in terms of local practices, this model also suffers from the prominent contradiction between highly imitating modern corporate management models and the difficulty of implementing a professional managerial system in a rural society. There is still a lack of highly qualified and credible personnel, as well as sound management and decision-making mechanisms. It is necessary to emphasize the need to take full account of the particularities of each country's rural society, such as non-economic factors, and to focus on gradual progress and flexibility.

5. Results

The LSCS has a promising future in solving the problem of "SSW" in China's agricultural development. Preventing further land fragmentation, improving unorganized business models, and enhancing the competitiveness of agricultural industries have long been called for as critical steps toward agricultural modernization in countries or regions characterized by high population pressure, land holding fragmentation, and traditional cultivation techniques with few inputs. Land fragmentation does not help farmers benefit from economies of scale [32,45,46], and to some extent it also hinders the adoption of advanced technologies to improve land management, climate risk resilience, and agricultural productivity [47,48]. Especially in countries with collective land ownership, the separation of ownership and management rights, and a vague definition of contracting and

management rights, which restrict the large-scale transfer of and long-term investment in arable land, are the root causes of the "SSW" problem in agricultural development.

Our three case studies demonstrate how China's rural areas can solve the problem of "SSW" in agricultural development through the LSCS. A comparison of them shows that in different development contexts and under different driving forces the LSCS presents different strategic patterns and characteristics (as shown in Table 1). The implementation steps, effects and potential problems of the three models of Tangyue, Chongzhou, and Zhouchong of the LSCS in addressing the problem of "SSW" are shown in Table 2. First, Tangyue Village takes the road of collective development, transferring the confirmed land to the cooperative for unified planning and use, while carrying out collective management and adjusting the industrial structure, realizing the improvement of the industrialization scale, organization degree and productivity level. Secondly, through in-depth cooperation with agricultural industrialization enterprises, Zhouchong Village has carried out comprehensive land improvement, perfected the product industry chain, and created a synthesis of production, supply and marketing, thus solving the problem of "SSW" in the original form of agricultural development. Third, Chongzhou City in Sichuan Province has solved the shortcomings of small farm production by developing land share cooperatives, training professional agricultural managers and building a social service system [18]. Despite the drawbacks, these schemes have solved the problems of small-scale, fragmented production and inefficient output faced by small farmers in China's agricultural development scenario to a considerable extent. Therefore, the LSCS, for countries with high population pressure and relatively scarce land resources, has great potential to achieve the moderate-scale and intensive operation of agricultural land and improve the competitiveness of the agricultural industry.

Table 2. Comparative analysis of the land cooperative system in solving the problem of "small, scattered and weak" in agricultural development.

	Tangyue Mode	Zhongchong Mode	Chongzhou Mode
How to solve "Small"	Land measurement Clarification of property rights and issuance of certificates Land transfer and shareholding cooperation	Comprehensive land consolidation Construction of supporting water facilities Concentration of land and establishment of land share cooperatives	Clarify rural land contract management rights and issue certificates Farmers convert land contracting rights into shares and establish land share cooperatives
How to solve "Scattered"	Unified planning and use of concentrated land led by village collectives	Cooperate with agricultural industrialized enterprises The enterprise organizes planting, provides seedlings, technology and is responsible for acquisition.	Train agricultural professional managers, new farmers and new agricultural business entities
How to solve "Weak"	Adjust industrial structure Develop high-quality agriculture Establish industrial parks	Create an agricultural industrialized consortium that integrates planting, processing and sales	Provide comprehensive socialization services
Achievements	Rapidly realized the concentration of land Realized organized management under the leadership of village collectives Realized industrialized production	Realized the concentration of land Realized organized production and operation with industrialized enterprises as the core Formed an agricultural industrialized consortium that integrates production, supply and marketing	Increased the rate of large-scale land management and agricultural standardization Improved the level of agricultural organization Increased crop production significantly Optimized the industrial structure
Contradictions	The overstrengthened role of village collective cadres and the absence of participation of commercialized enterprises.	Inequality of production and management rights and imbalance of benefit distribution between leading agricultural industrialized enterprises and ordinary farmers.	The contradiction between the ideal expectation of the modern enterprise management mode and professional manager system and the difficulty of implementing them in practice.

6. Discussion

6.1. Similarities and Differences between the Cases Examined and World Projects: Other Models?

The positive effects of similar programs have been demonstrated in other countries or regions, e.g., assisted cooperative or shared cropping systems were implemented in southern Spain [49], early collectivized land reforms in much of Eastern Europe and the Commonwealth of Central and Eastern Europe (CEE) and the Commonwealth of Independent States (CIS) addressing the fragmentation and small scale of farms have concentrated on particular instruments such as land consolidation and land banking [50,51], and community-based agribusiness was established and developed in Japan [52]. All of these programs have reduced the degree of land fragmentation and division to a considerable extent, improving productivity and agricultural modernization. Of course, they also reveal that we should take into account factors such as the original size of farmers' land holdings, household endowments, and the ability to engage in non-agricultural work in order to make specific policies [53].

This study advocates the use of the LSCS, which is a market-oriented way of transferring land compared to other land transfer models or agricultural professional cooperatives. The LSCS has two advantages. First, it safeguards farmers' rights and interests in land contracting and can effectively encourage farmers or contractors to invest in land in the long term. This view is the same as that of similar studies [54]. Second, it centralizes the land scattered among many farmers through collective economic organizations [23]. The original decentralized decision-making mechanism of many farmers in land use, management, investment, and disposal is transformed into a centralized and unified decision-making mechanism of the village community collective or share cooperative [40,41], which is a major shift from disorderly division to intensive management [55]. Through participation in the social division of labor and increased market access [56], large-scale land management and the maximum utilization of land value-added returns are achieved. In these terms, the LSCS is a feasible solution to support the problem of "SSW" in agricultural development.

Undeniably, there are some controversial concerns about the land share cooperative system, mainly focusing on the attributes of the combination of "share" and "cooperative", i.e., whether it is a cooperative system, share system or mixture system [36]. Recent studies have also concluded that agricultural companies are more beneficial to the development of Chinese agriculture out of the "SSW" system than is the cooperative-based LSCS [57]. In fact, the essence of the LSCS is a modern enterprise under the framework of cooperatives. At China's current stage of development, the level of development in most rural areas has not yet reached the requirements for the development of agricultural companies [58]. The arguments that cooperatives are more in line with the welfare and livelihood interests of farmers in developing countries than enterprises were more acknowledged [18]. Drawing lessons from the failed cases of relying only on dragonhead enterprises to expand and strengthen agricultural production, the model of forming share cooperatives or collective economic organizations in association with enterprises is a sensible approach, as also evidenced in Tangyue Village of this study. Additionally, the promotion of the LSCS can also lead to access to public policies and state financial support, and the rules of operation, governance, and distribution under the cooperative framework are more appropriate to the rural context [59].

6.2. How Did These Methods Contribute to Efficiency and Fairness

In solving the problem of "SSW" agricultural development, the land share cooperative system has achieved the Pareto improvement of efficiency and equity objectives. This conclusion is supported by relevant studies [35,60]. Under the constraint that there are more people and less land in the rural areas and a wide gap between urban and rural development, promoting agricultural development by optimizing resource allocation must involve taking into account the two major goals of efficiency and equity [61]. The establishment of the rural land share cooperative system makes the property rights relationship between the collective, farmers and enterprises clear [62], and creates mutual checks and balances. It has

effectively improved labor productivity and scale efficiency through certain incentive and constraint effects [63]. As an induced institutional change, the rural land cooperative system is a spontaneous change undertaken by a group of individuals in response to the profit opportunities arising from institutional imbalances [64]. Its institutional arrangements and business decisions take into account the opinions and demands of relevant stakeholders, and take into account the interests of the majority. "Consistency of consent" greatly reduces and saves the frictional, organizational, and transaction costs [62].

This study emphasizes that the LSCS is based on social equity and tenure security. This coincides with the view of Wang and Zhang [39]. In addition to the pursuit of economic benefits, its social security function is an important aspect of equity that must not be neglected. In this regard, adherence to the land tenure system of state and collective ownership is considered a crucial means of protecting farmers from the negative effects of market forces and land privatization. In the process of escaping the plight of the "SSW" and pursuing development via the LSCS, the accumulation and concentration of land in the hands of a few urban bourgeois landowners is prevented, which may lead to the subsequent eviction and impoverishment of peasants and the unwelcome urban–rural migration of landless peasants, hindering the revival of the lease system [65]. The findings of this study are consistent with existing research findings that land property rights have gained real legitimacy as a means of improving the economic and social welfare of rural China [66].

This study aims to help rural areas to break out of the development dilemma of resource and organizational constraints. Although the government bears part of the efficiency losses to achieve the fair goal of agricultural development and benefits to farmers, these losses can be regarded as necessary investments by the state. Even if agricultural development and rural revitalization are promoted through other programs, investment from the state or government is inevitable [67]. Furthermore, this investment is not a sunk cost, and its benefits are gradually emerging. Practice has shown that the LSCS also contributes to the growth of the collective economy, enhances public security undertakings, and improves the quality of life of community residents and the overall social environment [68]. The land share cooperative system is, to a large extent, the optimal solution for improving the efficiency of China's agricultural production and ensuring social equity in rural areas. In summary, it is a highly desirable solution to the problem of "SSW" agricultural development, and it has the potential for generalization after successful regional trials.

However, a lack of economic and social holistic considerations may lead to rural decline and rural urbanization [33]. In other words, it should be adapted for local conditions and should take into account both the goals of factor market development and welfare protection for community members. Notably, this study focus on solving the intractable problems in agricultural development rather than the development of the rural economy or urbanization as a whole. This means that much attention should be paid to the broader issues that arise from or are associated with the system in its later stages of implementation, such as compartmentalized industrialization, fragmented urbanization, etc. [69], in order to achieve sustainable development while alleviating the constraints in agricultural development.

7. Conclusions and Limitations

7.1. Conclusions

With the increasing contradiction between the expansion of urbanization and agricultural and rural decline, countries and regions with high population densities, scarce arable land, and little investment are facing great challenges in the process of increasing agricultural scale and modernization [70]. It is therefore urgent to find a way to provide more food production and value-added returns with limited land, while minimizing damage to the interests of smallholders and the integrity of the rural environment [69]. To achieve these goals, a systematic analysis of the productive and social security functions of land —a special resource—is needed. By unifying collective land ownership and management

rights and replacing farmers' contractual rights with shareholding rights, the land share cooperative system offers a worthwhile reform direction to help break out of the "SSW" dilemma of agricultural development while safeguarding farmers' land rights.

In general, the land cooperative system can objectively solve the problem of "SSW" in agricultural development, and it is a relatively ideal solution that is feasible and replicable. As described using the three examples of Tangyue, Chongzhou, and Zhouchong we discussed, this approach is used in rural China to centralize scattered land holdings. Organized operations and industrialized production by collective economic organizations or commercial enterprises have achieved a moderate scale of land, which helps scattered small-scale farmers participate in the social division of labor and enhance the competitiveness of the agricultural industry.

In addition to the places of origin, such as Jiangsu Province, Guangdong Province, Zhejiang Province and Shanghai City, this model is now being adopted with good results in a growing number of rural areas in China, such as Henan, Shandong, Sichuan, Liaoning, Guizhou, Hebei and Anhui Provinces. China's practical experience has also provided model cases and useful lessons for other countries in similar situations around the world, such as developing regions in the Global South such as Southeast Asia, most of Africa, and a small number of regions in North America, toward the transformation and development of agricultural scale and modernization.

7.2. Limitations

This study emphasizes the great potential of the land share cooperative system in solving the problem of "SSW" in agricultural development. However, the costs incurred in the implementation and promotion of the rural LSCS have not been objectively and accurately assessed, which in turn makes it difficult to quantitatively assess and analyze the efficiency of it in terms of costs and benefits. In particular, at the beginning of the project, for most of the less developed areas, it required a large amount of capital investment from governmental departments such as giving financial subsidies, tax incentives, introducing commercial investment, and providing financial and legal services, as well as paying hidden costs, such as the management talents of grassroots cadres [18]. Additionally, due to the difficulties in obtaining data and the nascent practice of agricultural companies in rural China, this study was not able to compare the potential of the LSCS with that of agricultural companies. In the future, quantitative analysis based on detailed data will be more conducive to confirming the economic, legal and operational feasibility of the LSCS and to optimizing and improving the implementation scheme.

In a conclusion, the land share cooperative system is a reasonable, appropriate, and relatively rational solution to the problem of "SSW" in agricultural development. In the future, it would be valuable to examine the sustainability potential and evolutionary direction of the land share cooperative system dynamically as the rural regional economy and agriculture develop.

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