Analysis of The Synergistic Effect of China's Rural Industrial Integration Land Use

Yingqiang Geng\textsuperscript{1}, Zhaocheng Wang\textsuperscript{2*}, Yuanzhi Geng\textsuperscript{3}

\textsuperscript{1}geng17772022@163.com, \textsuperscript{2}935310600@qq.com, \textsuperscript{3}geng_123_66@sina.com

\textsuperscript{1}School of Economics, Sichuan University, Chengdu, Sichuan, China
\textsuperscript{2}School of Software, Zhengzhou University, Zhengzhou, Henan, China;
School of Economics, Sichuan University, Chengdu, Sichuan, China
\textsuperscript{3}University of New South Wales

Abstract: Rural industrial integration land is a land use category that matches the rural industrial integration development. The prosperity of the industry inherently requires the coordination of rural industrial integration land use. The rural industrial integration land use synergy lays an important foundation for the multiplication effect of rural industrial integration. Based on the synergy theory, this paper analyzes the synergistic effect, the principle of servitude and the principle of self-organization of rural industrial integration land. The derivation is summarized into three major effects: the free flow of rural land elements, the synergy of large-scale production and operation of agricultural land, and the complex integration and synergy of rural industrial land. The reform of my country's rural land system should adhere to systematic and synergistic thinking, and must implement three major collaborative innovations from three perspectives: the synergy effect of free flow of rural land elements, the synergy effect of large-scale production and operation of agricultural land, and the synergy effect of complex integration of rural industrial land. The joint promotion of the reform of the land system, and the use of land as a link to promote the coordinated and synchronous aggregation of various production factors.

Keywords: rural industry integration; rural industry integration land; synergy; synergy effect

1 Introduction

Rural industrial integration is an inevitable product of China's unique new urbanization, and it is also a special industrial form that follows the laws of market economy. From the perspective of practical development, the essence of rural industrial integration is a kind of spatial economy, which is an organic combination of coupled intensification of production factors and diversification of business formats that occur at the urban-rural boundary and even in the corresponding rural space in the process of urban-rural integration. From the perspective of the elements of the integration of the primary, secondary and tertiary industries in rural areas, the
first integration is the land used for the primary, secondary and tertiary industries in rural areas, which shows that the implementation of the rural revitalization strategy, especially the prosperity of the industry, cannot be separated from the support of the rural land system. The 2020 No. 1 document of the Central Committee of the Communist Party of China and the State Council pointed out: "We will support all localities to build unique agricultural industrial chains based on resource advantages, establish and improve the mechanism for farmers to share the value-added benefits of the industrial chain, form competitive industrial clusters, and promote the integration of primary, secondary and tertiary industries in rural areas. Development” and "Solving the Land Use Problems for Rural Development. Adhere to the red line of arable land and permanent basic farmland protection. Improve the land use policy system for rural industrial development, clarify land use types and land supply methods, and implement classified management. "[Opinions of the Central Committee of the Communist Party of China and the State Council on Doing a Good Job in the Field of "Three Rurals" to ensure the realization of a well-off society in an all-round way as scheduled. Land is an important factor of production for the integrated development of the primary, secondary and tertiary industries in rural areas [1]. It reflects that the rural land system is the foundation and core of the rural system, and the integration of rural primary, secondary and tertiary industries requires reforming the current status of rural agricultural land, construction land, and unused land systems that are separate and managed separately.

This paper believes that the land for rural industrial integration is a category of land use that matches the integrated development of rural industries, and its essence is to serve the integrated development of rural industries. The integrated development of rural industries must require the integration of rural industries. Whether various rural land systems can be innovated and optimized in coordination is not only the premise to effectively solve the long-term “three rural” problems, but also the key to realizing the prosperity of rural industries. As a material carrier necessary for the development of rural industries, rural industrial land needs to be matched with the integration and coordination of rural industries in terms of total amount, location and shape.

The main contributions of this paper are as follows: First, scholars have discovered the contradiction between the integration of the three industries and land use, “The key to transforming traditional agriculture into a source of economic growth is to solve the problem of land use in the process of agricultural industrialization through the integration of rural land resources. (Fang Qinxiang, 2014). The extended integration of the agricultural industry chain centered on the agricultural product processing industry requires certain processing sites and exhibition and sales sites, which will be constrained by the lack of rural construction land indicators” (Cheng Li , 2019). However, there is a lack of analysis on the inherent mechanism between rural industrial integration and industrial land use system. This paper studies the synergistic effect of rural industrial integration land use from the perspective of synergy theory, which fills the theoretical gap in this field. Second, this paper integrates rural industry integration. The synergy mechanism of land use can be summarized as flow synergy effect, scale synergy effect and integration synergy effect. The research results show that considering the natural and economic characteristics of land use in my country and the complexity of land property rights, the rural industrial integration land use system should adhere to systematic and synergistic thinking. Realize the joint advancement of various specific land system reforms, and use land as a link to promote the coordinated and synchronized aggregation of various production factors.
2 Integration land use synergy

The revitalization and development of rural industries is the foundation of rural revitalization. However, the revitalization and development of rural industries needs to rely on the close support of rural land. Therefore, there is an inherent relationship between the synergy of rural industrial integration land and industrial prosperity, that is, industrial prosperity inherently requires rural industrial integration land coordination, and rural industrial integration land synergy lays an important foundation for the multiplication effect of rural industrial integration.

On the one hand, industrial prosperity inherently requires rural industrial integration and land use coordination. From the theoretical research and policy interpretation of the connotation of industrial prosperity, industrial prosperity includes the revitalization of agriculture and its related industries. It is only agricultural revitalization and development, not industrial prosperity. Therefore, realizing the comprehensive revitalization and development of rural industries is an inherent requirement for the prosperity of the industry, and the comprehensive revitalization and development of rural industries inevitably requires the integration of rural industries and the coordination of land use. In this field, the country's policy on land for integration of rural industries has made a comprehensive and detailed exposition of the coordinated development of land for integration of rural industries. For example, in 2016, the Ministry of Agriculture's "Notice on Promoting the Implementation of Policies and Measures for the Implementation of Integrated Development of Rural Primary, Secondary and Tertiary Industries" requires coordination of land for rural industrial integration, "In terms of land use policy, it is necessary to actively strive for a certain percentage of annual construction land indicators, which is specially used for land use. The new agricultural business entities shall carry out the construction of auxiliary facilities such as agricultural product processing, warehousing and logistics, and wholesale markets in the origin. In 2017, the Ministry of Land and Resources and the National Development and Reform Commission jointly issued the "Notice on Deepening the Supply-side Structural Reform of Agriculture and Doing a Good Job in Land Use for the Integrated Development of Rural Industries". Under the premise of usufructuary rights and preventing the encroachment and control of external capital, explore rural collective economic organizations to revitalize and utilize idle farm houses and homesteads by means of leasing and cooperation, and transform and construct homestay folk custom, creative office, and leisure agriculture in accordance with planning requirements and land use standards, rural tourism and other agricultural and rural experience activities". In 2019, the "Notice on Printing and Distributing the "Guidelines for the Implementation of the Industrial Land Policy (2019 Edition)" issued by the General Office of the Ministry of Natural Resources clearly required the integration of rural industries to "deeply promote the economical and intensive use of land, through the transformation of land use methods and the improvement of land use efficiency". Release more space for land use and ensure the development of new industries and new formats and the construction needs of people's livelihood service facilities".

The national land management department not only regulates the types of land used for rural industrial integration, but some relevant policies also limit the scale of the types of land used for rural industrial integration, such as supporting land and ancillary land. For example, in 2017, the Ministry of Land and Resources and the National Development and Reform Commission jointly issued the "Notice on Further Promoting the Structural Reform of Agricultural Supply Side and Doing a Good Job in Guaranteeing Land Use for the Integrated Development of Rural
"Industries (2017)", which pointed out that "for the various types of agricultural production processes needed Land for production facilities and ancillary facilities, as well as supporting facilities that must be built due to large-scale agricultural operations, including land for nursing management housing for vegetable planting, tobacco planting, tea plantations, rubber plantations and other crop plantations (single-story, covering an area of less than 15 square meters), land for primary processing facilities such as temporary flue-cured tobacco, fried tea, pre-cooling of fruits and vegetables, grape drying and other agricultural products for drying, temporary storage, sorting and packaging (in principle, the area shall not exceed 400 square meters). The Ministry of Rural Affairs issued the "Notice on Issues Concerning Improving the Management of Facility Agricultural Land" and also regulated the scale of land used for auxiliary facilities in various industries.

On the other hand, the coordination of land use for the integration of rural industries has laid an important foundation for the multiplication effect of the integration of primary, secondary and tertiary industries in rural areas. The integrated development of rural industries requires a coordinated and balanced supply of supporting rural industrial integration land. The integration of rural industries, through the reorganization and innovation of production factors, cultivates new formats, provides consumers with a variety of products and service consumption needs, realizes the value-added of rural industry integration, and promotes the prosperity of rural industries. Similarly, on the basis of the development of agriculture, the coordination of rural industrial integration land uses the allocation of secondary and tertiary industries related to agriculture, such as ecological tourism, entertainment and leisure, business exhibitions, trade logistics, drying and processing, etc., to achieve the integration of primary and secondary industries. Land use synergy, land use synergy for the integration of primary and secondary industries, and land use synergy for the integration of primary, secondary and tertiary industries, and other forms of land use for rural industry integration. Through the coordination of land supply, agricultural land creates land for new industries and new formats. Specifically, there is the following relationship between the coordination of rural industrial integration land use and the prosperity of the industry. First of all, the perfect land for agricultural production support facilities can effectively reduce the risks of agricultural production and operation. For example, in the face of arid natural environment, perfect water conservancy facilities can enhance the risk of resisting natural disasters and their secondary disasters. Secondly, the agricultural industrial chain extension facility land has effectively expanded the agricultural industrial chain. By creating new formats, improving the rural modern industrial system, production system and management system, the added value of the agricultural industry has been increased, the employment opportunities of rural labor force have been increased, and farmers' farming has improved. Income, but also prolong the shelf life of agricultural products and reduce the risk of "low grain damage to farmers". Thirdly, the use of land for rural labor reproduction facilities is conducive to improving the quality, management and skills of the rural labor force, improving the living environment of the rural labor force, and playing an important supporting role in the transformation of the rural small peasant economy to agricultural modernization. Finally, land for rural tourism supporting industry facilities is a key breakthrough path for rural industry revitalization. Compared with cities, rural areas are the best choice for developing rural tourism and leisure vacation due to their incomparable advantages in ecological and natural environment; in addition, improving rural tourism supporting facilities Industrial land can also promote the high-quality development of agriculture. In a word, through the integration of rural industries and land use coordination, the risks of agricultural production and operation can be
reduced, the added value of agriculture can be increased, and the transformation and upgrading of agriculture and high-quality development can be promoted, thereby realizing the prosperity of rural industries.

3 Rural industrial integration land use synergy under synergy theory

From domestic research, after reviewing existing literature research, it is found that domestic research results are basically applied to relevant domestic research fields based on foreign theoretical research results (Zhang, 2019), and the degree of synergy in this field is measured and analyzed (Liu, 2016). No scholars have conducted relevant research on the coordination of rural industrial integration land use (Yu, 2017). This paper believes that the synergy of rural industrial integration can be theoretically explained by Haken's synergy effect, the principle of slavery and the principle of self-organization.

(1) Synergistic Effect. Synergistic effect refers to the overall effect or collective effect caused by the interaction of a large number of subsystems in a complex open system, which can be represented as "". For any complex system, when a large number of foreign elements gather and reach a certain threshold state, the quantitative change will be transformed into a qualitative change, and at this time, the subsystems will have a synergistic effect to adapt to the new state.

(2) Slaving Principle. Also known as the dominance principle or the servo principle. In the process of system evolution, there are fast variables and slow variables. Fast variables are easy to achieve, while slow variables take a long time to achieve the goal, resulting in the inconsistency of the process of fast and slow variables in the process of achieving the goal. In order to achieve the goal of the system, generally speaking, fast variables must obey slow variables. Slow variables become the order parameters that determine and dominate the evolution process of the system. Each subsystem must serve the order parameters and cooperate with the order parameters to promote the evolution of the system towards the established goal.

(3) Self-organizing Principle. Self-organization refers to the fact that a system can automatically form a certain structure or function according to certain rules without external instructions, and it has the characteristics of internality and self-generation. The rapid advancement of my country's industrialization and urbanization and the accelerated implementation of the rural revitalization strategy will gradually break the urban-rural dual barriers of various production factors. With new opportunities, on this basis, we will further promote the in-depth integration of rural primary, secondary and tertiary industries. Various new products, new formats and new models of rural industries will continue to emerge and develop rapidly, thereby promoting the overall revitalization of rural industries.

4 Analysis on the coordination mechanism of rural industrial integration land use from the perspective of industrial prosperity

In the process of urban construction and development, natural resources have long-term and varying degrees of contractual impact on many developing countries. For example, in some
countries in Latin America in the 1980s, when the economic situation was expected to be good, the glorious days of the world's attention had appeared.

Through the detailed theoretical analysis of the synergistic effect, the principle of servitude and the principle of self-organization of rural industrial integration land, combined with the practice of implementing the industrial integration land system reform in the rural revitalization strategy, the results of the analysis of the above three principles and the rural industrial land coordination are carried out in depth. Combining, and deducing theoretically, three types of synergistic effects can be formed. The first is to take the self-organization of the rural industrial system as the core to promote the formation of the synergistic effect of the free flow of rural land elements (referred to as "flow synergy") for the integration of rural primary, secondary and tertiary industries. Promote the formation of the synergy of agricultural land scale production and operation (referred to as "scale synergy"); the third is to promote the formation of the complex integration synergy of rural industrial land with rural industrial integration as the core. (referred to as "Fusion Synergy").

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The synergy effect of the free flow of rural land elements mainly solves the problem of internal synergy of the main systems related to rural production and operation, which is logically higher than the internal synergy of the rural land system, and plays an integral and leading role in rural revitalization and industrial prosperity; the scale of agricultural land use The synergistic effect mainly solves the problems of rural land fragmentation and unstable property rights, which play a fundamental and supporting role in the prosperity of rural industries; the synergistic effect of the integration of rural industrial land mainly solves the bottleneck of the demand for rural collective construction land in the integrated development of primary, secondary and tertiary industries. The problem is the order parameter of the prosperity of rural industries.

(1) Mobility synergy effect

The first theorem of welfare economics points out that in a perfectly competitive market economy, the market can automatically achieve the Pareto optimal state through the competition mechanism and maximize the efficiency of resource allocation. Starting from the rural industry development function, the mechanism of the flow synergy effect on the prosperity of rural industries can be described as follows.

First, let the rural industrial development function covering the three production factors of labor, capital and land be
Among them, \( y \) is the output, \( l \) is the labor supply, \( k \) is the capital supply, \( q \) is the land supply; Secondly, it is assumed that there are two regions A and B with the same rural industrial development function, and the labor supply and capital supply are the same in the two regions [3]. Due to the difference in land resource endowment, the land supply in the two regions is different, that is, the land supply in area A satisfies the optimal economic operation capacity of the existing business entities and there is still a surplus, while the land supply in area B cannot meet the optimal economic operation capacity of the existing business entities. Thus, the production functions of rural industries in regions A and B are as follows:

\[
y_A = f(l, k, q_A)
\]

\[
y_B = f(l, k, q_B)
\]

And assume that the optimal economic management capabilities of the two regions A and B are respectively \( q_A^0 \) and \( q_B^0 \), \( q_A > q_B^0 \), \( q_B < q_B^0 \). According to the market competition relationship, in area A, due to the excessive supply of rural land, labor and capital are fully and effectively utilized, while land has not been effectively utilized, and there is still room for improvement. In Region B, due to the limited supply of rural land, which is insufficient to meet the investment needs of capital and labor, land can be effectively used, while capital and labor have not been effectively used, and there is still room for improvement. Therefore, the two production factor markets A and B have not realized the complete and effective utilization of production factors. Therefore, under the market mechanism, the completely free flow of production factors between the markets is realized, and then the market supply of production factors and the market demand for production factors are effectively connected according to the resource allocation determined by the market. Regionally, the following approaches can be taken to improve the effect of resource allocation covering markets A and B. Specifically, by building a market mechanism, the excessive labor and capital elements in area B are transferred to area A, and combined with the excess land elements in the area, so as to improve the utilization of resources in the entire market.

It can be seen from Figure 1 that the land use efficiency in area A is significantly lower than that in area B. According to the assumption, the equilibrium point of the rural land market in areas A and B is at point N. At point N, for area A, each decrease for one unit of rural land supply, the marginal efficiency of land resource utilization has been improved; for Region B, for each additional unit of rural land supply, the marginal efficiency of land resource utilization has also been improved. As a result, through the spatial adjustment of land supply, the land use efficiency of both regions A and B has been improved, that is, the overall land resource market
use efficiency has been improved, until it is adjusted to the ideal state of point M, the overall land resource. The efficiency of market utilization has been maximized.

Figure 1. The imbalance between supply and demand of rural land between regions and the balance between supply and demand.

Figure 2. Synergistic effect of large-scale production and operation of rural industrial land.

The same as the land factor, the labor factor and the capital factor are also the same. In addition, in the process of rural industrial development, in addition to land, capital, labor and other factors, technology, management and other factors also have differences, from the perspective of the overall market, there is also room for improvement [4]. However, there are still the following obstacles to realize the synergistic effect of flow: First, how to realize the free flow of farmers' agricultural land (contracted land) management rights; second, how to realize the free flow of farmers' homestead use rights; How to achieve free flow of unused land; Fourth, whether the use of rural land in my country and other related rights can be the same as state-owned land [5]. The influencing factors of these flow synergies all involve the collaborative innovation reform of the rural land system.
(2) Scale synergy effect from the perspective of scale synergy effect, an implicit theoretical premise is that there is a scale economy effect in rural industrial land. As shown in Figure 2, the vertical axis is the output scale of agricultural products in rural industrial land (Q), and the horizontal axis is the scale of rural industrial land (S). \( Q(S) \) is the output function of agricultural products. In, \( P_1 \), \( P_2 \), \( P_3 \) are the three points on the production function, where \( P_2 \) Tangent to the production function curve, the scale of industrial land in rural areas is \( S_1 \). When the unit output of rural industrial land is \( Q/S_1 \). The scale of industrial land in rural areas is \( S_2 \). When the unit output of rural industrial land is \( Q/S_2 \). The scale of industrial land in rural areas is \( S_3 \). When the unit output of rural industrial land is \( Q/S_3 \). From this, the relationship between the output of rural industrial land per unit can be obtained:

\[
\frac{Q(S_2)}{S_2} > \frac{Q(S_1)}{S_1} > \frac{Q(S_3)}{S_2} > \frac{Q(S_3)}{S_3}
\]

The policy implication of inequality (4) is: the scale of industrial land in rural areas is \( S_3 \). When the scale economy effect of rural industrial land reaches the optimal value. When the scale of rural industrial land is less than \( S_3 \), the output per unit of rural industrial land can be increased by increasing the scale of rural industrial land; when the scale of rural industrial land is greater than \( S_3 \), the output per unit of rural industrial land can be increased by reducing the scale of rural industrial land. In addition, from the perspective of the output of agricultural products increased by each additional unit of rural industrial land, the following relationship is established:

\[
\frac{dQ(S_0)}{dS_0} > \frac{dQ(S_1)}{dS_1} > \frac{dQ(S_2)}{dS_2} > \frac{Q(S_1)}{S_1} > \frac{Q(S_2)}{S_2} > \frac{Q(S_3)}{S_3}
\]

The policy implication of inequality (5) is that when the scale of rural industrial land is reached \( S_0 \), the marginal output value at this time is the largest. When the scale of rural industrial land is smaller than that \( S_0 \), for each additional unit of rural industrial land, the output of agricultural products brought by the unit of rural industrial land will increase. When the scale of industrial land is larger than \( S_0 \), the marginal output of rural industrial land caused by the reduction of one unit of rural industrial land will increase.

Therefore, the point \( S_0 \) of the scale of rural industrial land is the maximum point of marginal output, and the point \( S_0 \) is the point of maximum average output, and the optimal range of
industrial scale synergy effect is generally $\left( S_0, S_2 \right)$ included. However, there are still two major obstacles to realizing the scale synergy effect: first, how to solve the problem that the property rights of contracted land have been solidified and formed the status quo of rural land fragmentation; Infrastructure, especially the corresponding types of agricultural land. The influencing factors of these scale synergies all involve the collaborative innovation reform of the rural land system [6]. It is necessary to further promote the reform of ”separation of three rights” in agricultural land, and to break the shackles of fragmentation of rural land and unstable property rights of agricultural land from the system by implementing ownership, stabilizing contract rights and relaxing management rights.

(3) Integrating synergistic effects. Rural industrial integration is an inevitable product of China's unique new urbanization, and it is also a special industrial form that follows the laws of market economy. From the current practice of rural industry development in my country, the secondary industry (tertiary industry) that can be stably and independently developed in rural areas is obviously more profitable than the primary rural industry (agriculture), and it presents a comparative benefit. If the rural primary industry and the secondary industry are integrated, the income is higher than that of the rural primary industry, and presents a special increasing income effect; if the rural secondary industry, the tertiary industry and the primary industry are fully integrated and developed, a special multiplier effect is produced in practice. Therefore, whether or not to obtain collective construction land that meets the needs of industrial land is a constraint for the secondary and tertiary industries to develop smoothly in rural areas and obtain higher returns. In the vast rural areas, only by taking homesteads as the incremental potential of collectively-operated construction land can we formulate guidelines and policies that meet the national land use control in rural areas and the intensive and economical use of construction land while meeting the needs of industrial integration land.

5 Conclusion and Implications

Based on the synergy theory, this paper analyzes the synergistic effect mechanism of rural industrial integration land. After systematic theoretical analysis, the following conclusions are drawn: The three basic theories of synergy theory are synergy effect, servitude principle and self-organization principle. Based on the general theory, combined with the actual needs of rural land system reform from the perspective of industrial prosperity, the synergy mechanism of rural industrial integration land use is deduced and summarized into the free flow coordination of rural land elements, the coordination of large-scale production and operation of agricultural land, and the complex integration and coordination of rural industrial land. three effects. The reform of my country's rural land system must implement three collaborative innovations from three perspectives: the synergy effect of free flow of rural land elements, the synergy effect of large-scale production and operation of agricultural land, and the synergy effect of complex integration of rural industrial land. Improve the synergy effect of free flow of rural land, improve the synergy effect of the scale of production and operation of agricultural industrial land through the reform of ”separation of three rights” for agricultural land; promote the complex integration synergy effect of rural industrial land through the reform of the collective commercial construction land system. In the context of rural revitalization and industrial prosperity, the integration of rural industries should emphasize systematicness, integrity, and synergy, so as to
Improve the prosperity of rural industries through the optimization of the land structure and system for integration of rural industries, so as to achieve the goal of overall rural revitalization. The rural industrial integration land use system should adhere to the system and synergistic thinking, realize the linkage promotion of various specific land system reforms, and use land as a link to promote the coordinated and synchronous aggregation of various production factors.

References