

# Research on the Linkage between Land Consolidation and Rural Industrial Development Based on Land Spatial Planning

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**Abstract:** Under the background of the rural revitalization strategy, rural industries are gradually developing in the direction of spatial stratification and product diversification<sup>[1]</sup>. As a carrier of space, land is naturally inseparable from land consolidation to realize the reconstruction of industrial space. Based on the situation of adapting to the new stage of rural transformation and development, under the framework of land spatial planning, this paper explores the governance advantages of organic connection between land consolidation path and rural industrial development. Nan'an Town, Wenshui County, Shanxi Province, a typical demonstration area of industrial transformation under the land consolidation strategy, was selected as a research case, and comprehensively discussed from the perspective of industrial restructuring and spatial reorganization under the role of land consolidation. While continuously promoting its characteristic pear orchard industry, combined with land consolidation suitable for local industrial development, the site has built a new type of industrial structure at the village scale, replacing the traditional primary industry with characteristic industries, and gradually extending and expanding on this basis. At the same time, the industrial space reorganization was realized through land consolidation, and the "production-life" composite space and the "production-ecology" composite space were gradually formed, and the transformation and development of the countryside was realized. Land consolidation and rural industrial development promote each other, linkage development, the resulting economic benefits, social benefits, ecological and environmental benefits are obvious, the current rural economic development and land consolidation reform will have a positive reference and demonstration effect.

**Keywords:** land consolidation; Rural industrial development; Industrial restructuring; Spatial reorganization

## 1. Introduction

Rural economy is an important part of social economy, and social development is inseparable from rural revitalization. Ignoring the disadvantages of rural development continues up to now. Compared with urban economy, the problem of rural economy development lags behind, and the problem of unbalanced urbanization development is becoming increasingly prominent. Therefore, it is of great significance to thoroughly implement the rural revitalization strategy according to the actual situation of rural industries and the national industrial prosperity. Rural revitalization must be inseparable from land consolidation. Land consolidation plays an important role in improving the efficiency of land use and promoting the development of characteristic agricultural industry, and is an important link connecting industrial development and rural construction.

In the context of national spatial planning, through farmland water conservancy, field roads, farmland protection, ecological management measures to efficient use of land, not only can increase the effective farmland area, improve the level of land use, also effectively improve the rural production and living structure layout, realize the maximization of rural land space utility. Therefore, as the breakthrough point and power source of rural revitalization, land consolidation planning for industrial development has always been a hot topic of many scholars in the field of urban and rural planning in China. Domestic scholars mainly focus on the land consolidation mode, landscape ecology, related technology, public participation, benefit evaluation, etc<sup>[2]</sup>. analyzed the capital benefit and spatial difference of land consolidation from 2003-2008 to 2008, and Yan Jian focused on the economic development of rural tourism industry in 2018. However, land consolidation was carried out abroad earlier, and the research on related rectification mode is also relatively mature. Its research fields mainly focus on land remediation and soil and water conservation, the evolution mechanism of land remediation and

ecological landscape, and the relationship between land remediation and biological species. However, generally speaking, the existing literature has less theoretical research content from the perspective of industrial chain space. Based on this, this paper based on the strategy theory of industrial and spatial integration from the perspective of industrial restructuring and spatial reconstruction under the action of land consolidation. It is believed that this research will inevitably have a positive role in realizing the sustainable development of the current rural economy and promoting the overall development of urban and rural areas.

## **2. Conceptual analysis of land consolidation and industrial upgrading**

As a breakthrough and power source for rural revitalization, land consolidation plays an important role in the coordinated development of urban and rural areas. Carry out comprehensive improvement of fields, water, roads, forests and villages, on the one hand, increase the quantity of cultivated land, improve the quality of cultivated land, and take the newly added cultivated land area as an indicator of balance between occupation and compensation; On the other hand, it uses engineering and technical means to scientifically and rationally lay out the industrial structure, improve agricultural production conditions, and increase peasants' incomes. In the process of implementing the rectification project, we have always adhered to the principle of linking the increase and decrease of urban and rural land use, and through the collation and reclamation of abandoned and idle land in rural areas, we will focus on farmland rectification, realize the overall layout of optimized land use, and promote the efficient use of land resources and the sustainable development of rural construction. However, in general, China's land consolidation started late, and in the process of land consolidation project implementation, the systematicness and scale of the project are not perfect enough, and it still needs to be improved. Industrial upgrading, that is, an innovative industrial development model composed of two modules of industrial restructuring and spatial reorganization based on the construction strategy of industrial and spatial integration. Industrial restructuring refers to the change of industrial cluster and industrial structure between construction land and agricultural land, which is mainly manifested in large-scale agriculture, characteristic agriculture, brand agriculture and the integrated development of rural tourism.

Industrial restructuring is the foundation of rural transformation, and agriculture is the basic industry of rural areas. Secondary and tertiary industries are derived from characteristic-scale agriculture, and related industries are organically integrated to achieve the overall optimization of industrial layout, so as to better enhance the industrial structure and improve the industrial chain. Spatial reconstruction, as a suitable construction mode for rural space, specifically refers to the development of industrial transformation, the traditional material space is broken, and the construction form and shape of the industrial bearing space undergo corresponding changes, including all the spaces on agricultural land and construction land, to achieve new element flow and spatial integration, and finally highlight the comprehensive function of the space plate. With the guidance of industrial development and the support of land consolidation technology, rural habitat and ecological space have gradually derived productive functions, and the traditional three major living spaces have been reorganized in series to form a "production-life" composite space and a "production-ecology" composite space.

## **3. The current situation of comprehensive land improvement in Nan'an Town**

Nan'an Town, Wenshui County, is located in central Shanxi Province, on the western edge of the Taiyuan Basin, at the eastern foot of Lüliang Mountain. The terrain is gentle and the climate belongs to the warm temperate continental semi-arid monsoon region. In recent years, Nan'an Village has applied for the "Wenshui County Nan'an Village Crispy Pear Modern Agricultural Demonstration Park Construction Project", vigorously carried out land consolidation, and hardened the streets and alleys in the village with high quality. From 1999 to 2005, Nan'an Village implemented the project of supplementary arable land, and carried out reclamation and unused land development; From 2005 to 2008, land-saving replacement and hollow village remediation were carried out; After 2008, comprehensive land improvement will be implemented, supporting rural farmland water conservancy facilities, and effectively reducing and preventing soil erosion.

Adopting the way of introduction to go out, Nan'an Town has continuously expanded the planting area of characteristic pear orchards, actively introduced new varieties and new technologies, established pear and fruit industry associations, built and stuffed 76 warehouses, and established 61 agricultural cooperatives, initially forming an integrated industrial layout of "production + marketing". Land consolidation has promoted the transformation of farmers in Nan'an Town from traditional small-scale

farmers to large-scale production of fruits, focusing on the core industry of "fruit pear planting", while consolidating the management and protection technology, changing the status quo of villagers' labor-type planting and picking, integrating more elements to achieve fine treatment, and encouraging the development of deep processing enterprises (such as pear wine and pear paste) and printing industry of pear products, thus extending the second industrial chain. At the same time, the ecological and cultural tourism development project was carried out, the main contents of the project mainly include: First, to create a wetland ecological zone, to attach equal importance to the ecological and economic benefits of the wetland, and to create an eco-tourism forest scenic spot covering an area of more than 1,000 acres; Second, the development of haojiapu, Beihu and other villages as the main agricultural leisure tourism area, the holding of pear blossom festivals, etc., under the premise of attracting tourists to promote the development of catering, service, transportation and other tertiary industries.

#### **4. The impact of land consolidation on the restructuring of rural industries**

##### ***4.1. Industrial restructuring path***

The restructuring of rural industries mainly involves three aspects: industrial scale expansion, structural upgrading, and industrial chain diversification. Industrial restructuring is the foundation of rural revitalization, which refers to industrial agglomeration and industrial structure change on agricultural land and construction land, and its essence is a reorganization path that replaces traditional small-scale peasant economic industries with green and new industries<sup>[3]</sup>. Industrial structure adjustment and optimization is an important way to achieve rural value diversification. Through the analysis of the historical experience and local practice of rural transformation, the adjustment of industrial structure can be summarized into two forms: new and old replacement and epitaxial expansion.

(1) "Old and new replacement" refactoring path. Driven by characteristic agriculture, based on resource endowments, the adjustment of land use structure will be realized, and the traditional primary industry will be replaced by a new primary industry. The plan points out that it is necessary to lead the industrial development of the village collective through new technologies and new structures, and realize the centralized use of land and the diversification of land value. Since the implementation of the project, Nan'an Town has vigorously developed other industrial economies on the basis of consolidating the industrial economy of pear orchards, and the supply-side structure has gradually shifted from the traditional pear orchard industry to the economic industries such as wine, printing and tourism, and the industrial structure has been continuously upgraded. In addition to inheriting the gifts brought by traditional industries, the implementation of projects such as machine wells, roads and ecological shelterbelts covered in the "Construction Project of Crispy Pear Demonstration Park" has also provided new opportunities for the development of tourism in Nan'an Town.

(2) "Epitaxial expansion" reconstruction path. Due to the bottleneck of the single industrial structure in the village area and the limited development space, it has become an urgent choice for rural industrial development to use the advantages of the existing characteristic pear orchard industry and inject new industrial elements to extend the industrial chain. Based on the recognition of the external market, the Nan'an Village Plan points out that in order to make full use of various resources, it is necessary to achieve industrial upgrading under the promotion of diversified compliance, and integrate rural fields, water, roads and forest ecological landscapes into existing characteristic industries, so as to achieve the diversification of rural functions<sup>[4]</sup>. By extending the industrial chain, a leisure tourism industry integrating viewing, picking and shopping has been formed, which has broadened the livelihood and employment mode of farmers.

##### ***4.2. Industrial structure upgrading***

(1) "Industrial structure upgrading". The industrial structure essentially refers to the economic and social relationship between industrial factors, which is an organic whole composed of several industrial types and can play a specific function in a certain environment. In order to maximize the value, the company will be the original product processing and manufacturing, advertising language, after-sales service, marketing means and other links separated from the industrial chain, the value of a relatively large proportion of the core links that need to rely on local geographical advantages to retain the local, and for the publicity and marketing and other relatively low-end links to the outside transfer, to achieve the spatial separation of the primary and secondary industries and the tertiary industry.

(2) "Diversification of business models". The continuous optimization of the industrial structure has

produced a ripple effect that drives the coordinated economic development of the surrounding areas, and stimulates farmers to develop a more diversified business model<sup>[5]</sup>. Hierarchical food processing enterprises implement a meticulous division of labor, well-developed large growers take the lead in development, and product manufacturing, semi-processing, marketing and publicity and other links continue to approach the direction of contractor diversification. On the basis of making full use of the ecological advantages of modern green industry, many migrant workers have been attracted to devote themselves to the development of surrounding extended industries, forming a linkage effect between industrial revitalization and talent revitalization.

## **5. The impact of land consolidation on industrial spatial reorganization**

### ***5.1. "Production-ecology" integration of production and scenery***

Under the background of territorial spatial planning, the traditional three-life space has gradually changed from the original mutual separation to the "life-production" composite space and the production-ecology composite space. In the process of implementing the Nan'an Village project, land consolidation is organically combined with village infrastructure and ecological landscape construction, and while developing the rural economy, it will feed back ecological construction. In order to ensure the smooth development of the "Crispy Pear Demonstration Park Construction Project", vigorously implement the land consolidation, land reclamation, machine wells, roads, ecological shelter forests, land leveling and other contents covered in the project, and simultaneously and comprehensively build the forest villages of Tianshui Road, while continuously promoting the spatial expansion of additional industries in rural areas. Taking fruit, forest and flower planting as an example, while promoting the development of industrial economy, we will create an ecological and cultural corridor and develop the tourism industry chain, thus forming a joint force of continuous integration and extension of production-ecological composite space.

While developing and building traditional industries and pillar industries, Nan'an Village is committed to accelerating transformation and development, and building an agricultural ecological zone, a wetland ecological zone, and a cultural and leisure zone. First, relying on the geographical advantages of Nan'an Town close to the Fenhe River, we will create an eco-tourism scenic spot that occupies more than 1,000 acres of ground; The second is to closely focus on the ecological advantages of its 50,000 mu of pear orchards and the geographical advantages of a short drive from Taiyuan City to build an agricultural leisure tourism area, and gradually develop rapeseed planting, grape and strawberry picking gardens, and plan a green belt; Third, the Establishment of nan'an Liguó United Society, with more than 100 constant temperature warehouses in the town, has reached the capacity of warehousing 100 million catties. At present, Nan'an Village, Xiao nan'an Village and Bei' an Village are mainly used to build cultural and leisure tourism areas, and the original site of Sun Qian's former residence has been added and expanded, and a wine processing plant has been built to create a winemaking culture exhibition hall and brewing experience hall of more than 2,000 square meters.

### ***5.2. "Production-life" integration of production and residence***

Rural living spaces gradually evolved into productive functions. According to the willingness and development conditions of farmers to reclaim, rationally use the abandoned homesteads around the village, give full play to the advantages of ancient architectural style homestay tourism, and promote the upgrading of the service industry. At the same time, new power stations, monitoring stations and other facilities are built to facilitate agricultural operation and management, and optimize the layout of agricultural product factories and trading markets near residential areas. Rural tourism has been promoted by maintaining traffic roads and sidewalks, building new lanes and parking lots, and implementing infrastructure and public service project construction, while renovating the village environment and enabling residents to carry out handicraft and commercial activities accordingly. The development of additional industries represented by leisure tourism integrates the rural industrial economy with life, and the penetration of such industrial space in the countryside is bound to form a state of integration and expansion of rural production-life composite space<sup>[11]</sup>

As of 2009, Nan'an Town has completed more than 100 kilometers of brick roads, cement roads and oil roads; In the human and animal draft project, a total of 3.8 million yuan was invested in the

construction of 3 new water distribution stations, and more than 25,000 meters of water diversion pipelines were buried, and the centralized water supply system in Nanxu Village was connected. In the pear and fruit industry, the business model of "company + base + farmer" has greatly improved the processing conversion rate and added value of agricultural products, driven the economic development of surrounding villages, and continuously enhanced the radiation driving capacity of the industry. Pear Group has driven more than 4,000 farmers through orders, contracts and cooperation with farmers in Baolian Village, with an average household income of more than 5,000 yuan and effectively resettling more than 1,000 surplus rural laborers.

## **6. Conclusions**

### ***6.1. Land consolidation and reconstruction of rural industries***

Land consolidation is an intermediary that links industrial development and rural construction, and plays a vital role in improving land operation status and rural industrial revitalization. The efficient implementation of a series of land consolidation measures has developed and utilized the originally abandoned and idle and inefficient land resources, continuously improved the thickness of the soil layer and the quality of soil cultivation, and greatly improved agricultural output. At the same time, through the improvement of settlements and industrial areas, the production and living structure in the village is further improved, the land is further leveled, the production and living layout is re-planned, the pastoral economy is created, and the ecological landscape construction is fed back, and the integrated development of the three-life space is realized. On the basis of the development of the primary industry, the secondary and tertiary industrial chains are extended to realize the restructuring of rural industries. While vigorously developing the pear and fruit sales industry, we will vigorously carry out the construction of farmland water conservancy, field roads, farmland protection, ecological governance, etc., support rural farmland water conservancy facilities, give full play to the ecological advantages of modern green industries, and create a unique rural tourism supported by the pear garden economy, giving full play to the location advantages. This measure has greatly improved the rural production conditions and revitalized the rural industry.

### ***6.2. Industrial development drives rural revitalization***

With the fruit forest economy as the main body, we continue to explore the diversification of production levels on this basis, providing a new development path for Nan'an Village. From the initial expansion of industrial scale to the structural upgrading and diversification of the industrial chain after the mature stage, the supply-side structure of Nan'an Town has gradually achieved partiality<sup>[6]</sup>. Relying on the ecological advantages of the town's green industry, we will create its own unique rural tourism with the pear garden economy as the support and highlight the local flavor of the pear culture, so as to promote the diffusion and flow of rural space, realize the optimization of industrial structure, and strengthen local economic development.

Therefore, in the process of exploring the practice of rural revitalization strategy, the case of Nan'an Village has a certain reference. Combined with the resource endowments and industrial base of various regions, according to local conditions, carry out land consolidation suitable for industrial development, and rationally arrange projects such as ecological tourism to promote the development of other related economic industries, so as to form a complete industrial chain.

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