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The Impact of Governance Structures on the Distribution of Land Consolidation Benefits in Urban Areas: Case Studies in Ningbo, China

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Abstract: Against the backdrop of an urban-rural dual structure, governance structure significantly influences the fairness and sharing of land value increment profits from land consolidation in various regions. This paper develops a spatial-institutional analytical framework, reflects on the traditional government-led land quota planning management mechanism and advocates optimizing governance structures in land consolidation to facilitate urban-rural element flows and the sharing of land value increment profits. This paper selects two comprehensive land consolidation cases in the Fenghua District and Cixi City of Ningbo, representing government-led and village collective self-organized governance structures. The research shows that the Fenghua case adopts a government-led state-owned enterprise coordinated governance structure, which state-owned enterprises bear operational risks and the majority of profit sharing, while village collectives, as landowners, are insufficiently protected in benefit sharing. The Cixi case employs a government-embedded village-town governance structure, with the village collectives as the main operating body, allowing collective construction land to enter the market to ensure the sharing of community profits. Both governance structures promote the bidirectional flow of urban-rural land resource elements; the former significantly drives urban development, while the latter ensures better benefit sharing for village collectives. The research proposes that optimizing governance structures and improving land quota allocation mechanisms can further stimulate various entities' participation in land consolidation and land value activation.

Keywords: land consolidation; government-led model; village collective self-organization model; profit distribution; Ningbo

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1. Introduction

With the acceleration of urbanization globally, the migration of large rural populations and land resources into urban areas has intensified the decline of rural areas in many countries, as evidenced by inadequate infrastructure, declining agricultural economy, population outflow, and natural resource shortages [1]. To address the challenges posed by globalization and urbanization to rural areas, land consolidation has gradually evolved into a policy tool for promoting the transformation of rural land use and rural development [2,3]. Since the year 2000, China has launched numerous land consolidation projects, playing a positive role in alleviating poverty and promoting rural revitalization [4]. In 2019, China's Ministry of Natural Resources announced a new round of comprehensive land consolidation pilots, transforming the focus of consolidation from purely agricultural and

rural construction land to the integration and cooperation of different types of consolidation and the combination of urban-rural ecological space protection and restoration. In 2020, the central government of China further proposed the pilots of comprehensive rural land consolidation, defining its goal as the comprehensive consolidation of the mountains, rivers, forests, fields, lakes, and grassland systems.

In the practice of land management, various types of governance structures have gradually evolved. The central and local governments have formed a governance structure of decentralization and centralization. The central government allows local governments to exercise part of the land economic power through decentralization, and then restricts local governments' land use decisions through centralization [5]. In rural land circulation, government governance focuses on the reform of the rural land property rights system and the construction of the land property rights trading platform, which can significantly improve the quantity of land circulation, but does not play a sufficient role in the quality of land circulation. The internal governance structure of village collectives can effectively reduce the transaction costs in the process of signing, supervising, and managing land circulation contracts, and improve the quality of land circulation [6]. In land management, rural collective economic organizations usually establish a joint-stock cooperative governance structure to regulate the rights and responsibilities of various internal stakeholders [7]. The duty of the collective economic organization is to ensure that the rights and interests of its members are protected [8]. In land consolidation, there are government-led, village collective autonomy, and multi-agent governance structures. The governance structure of village collective autonomy can better safeguard the legitimate rights and interests of rural households and promote urban-rural integration [9]. It can be seen that the governance structure dominated by the government and village collectives has different roles and benefit distribution effects.

Under the background of the urban-rural dual structure, the overall institutional framework prioritizing urban development has led to the issue of "urban-biased" resource and land value increment profit distribution, becoming one of the main problems faced by land consolidation [10]. Since 2000, China's land consolidation policy, as an important policy tool for coordinating urban and rural development, has gradually manifested two different governance structures in practice: a "top-down" government-led governance mode and a "bottom-up" collective self-organized governance model. The imbalance in power structure due to over-centralization of power and excessive government intervention in rural autonomy is a major cause of imbalances in land value increment profit distribution [11]. In recent years, the central government of China has increasingly emphasized the development goals of urban-rural integration and common prosperity. The new value orientation has an impact on land consolidation in different regions, requiring land consolidation to ensure greater guarantees for rural benefit distribution. However, there has been a paucity of in-depth studies on how different governance structures, namely government-led and village collective self-organized structures, affect the distribution of benefits from land consolidation.

To fill this research gap, we took Ningbo's comprehensive land consolidation pilot as the research area, selecting two typical cases from the Fenghua District and Cixi that respectively represent government-led and village collective self-organized governance structures, to compare the effects of the two governance structures on the distribution of land consolidation benefits. The research conclusions can enrich the theories on governance of land benefits and offer reference value for other regions and countries undertaking land consolidation.

2. Spatial-Institutional Framework for the Analysis of Land Consolidation Profit Distribution

The paper established a theoretical analysis framework to assess the impact of governance structures on the distribution of land consolidation profits from both spatial and institutional dimensions (Figure 1). The spatial dimension examines the imbalances in

resource allocation among the urban center, urban-rural interface, and peripheral areas. The institutional dimension analyzes the shared nature of government intervention in land consolidation profit distribution.

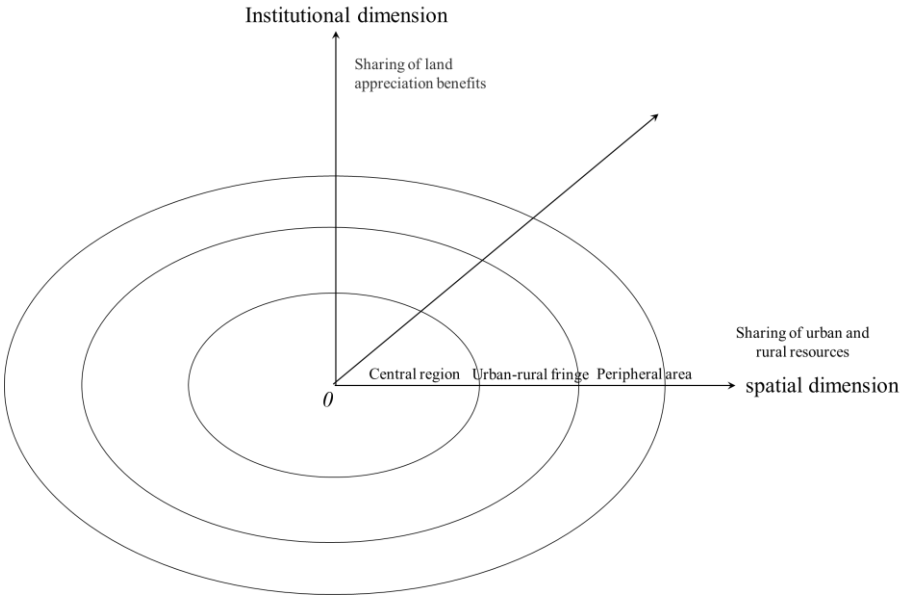

Figure 1. Conceptual Framework for Spatial-Institutional Analysis. "The center, rural-urban interface and periphery together make up the urban area".

2.1. Spatial Dimension: Imbalance in Resource Allocation among Central-Urban Rural Interface-Peripheral

In the spatial dimension, there exist disparities in resource endowments among urban centers, urban-rural interfaces, and rural areas. Land values are highest in urban centers, followed by the urban-rural interfaces, and lowest in peripheral lands. This differential prompts the government to exchange land quotas from the periphery for more valuable urban center development quotas, resulting in a government-led land quota planning focus on the urban center. This not only overlooks the developmental space of rural peripheries, exacerbating rural decline driven by urbanization [12], but also marginalizes the original inhabitants of the urban-rural interface as they are unable to share in land value increments, leading to the "urban-rural interface dilemma" [13]. Urban and rural areas are an indivisible organic whole. The urban-rural dual structure causes an obstruction in element flow, unequal resource distribution, and unbalanced development. Resources such as technology, capital, organizational structures, and functions are essential for rural industrial development [14]. The flow sharing of urban and rural element resources becomes the core of land consolidation to break down the urban-rural dual structure. As a platform for urban-rural resource exchange, land consolidation paves the way for the flow of urban capital, markets, and technology to rural areas, while guiding rural resources, products, and labor into cities, facilitating the flow of rural elements toward urban centers [15]. Land consolidation fosters urban-rural integrated development through the flow of urban and rural elements, with significant spatial spillover effects and higher applicability in economically developed villages [16].

2.2. Institutional Dimension: Imbalanced Distribution of Land Benefits under Government-Led Structure

The government-led land quota planning management model has led to imbalanced distribution of land development rights among regions. For a long time, the unequal allocation of urban and rural development factors and rights has been a crucial factor in insufficient and uneven rural development [17]. Based on a "unified graded quota" land planning management approach [18], governments at all levels decompose construction

land quotas down to lower levels of local government. On one hand, there is a severe shortage of construction land quotas in areas with scarce arable land but developed economies. On the other hand, there is a surplus of construction land quotas in regions with abundant arable land but underdeveloped economies. Zhejiang Province's land development rights management allows for cross-regional transfer of construction land quotas with upper-level approval [19]. However, farmers still lack property rights protection and policy protection in land transactions and profit distribution [20,21], and cannot receive a fair share of land value increment profits, resulting in an imbalanced distribution of land profits.

2.3. Optimized Governance Structure Promotes Urban-Rural Resource and Value Increment Profit Sharing

Traditional land consolidation's economic rationality focuses more on supplementing arable land area, improving arable land quality, and increasing tradable construction land quotas to maximize land output economic benefits [10]. Under the purview of rural revitalization, it is necessary to reshape the value orientation of land consolidation based on scientific knowledge of urban-rural relationships and rural regional functions [22]. Land consolidation that coordinates urban and rural areas should combine "top-down" government overarching design with "bottom-up" consolidation needs. In the overarching design, the direction of land consolidation is managed globally with precise project layout, scientific siting, and rational planning; while on the demand side, land consolidation projects are arranged based on the actual needs of farmers' production, living, and ecology [23].

In the process of land consolidation, the resource and spatial value of land gradually manifest as land value increment profits [24]. Land consolidation must balance efficiency and fairness, constructing a reasonable multi-entity governance structure in the institutional dimension that ensures both the strategic objectives of government-led land consolidation and priority protection of the status of village collectives and farmers to achieve the sharing of land value increment profits. In the spatial dimension, it emphasizes the protection of the rights of farmers in urban-rural interface and peripheral areas to promote the overall level of urban-rural socio-economic development.

3. Materials and Methods: Comparative Analysis of Land Consolidation Cases

Ningbo, a key city within the Yangtze River Delta urban agglomeration with a population nearing ten million, has made significant achievements in land consolidation. Since 2018, a total of 3677 villages have been consolidated in the region [25]. Since 2022, Ningbo has been designated as a national pilot city for comprehensive land consolidation, championing this strategy as a pivotal policy tool to bolster high-quality urban development and shared prosperity. Within this context, Ningbo's land consolidation initiatives have progressed through a three-stage practical process, encapsulated by the "point-area-zone" model—from individual project points, to township-level areas, and ultimately to macro-scale urban-rural coordinated zones. This research selects and scrutinizes two representative land consolidation cases post-2021, illustrating the characteristics of both government-led and village collective self-organized models.

In Ningnan Area, located within the urban-rural interface at the outskirts of the Fenghua District in Ningbo (Figure 2), a government-led zone development consolidation model has been adopted. A state-owned enterprise spearheads the coordination of land resources, financial investments, and industrial operations for the entire region. This zone encompasses 13 administrative villages across Jiangkou and Xiaowangmiao streets. As of 2021, the permanent population of the area stood at approximately 29,000, with a village populace of 16,000. Agricultural land spanned 873 hectares, while construction land extended over 379 hectares. Pertaining to land ownership, collective land constituted 80% of the total holdings.

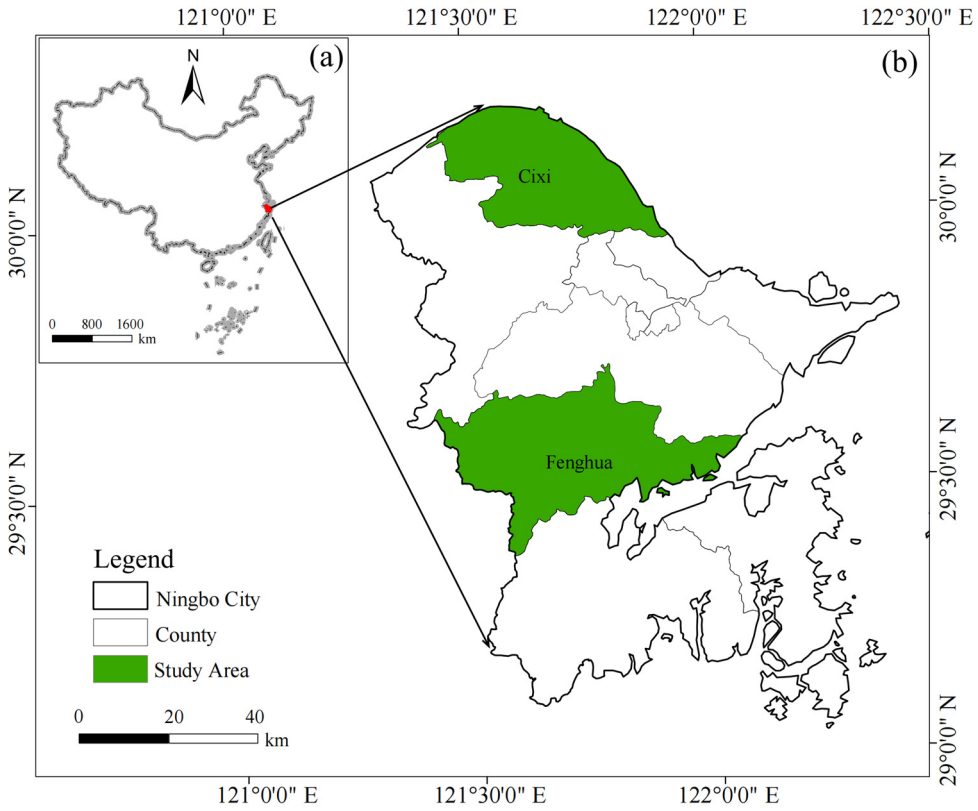

Figure 2. (**a**,**b**) Schematic Diagram of the Case Study Locations. "Cixi and Fenghua in Ningbo correspond to two research cases".

In contrast, the Zhouxiang Area in Cixi City of Ningbo (Figure 2), a small town detached from the central urban area, has implemented a government-embedded village collective self-organized consolidation approach. Here, village collectives autonomously oversee the comprehensive management of land resources, finances, and industrial operations within the project zone. A flagship project within this model is the Wan'an Zhuang Village consolidation. The village occupies an area of 2.4 square kilometers, with a registered population of 1870. By 2022, the collective operational income of the village was 4.1 million yuan, and the per capita income of villagers had reached 51,000 yuan. From 2004 to 2023, five phases of land consolidation have been enacted, encompassing the renovation of old villages; enhancement of residential environments, improvement of public facilities, reclamation and central resettlement of homesteads; facade refurbishment; construction of cultural squares and auditoriums; and establishment of smart farms, culminating in the formation of a shareholder-operated cooperative.

3.1. Revenue Distribution in Government-Led Land Consolidation at the Urban-Rural Interface

3.1.1. Governance Structure Spearheaded by State-Owned Enterprises

The land consolidation governance structure of the Yanshui Pastoral Land Project involves a state-owned agribusiness group from the Fenghua District as the main executor, coordinating social capital and collective village resources (Figure 3). The corporation is responsible for funding land consolidation, introducing industries, attracting business operations, and overseeing project coordination. Activities encompassing agricultural land reclamation, purchase of reclamation quotas, resident relocation, centralized demolition of villages, and the reclamation of farmland from forests entail significant financial investments (Figure 4). With substantial financial capabilities, the agribusiness group effectively orchestrates these endeavors. Its subsidiaries obtain land management rights from village collectives and introduce social capital operators and large-scale grain farmers for operational management. For villages identified for demolition and relocation in the plan, the

street-level government will assist the village collective in implementation. The most direct benefit to villagers comes in the form of relocation compensation for homestead land, with three different compensation methods available: relocation to a community constructed by the village collective, acquisition of "housing vouchers" to purchase urban real estate, or an equivalent cash subsidy. For the villages preserved in the plan, the focus is on improving foundational and public service facilities.

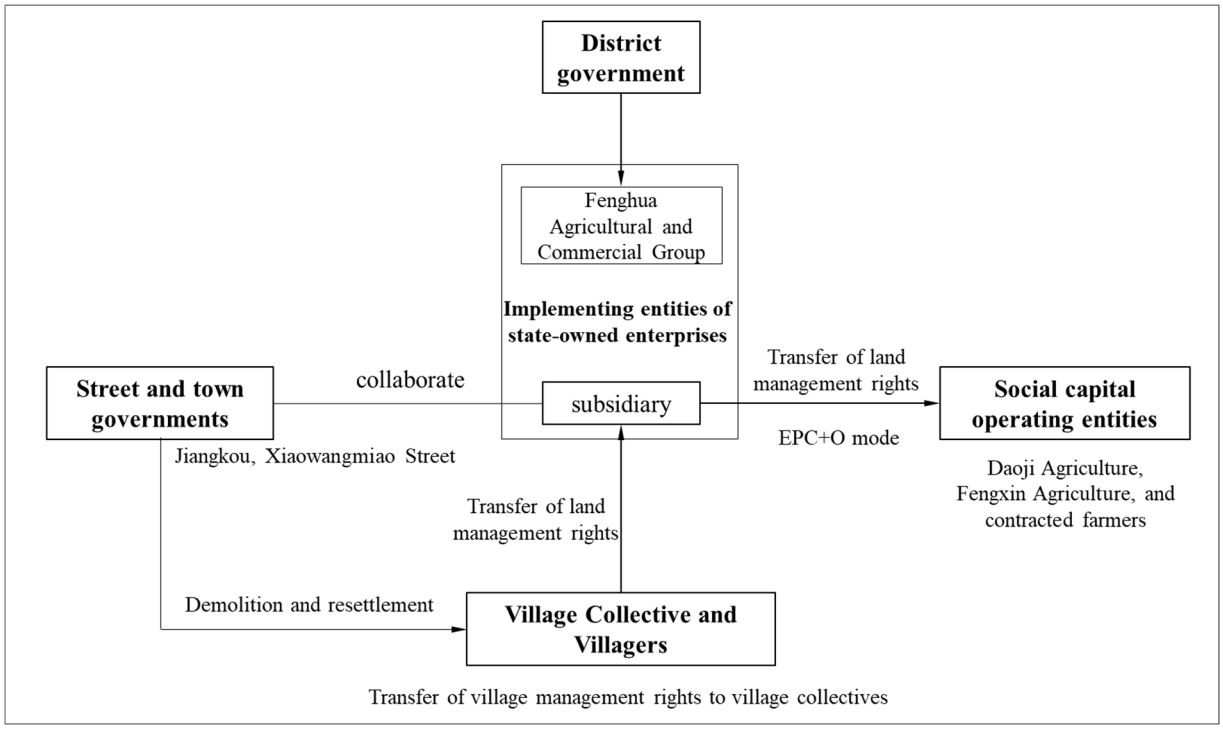

Figure 3. The governance structure of land consolidation coordinated by the state-owned enterprise under government leadership.



Figure 4. Fragmentation before land consolidation. Concentrated contiguous effect of land consolidation. "The source is the construction plan for the launch block of comprehensive land and space consolidation in Fenghua District, and the author's photography".

3.1.2. Operational Risks and Revenue Distribution Challenges Faced by State-Owned Enterprises

The intricacy of the Yanshui Pastoral Land Project as a unit within the urban-rural continuum lies in its operation as an open system involving a comprehensive unit across the urban-rural dichotomy, with construction land quotas and capital flows moving between urban and rural areas. The project undertakes land organization and industrial operations using a planning + Engineering, Procurement, and Construction (EPC) + Operation (O)

model. During the early stages of land consolidation, substantial funds are required for low-return projects, such as land reclamation, centralized village demolition, infrastructure, and public service facilities construction. In the absence of land sales, the agribusiness group primarily relies on operational revenue to offset capital investments, facing challenges in achieving short-term revenue balance. Moreover, the industrial operators introduced require long-term investments to generate stable operational revenues. The reliability of funding sources and operational incomes is crucial for the state-owned enterprise's sustainability. Any shortfall in funds or a break in the financial chain could result in substantial debt risks.

Additionally, the state-owned enterprise bears excessive operational management risk. As the executing entity, it must coordinate project planning, design, procurement, construction, and pre-operational needs while also managing the government's administrative duties. Thus, it incurs both engineering risks and business operational risks. In the event of operator default, massive compensation claims may be difficult to recover. The "EPC + O" model typically necessitates an operational period exceeding ten years, and only operators with robust financing and strong operational capabilities can persist through a decade of management. This signifies that the agribusiness group must be discerning in its selection of operators.

The increase in construction land quotas generated in rural areas and their transactional value flow to urban areas, where they are centrally allocated by the government. Since the state-owned enterprise concentrates the principal capital investment and operational risk, it consequently secures the majority of revenue distribution derived from the land value appreciation achieved through land consolidation. Concurrently, despite the state-owned enterprise plus social capital agricultural land operation model enhancing the economic value of agricultural output, the attribution and distribution of land operation value-added remain limited between the state-owned enterprise and social capital. The village collectives, as the land ownership holder, has yet to establish a fully-fledged mechanism for sharing the revenue benefits.

3.2. Revenue Distribution in Rural Collective Autonomous Embedded by the Government

3.2.1. Hierarchical Embedment of Land Consolidation from City to Town to Village

The land consolidation in Wananzhuang Village, Zhouxiang Town, Cixi, has developed a hierarchical governance structure embedded from city to town to village levels (Figure 5). Due to Ningbo's lack of direct administrative control over Zhouxiang Town, there is a significant void of enforceable administrative influence when implementing pilot policies, rendering policy efficacy and administrative directives scarcely permeable to the collective village level. In contrast, county and town-level governments can more easily embed themselves in the land consolidation process of village collectives. These collectives require town governments to improve productive services, providing facilities to support small household appliance smart manufacturing, agricultural product processing, and the integrated development of agriculture, culture and tourism (Figure 6), jointly constructing a smart appliance manufacturing town. Cixi's city government support the innovative initiative of transforming Wananzhuang's collective construction land into state-owned allocated land, enabling collective land to enter the market on a small scale. Meanwhile, Ningbo's land consolidation policy hardly links to the development needs of village collectives, posing challenges in assimilating such policies within the village collective interior.

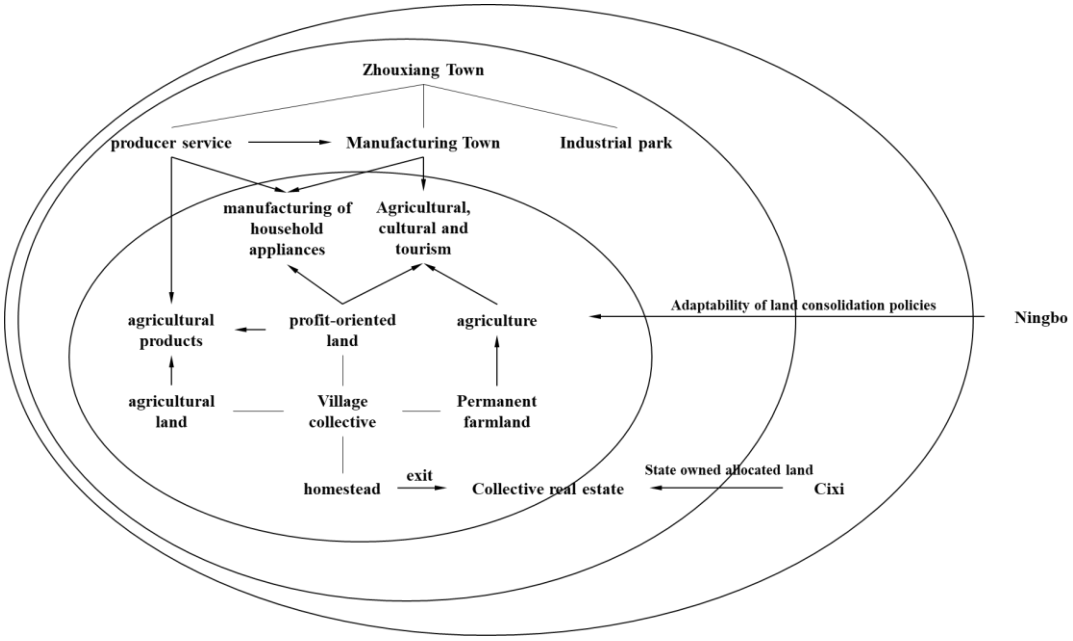

Figure 5. The rectification system model for the Wananzhuang Village case.



Figure 6. Comparison of the effects before and after the village remediation. "The source is the pilot plan for comprehensive land and space consolidation in Zhouxiang area of Cixi City".

3.2.2. Devolution of Spatial Development and Governance Rights to Village Collectives

For a long time, the city of Cixi has adopted a management model that devolves governance rights down to Zhouxiang Town government, endowing it with considerable autonomous management rights. The town government coordinates the flow, transfer, and reallocation of regional elements such as land, capital, and quotas. Zhouxiang Town's significant autonomous rights lead to a pronounced self-governance tendency at the town and village level. The government-led state-owned enterprise coordination model designed for Ningbo's land consolidation pilot projects conflicts with the local long-standing tradition of autonomy, increasing the difficulty of implementing Ningbo's city-wide rectification policy objectives at the village level. In the process of land consolidation, village collectives adopt an avoidance strategy for content that does not align with the interests of the community and villagers or with the village's current reality and future development plans. For example, Wananzhuang Village aimed to use the withdrawn homestead land and reclaimed construction land quotas to build collective housing. When rectification policy objectives do not align with the collective's interests, motivation to proceed is lacking.

3.2.3. Exploration of Market Entry for Collective Construction Land: "Collective Real Estate" Revenue Sharing

Land consolidation practices are primarily financed by government fiscal funds, with inadequate innovation in market-oriented investment and financing mechanisms [26]. For the land consolidation of Wananzhuang Village, the higher-level government provided almost no fiscal input, and the state-owned enterprise did not undertake the task of fundraising during implementation. Project funds came from the village collective's capital and loans from multiple sources. Some economically weak village collectives have annual debts reaching ten million yuan yet generate less than 500,000 yuan in annual income, leading to a considerable deficit that strains village and town finances. In the absence of government fiscal support, village collectives innovatively explored the "collective real estate" model for the limited market entry of collective construction land, raising capital funds for land consolidation.

In the exploration of market entry for collective construction land and the mechanism for homestead withdrawal, Wananzhuang Village first established a village collective economic cooperative, encouraging villagers to contribute their land-use rights as share capital and solving early-stage funding issues for real estate projects with self-raised funds. Regarding the land rights of collective real estate, the village collective applied to the Cixi City government to convert collective construction land into state-owned allocated land, addressing the restriction that collective land cannot enter the market. After the construction of collective housing, residents withdrew from idle homestead land for replanting, and the village collective obtained a 34-mu (about 2.27 hectares) construction land quota for industrial development land and operational land for smart appliance manufacturing. Besides meeting the residential needs of local villagers, the collective housing was also made available for market transactions within the scope of Cixi City, resolving the financial issues of land consolidation operations. However, the problem that remains is that after the market entry of collective construction land, the value-added revenue-sharing mechanism between the government and village collectives is not yet fully established.

3.3. Case Comparison

The case in the Fenghua District adopts a government-led and state-owned enterprise-coordinated governance structure, akin to a combination of ABO model (Authorization-Building-Operation) and EPC + O model. Under local government authorization, state-owned enterprises are responsible for land consolidation, infrastructure development, and other public service functions, whereas operation is delegated to private enterprises or social capital. The implementation follows a concession-operations model, with the government establishing rules and performance assessments, and paying authorized operational fees to the authorized implementing entities. The land consolidation of the Yanshui Pastoral Land Project has transitioned from spontaneous and unorganized to organized and stable investment, with top-down administrative forces and state-owned enterprise coordination playing a decisive role. While the state-owned enterprises bear the operational risks and potential future profits, the mechanism for ensuring the village collective—as the land-rights owner—shares in the revenue is not well-developed.

The case of Cixi City adopts a governance structure where the government is embedded within village-level administrations, with the village collective as the operation subject. Decision-making on land-use quota and homestead withdrawal modes is solely managed by the village collectives, reinforcing their status as entrepreneurial entities. It innovates market entry for collective construction land and compensated withdrawal of homesteads to guarantee revenue sharing. Both governance structures facilitate the bidirectional flow of urban-rural land resource elements; the former significantly drives urban development, while the latter provides better safeguards for revenue sharing within village collectives. However, the mechanism for sharing the increased valuation profits from the market entry of collective construction land remains to be perfected.

In general, the government-led land consolidation can coordinate land use indicators and various resources, significantly optimize the overall structure of urban and rural space, and make fragmented land efficiently concentrated and contiguous. However, government-led structure needs to balance the large amount of capital invested by state-owned enterprises in the early stage, and the allocation of funds and land use indicators will significantly discourage the enthusiasm of village collectives and villagers. Moreover, the development space of villages will be further limited, which is not conducive to the long-term sustainable development of villages. The self-organized governance of village collectives significantly stimulates the enthusiasm of the collectives and villagers, selects the model that is conducive to the development of local industries. The retention of land use indicators and the development of collective real estate are also conducive to the growth of collective economy and ensure the long-term income of villagers.

Therefore, the two governance structures, government-led and village collective self-organization, have both advantages and disadvantages (Table 1). In the case that the government has sufficient financial funds and needs to optimize the spatial structure of urban and rural areas on a large scale, the government-led is conducive to the overall and efficient structural optimization. In the case of limited government financial funds, it is necessary to delegate governance power to village collectives to stimulate the enthusiasm of villagers and commercial organizations.

Table 1. Comparative analysis of government-led and self-organized by village collectives.

Case	Fenghua District, Yanshui Pastoral Unit	Wan'anzhuang Village, Zhouxiang Town
Governance structure	Government-led	Village collectives are self-organized
Advantage analysis	Higher efficiency, significantly optimize the spatial structure of urban and rural areas, which is conducive to the rapid concentration of fragmented land. The co-ordination of indicators is conducive to the optimization of urban and rural spatial structure	The village collectives and villagers have a high degree of autonomy and enthusiasm, which is conducive to the industrial development that adapts to the local needs, and the villagers can obtain long-term benefits under the shareholding structure
Weakness analysis	It has significantly discouraged the enthusiasm of village collectives and villagers to participate. In the case of limited government financial funds, the operational and capital risks of state-owned enterprises are high, and it is difficult to take into account the interests of some village collectives.	It is conducive to the local spatial optimization at the village and town level, but the optimization of the overall spatial structure of urban and rural areas is restricted by local constraints
Distribution of benefits	The benefits of land consolidation are used to balance the capital investment of state-owned enterprises, and village collectives and villagers only receive short-term compensation. The development rights of regions with poor resource endowments are further restricted, and the imbalance of income distribution is likely to further expand.	Village collectives can use the land indicators of land rehabilitation to develop local industries, and the collective real estate income from collective construction land into the market enables village collectives to obtain sufficient funds. Villagers can obtain long-term benefits under the shareholding structure.

4. Research Results and Discussion

4.1. Village Collective Interest Protection Requires Government Integration into Village Autonomy Systems

Land consolidation projects often get established by the government through a "top-down" approach, lacking the spontaneous "bottom-up" initiation by the populace, thus reflecting the will of the government rather than the demands of the farmer [27]. An unrestricted "activist government" can easily become excessively dominant, leading to sig-

nificant economic and social imbalances [28]. The biggest issue with state-owned enterprise-coordinated land consolidation guided by the government is the lack of preserved industrial development space for village collectives, which may result in employment and livelihood security problems for farmers. At the urban-rural interface and peripheral rural areas, local governments need to integrate into the village autonomy system, internalizing the resolution of public services such as social security, pensions, and healthcare into the advancement goals of government-led land consolidation policies.

Although the "Land Management Law" describes rural collective economic organizations, their status as independent operating entities is not clear in practice. In the consolidation of villages, administrative dominance by the government brings about issues of benefit distribution from land transfers. The only entities with professional decision-making capacity and the ability to interact positively with the government within the system are village collectives. By devolving spatial development rights and governance to villages within the governance structure and embedding the implementation model of land consolidation into the village autonomy system, local governments can stimulate the enthusiasm at the village level. The government must fully empower villages and villagers to actualize their development needs through land consolidation.

4.2. The Government Embedding Village Collective Self-Organization Is the Optimal Model

Land consolidation entities can gain reasonable returns through the operation of pillar industries, allowing these entities, social capital, and village collectives to benefit directly from interests and share dividends [29]. In practice, there are incentives in land consolidation where collective asset ownership is transformed into shareholding rights [30]. The land consolidation in the Zhouxiang area is implemented and operated mainly by the town and the village collectives, with state-owned enterprises providing credit enhancement guarantees for the project company's financing, flexibly addressing the conflict between overall goals and local development needs. The village collectives, serving as the operating entity, coordinate local social resources such as local talents, chambers of commerce, and rural enterprises, integrating both local social capital and resources from chambers of commerce with external development. They achieve large-scale land transfer by using land usage rights and operating rights to acquire shares in the business operations of the village collective, thereby enhancing the benefits of scale management.

In summary, the best choice is to fully combine the advantages of the two governance structures and embed government governance into the village autonomy system, which not only utilizes the government's ability to optimize the urban and rural spatial structure, but also ensures that the village development needs are met. The specific implementation can make full use of government financial funds and social capital resources, delegate governance power to village collectives, set up a revenue distribution mechanism between the government and village collectives, and reserve part of the land index to meet the development needs of village collectives. The embedded governance structure is also more conducive to the integration of social capital resources, reducing the conflict and cost of implementation and governance. The shareholding system with village collectives as the main operation body is also more conducive to motivating villagers and social capital to participate in land consolidation and balancing the benefits of various stakeholders.

4.3. Government-Market Combined Indicator Allocation Facilitates Urban-Rural Resource Sharing

Land consolidation can stimulate the participants' enthusiasm by granting them land leasing rights and operating rights for a certain period and the rights to income from inter-regional land index transactions. An interest-sharing mechanism can be built through annual land-use planning index rewards and the priority adjustment of supplementary arable land indices across regions [31]. The inter-regional trade of indices originated from local practices such as the Zhejiang model and the Chengdu-Chongqing model under the policy of linking the increase and decrease of construction land [19]. Zhejiang Province has set up an adjustment platform for unused urban and rural construction land index,

with inter-county (city, district) index adjustments traded on the provincial platform and established a minimum protection price system of 500,000 RMB per mu (about 33,350 RMB per hectare). In practice, some towns have also explored the "enclave model", where indices generated from village reclamation are "flown" into urban or industrial areas for unified development and shared benefits [32].

The inter-regional trade of indices across urban and rural areas requires a shift from the traditional government-led "more trade, more gain" rational model, creating a "government transfer payment and market trade coordination model" that emphasizes sharing between developed and underdeveloped regions. A coordinated system of the fund pool and index pool must be established. Underdeveloped areas provide indices to the index pool system, receiving corresponding transfer payments from the government's fund pool based on the indices provided. However, the market transaction of indices across urban-rural areas and regions should also be liberalized in underdeveloped areas. Developed areas with index needs can purchase additional indices at prices higher than the transfer payments, supplementing the government index pool's transfer payments, effectively promoting the bidirectional flow of urban-rural resource elements (Figure 7).

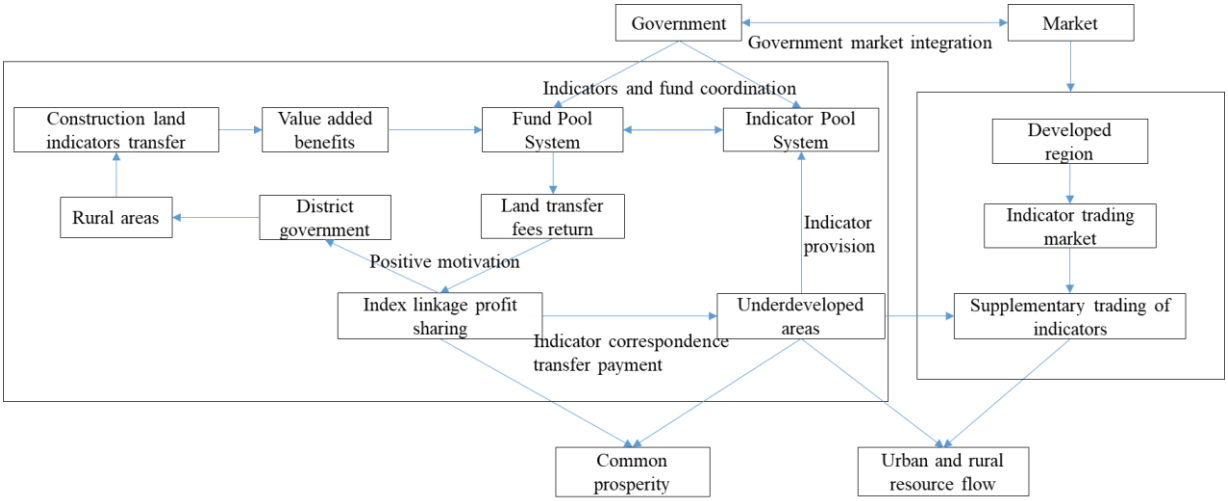

Figure 7. Coordination System of the Fund Pool and Index Pool Combined with Government and Market Mechanisms.

4.4. Establishing a Reasonable Mechanism for the Sharing of Land Value Increment Benefits

It is pivotal for the government to reserve sufficient development space for construction land for village collectives. In Zhejiang Province, policies have been formulated to ensure that, from the additional arable land area reclaimed through construction land, village collectives can retain up to 20% as a reserved index for new local construction land; this signifies that village collectives might use land liberated through land consolidation for the construction of public welfare facilities, such as rural housing and nursing homes [32]. Current legal policies also support village collective economic organizations and members in revitalizing and utilizing idle rural homesteads through various methods such as self-operation, leasing, shareholding, and cooperation [33]; the government can transform some collective operational construction land into residential land and then compensate the village collectives by sharing a portion of the land transfer fee, thereby guiding them to opt for development after the conversion of the collective operational construction land into state-owned land.

In Yiwu, Zhejiang, if homestead rights holders voluntarily withdraw their rights, the village collectives can repurchase them collectively through market-oriented mechanisms such as public auctions, providing a way for members of the village collective economic organizations to adjust rights with compensation [34], representing a direction of reform exploring the market entry of collective construction land and the compensated withdrawal

of homestead land [24]. Therefore, in urban-rural fringe and peripheral areas, implementing a village collective shareholding cooperative system, attempting to relax transaction constraints of the collective homestead real estate market on a small scale, and allowing collective homesteads to serve as a proper supplement to the real estate market are viable methods for sharing the benefits of land value increment through land consolidation.

Urban middle and high-income residents demonstrate a certain market demand for rural residential real estate in "peripheral" areas [12]. This demand can be met through spatial substitution methods by enabling "peripheral" collective operational construction land to enter the market "off-site" on a small scale via "area-wide coordination", or to realize an indirect "off-site market entry" after conversion to state-owned land. Meanwhile, local governments can engage in fair distribution between governments and village collectives by imposing a value-added tax or setting a land value increment sharing ratio. Earnings from land index transfers and the land's operational or market entry value increments should ensure baseline protections for the village residents and collectives regarding value increment and operational income, while also stimulating enthusiasm among rectification entities to participate in land consolidation and operation. This paper proposes two incentive-oriented mechanisms for the distribution of land-value increment benefits, as shown in Figure 8.

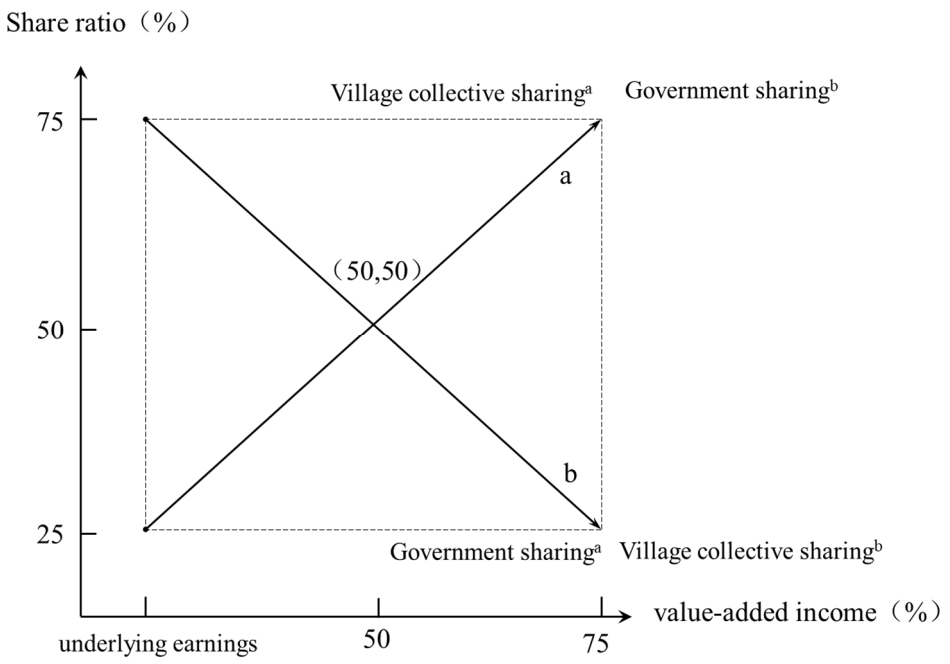

Figure 8. Two Profit-Sharing Models of Village Collective Incentive Orientation and Baseline Revenue Guarantee. "a represents the gradient increasing proportion, and b represents the gradient decreasing proportion".

Model A for Village Collective Incentive-Oriented Distribution of Value Increment Benefits (Figure 8, Village Collective (a), Government (b)): A tiered sharing ratio is established based on initial baseline profits, such as 75% for the government and 25% for the village collective. As the land value increment benefits increase, the sharing ratio progresses through gradients of 75–25, 65–35, 55–45, 50–50, 45–55... to 25–75%; the 25–75% is the upper limit of the sharing ratio between the government and village collective, beyond which the village collective's share does not increase. This revenue sharing model ensures a 75% initial distribution baseline protection for the government, with the village collectives starting with a lower share. However, the tiered incremental distribution provides a stronger incentive to the village collectives, stimulating the villagers and collectives to enhance their active participation in the operational returns from land consolidation.

Model B for Village Collectives Baseline Protection of Value Increment Benefits (Figure 8, Government (a), Village Collective (b)): A sharing ratio for the initial baseline profits is set at 25% for the government and 75% for the village collective. Following this, as the land value increment benefits grow, the distribution progresses through gradients of 25–75, 35–65, 45–55, 50–50, 55–45. . . to 75–25%; the 75–25% is the upper limit of the government and village collective sharing ratio, after which the government's share does not increase. This revenue sharing model guarantees a 75% initial distribution baseline protection for the village collective, with the government starting with a lower share. The tiered incremental distribution provides a stronger incentive for the government, spurring the government's active efforts in enhancing operational returns from land consolidation. Both incentive-oriented distribution mechanisms should be selected according to local socio-economic and institutional environments, tailoring to local conditions.

4.5. Comparison and Implications of International Experience

There are significant differences in land consolidation governance models around the world. In China and Europe, land consolidation has developed into a complex land-use planning tool, including nature conservation, erosion control, and resource management. Although land consolidation is a necessary policy tool for the government, farmers see it as a burden, and they either refuse it or expect compensation. A more comprehensive institutional design at the social governance level is needed to realize the potential of bottom-up farmland protection and land consolidation [35].

In Turkey, the government tried to use land redistribution to eliminate structural deficiencies in agricultural land, but relied more on government planning tools. Although the process included interviews with farmers and the collection of opinions, the optimization of the governance structure was not significant [36]. The successful experience in Turkey was the innovation of ownership systems, where the government allowed farmers to acquire farms with fewer plots, larger scales, and better shapes, which incentivized farmers to increase inputs and adopt new agricultural technologies [37]. In Denmark, the latest policies support citizens' bottom-up multifunctional use of land to improve the social benefits of agriculture, but farmers bear most of the costs while other stakeholders share most of the benefits [38]. In North Macedonia, landowners are opposed to land consolidation, mainly due to a lack of trust in the government and fear of manipulation or unfair processes. Landowners' decisions are influenced by cognitive and emotional factors such as norms, trust, reciprocity, beliefs, etc. Therefore, more attention needs to be paid to the level of trust between communities and farmers in the early stages [2]. In the case of land consolidation in Rwanda, short-term access to finance and asset ownership are potential constraints, while access to credit is a major factor affecting the success of land consolidation. The economic conditions and asset status of farmers need to be considered, and help farmers remove market barriers to access credit and reduce economic burdens [39].

It can be seen that different social and institutional environments are suitable for different governance structures. Unlike other countries, the Chinese government has a strong ability to co-ordinate, but is also prone to over-intervention, which needs to strengthen the bottom-up village collective. The commonality is that they both need the help of market forces to ease the burden on farmers and increase their profits. Therefore, the government's policy measures need to be embedded in communities and village collectives, and promote land consolidation in combination with social norm and reciprocity. This will ensure that farmers obtain long-term fair returns with adaptive governance structures and institutional design.

5. Conclusions

This research reveals that China's traditional government-led land quota planning management mode has led to resource allocation imbalances and conflicts over the sharing of land value increment benefits in the urban-rural fringe and peripheral rural areas. The paper constructs an analytical framework from spatial and institutional dimensions,

dividing land consolidation regions into urban centers, urban-rural fringes, and rural peripheries. It reflects on the profit distribution mechanism under the government-led planning management mode and proposes optimizing land consolidation governance structures to promote shared urban-rural resources and increased land value benefits.

The pilot program of comprehensive land consolidation in Ningbo serves as the research area, with two typical cases from the Fenghua District and Cixi, Ningbo, representing government-led and village collective self-organized governance structures, respectively. The Fenghua District case employs a government-led governance structure with state-owned enterprises coordinating the consolidation efforts, where top-down administrative force and enterprise coordination play a decisive role. However, while the enterprises bear operational risks and potential future profits, the profit-sharing mechanism for the village collective, as the landowner, is imperfect. In contrast, the Cixi City case adopts a government-embedded village-level governance structure, with the village collective as the operator. The village collectives autonomously decide on the use of land quotas and the withdrawal of homestead land, enhancing the collective's management role and innovating profit-sharing through the market entry of collective construction land and compensated withdrawal of homestead land. Both governance structures facilitate the bidirectional flow of urban and rural land resources, with the former driving significant urban development and the latter providing better protection for village collective revenue sharing.

The paper further proposes policy recommendations to optimize governance structures to simultaneously promote urban-rural integration and shared benefits. These include valuing the embedded governance mode where the government integrates into the village autonomy system, establishing a land quota allocation scheme combining government and market, and creating land value increment benefit-sharing mechanisms that cater to village collective incentives and baseline protections. This stimulates the active participation of governments, enterprises, village collectives, and social capital in land consolidation. This paper argues that governance structures significantly impact the equity and shared nature of land consolidation benefits. Adjustments to governance structures need to be context-specific, adopting adaptive models based on spatial location and local socio-economic conditions. The findings offer insights for other large urban regions in China undertaking comprehensive land consolidation.

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