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# Practical approaches to rural ecological value realization: a cash study of the China palletized ecological project

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This study investigates the ecological resource development of terraced fields in Dongluo Village, China, by analyzing the historical dynamic analysis of the village's ecological value evolution. It aims to identify practical strategies for rural ecological development and explores the multiple logics underlying the realization of rural ecological value. This study constructs a three-dimensional (3D) analytical framework of government, market, and society. The studies highlighted the role of government in providing institutional support through policy formulation and resource integration. The markets contribute by optimizing the allocation of ecological dividends and driving economic transformation. Meanwhile, society enhances the social legitimacy of ecological projects via multi-stakeholder cooperation and interest articulation. These interactions enable the activation and transformation of rural ecological value, and further provide useful experience for the construction of ecological civilization.

KEYWORDS

**ecological sustainability, government-driven, market operation, rural ecological value, social participation**

## 1 Introduction

Ecological value represents the multifaceted benefits ecosystems provide to human society, encompassing environmental quality, biodiversity, resource utilization, and ecosystem sustainability (Ralston and Tongjin, 2000; Marten et al., 2012). It includes four key dimensions: i) environmental value, which pertains to the maintenance and enhancement of environmental quality; ii) biodiversity value, which focuses on biodiversity conservation and ecological vitality; iii) resource value, which involves the rational use of natural resources such as soil, water and air, and iv) ecosystem value, which emphasizes the ecosystem stability and long-term resilience (Hu, 2006). Ecological value exhibits distinct characteristics that vary across different climate zones, historical periods, and social contexts; for instance, eco-hydrological features differ in specific climatic regions (Liu et al., 2020), while connotations and manifestations of ecological values may shift over time and between societies (Wang, 2024).Thus ecological value encompasses both natural attributes and social attributes, and it is the product of the interaction between nature and society (Wang, 2024). To evaluate it, the person needs to comprehensively consider multiple aspects and levels of the ecosystem. The holistic approach emphasizes that ecological value is an organic whole composed of multiple dimensions and elements, and its assessment needs to comprehensively consider multiple aspects and levels of the

ecosystem (Wang, 2006). Ecological value is a multi-dimensional composite concept that encompasses environmental, economic, and social dimensions. In the process of promoting the construction of ecological civilization and sustainable development, it is essential to adopt a holistic understanding of these dimensions to achieve the goal of harmonious coexistence of man and nature. A comprehensive approach to ecological value ensures the optimization of ecosystem functions, enhances overall environmental benefits, and supports long-term socio-economic sustainability.

Significant progress has been made in research on the pathways for the realization of ecological values, advancing both theoretical understanding and practical applications (Fisher and Eastwood, 2016). Scholars widely recognize the ecological economic model as an important tool for realizing ecological value into economic benefits. This model enhances the precision and efficiency of ecological conservation and development by systematically integrating the interaction between environmental systems and economic activities (Braat and Van Lierop, 1986; Grasso, 1998). Amid rapid economic growth, maintaining a high level of ecological integrity requires the implementation of sustainable urban planning and ecological protection strategies. This necessitates a balanced approach that integrates environmental conservation with economic development, ensuring long-term ecological resilience (Haque et al., 2025). At the same time, scholars at home and abroad also recognize that market mechanism is an indispensable institutional arrangement for realizing ecological value, including the collection of water tariffs (taxes), water user pays, polluter pays, environmental taxes and other methods, as well as the market economy to carry out water trading, transfer of sewage rights, and other flexible and effective economic means. The eco-environmental payment mechanism incentivizes environmental protection by converting potential degraders into stewards of the ecosystem. Aligned with market dynamics, it enhances ecological investment while meeting the demand for ecosystem services, resulting in a more favorable input-output ratio (McElwee, 2012; Liu and Guo, 2015). Another example is the carbon sink mechanism, which allows enterprises and individuals to buy and sell emission rights or carbon sinks, thus realizing the trading and compensation of ecological value. In addition, government subsidies and tax incentives are also important means to promote the realization of ecological value. The government can provide subsidies or tax incentives to encourage enterprises and individuals to adopt ecological protection measures. This approach can reduce the cost of ecological protection, which could be a stimulus to develop a platform for the active participation of different sectors/societies in ecological protection (Zhou et al., 2025).

Despite existing research on ecological value realization pathways, comprehensive frameworks integrating the complex interplay of government, market, and society remain underdeveloped. While public participation has been widely studied, the role of "eco-consciousness" in shaping green consumption behaviors and sustainable lifestyles requires further exploration. Furthermore, scholars highlight that public participation indirectly promotes environmental protection by enhancing awareness. Nevertheless, the empirical evidence regarding the long-term impacts of such awareness is insufficient. In particular, there is a dearth of data on the influence of this awareness on economic development models and ecological governance.

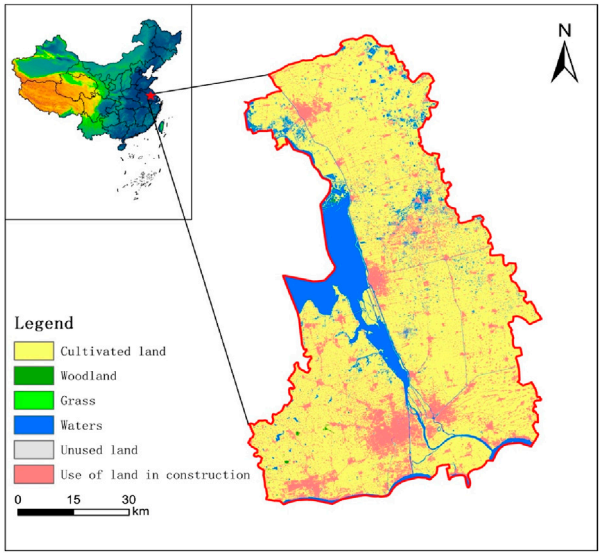


FIGURE 1
Location of duotian agrosystem in dongluo village.

This study focuses on the Duotian countryside, a site of significant ecological and cultural heritage, to analyze the roles of local governments, enterprises, village collectives, and villagers in the transformation of ecological and economic value. This study explores mechanisms for identifying, creating, and sharing rural ecological value, aiming to elucidate the collaborative logic that balances ecological conservation with economic benefits, while establishing a comprehensive, multidimensional framework integrating government, market, and society to address gaps in realizing ecological value. It aims to identify innovative approaches for ecological conservation and utilization while propose policy recommendations that foster long-term public engagement and align economic growth with environmental sustainability.

# 2 Materials and methods

## 2.1 Study area

Dongluo Village, located in Qianyi Town, Xinghua City, was selected for the study area (Figure 1). Xinghua City is a county-level administrative division under the jurisdiction of Taizhou City in Jiangsu Province, located in the central region of Jiangsu Province within the Lixiahe River region. Historically known as Zhaoyang and also referred to as Chushui. The region is characterized by a low-lying, flat terrain with a dense river network. The city's maximum east-west and north-south extents each measure approx. 55 Km, covering a total area of 2393.35 $Km^2$, of which 1949.65 $Km^2$ is land cover and 443.7 $Km^2$ is water cover. Xinghua City experiences a north subtropical humid monsoon climate, with abundant rainfall, abundant light, a warm climate, and four distinct seasons. The region has a prolonged frost-free period, and very rich climate resources, supporting diverse agricultural and ecological systems.

Palletizing is a unique traditional agricultural system in the low-wet areas along lakes or river networks in southern China. Similar to pai gao tian, crops are planted on platforms of piled-up soil by digging deep, net-like ditches or utilizing soil deposits from small rivers. The formation of palletized fields lies in the drastic changes in the natural environment and the farmers' active transformation of the environment. During the Yuan Dynasty, the Xinghua Lixiahe area was located in the southern part of the core area of the ancient Sheyang Lake, and its swampy lake characteristics were already obvious. During the Ming and Qing dynasties, the Yellow River encroached on the lower Huai River channel into the sea, bringing frequent flooding and large amounts of sediment to the Lixiahe River region. In order to cope with the frequent floods and to meet the demand for food brought about by population growth, local villagers dug ditches in the shallow water area to clear the flood discharge channel, and dug out the silt and water plants to pile up, so this pallet field was formed.

Dongluo Village, located in the northwest of Xinghua City, benefits from a prime geographical position. It is surrounded by notable attractions, including the Thousand Stacks of Cauliflower Scenic Spot, Lizhong Water Forest, Pingwang Lake Dream Island, and a high-efficiency agricultural belt to the north. The area, characterized by plains, low elevation, and a dense water network, is part of one of China's most concentrated regions of stacked fields and rivers. This unique landscape, dominated by ecological wetlands and the Lixia River water town features, provides favorable conditions for the development of green industries, ecological tourism, and cultural initiatives (Li et al., 2023). Dongluo Village boasts abundant water resources, with interwoven streams and lakes that not only support agricultural irrigation but also enable aquaculture and other industries. The palletized fields, surrounded by water, form a natural irrigation system, ensuring adequate water supply even during dry periods. These resources also provide opportunities for water-based tourism, including boating, fishing, and sightseeing, further enriching rural tourism (Zhao and Li, 2022).

The natural ecological resources and agricultural foundation of Dongluo Village provide a broad space for future development. In the future, Dongluo Village can further optimize the planting structure of eco-agriculture, promote more green planting and breeding techniques, and enhance the added value of agricultural products. At the same time, it can continue to expand its rural tourism program and develop more tourism products and services with special characteristics, such as ecological lodging, rural recreation and study tours, to enhance the quality and attractiveness of rural tourism. In addition, Dongluo Village can also strengthen cooperation with neighbouring areas to form a regional tourism linkage effect and jointly build an influential rural tourism brand.

## 2.2 Analytical framework

The ecosystem services proposed by Fischer emphasize the interaction between humans and nature, and consider that ecosystem service provision is a co-production process that consists of the interaction of multiple socio-economic factors, such as natural assets and social capital (Fischer and Eastwood, 2016). This process involves a variety of aspects, such as labor force, technology, financial resources, and institutions, and covers ecological value management, ecological value cognition, and ecological value sharing. The theory of co-production of ecosystem services provides an important foundation for this study. This study analyzes the evolution and function of rural ecological project development. It covers three stages: ecological value recognition, ecological value creation, and ecological value sharing. The aim is to explore ways to activate latent palisade resources and achieve the transformation of lucid waters and lush mountains are invaluable assets. It also reveals the mechanism and practical logic for realizing the ecological value of modern rural areas. It also reveals the mechanism and practical logic of realizing the ecological value of modern countryside. This study constructs a three-dimensional analytical framework of "government-market-society" under the process of ecological value identification, ecological value creation and ecological value sharing, as shown in Figure 2, which incorporates concepts such as ecological environment-related legal policies and rural governance model, As shown in Figure 2, the concepts of ecological environment-related legal policies, rural governance model, ecological value stakeholders and benefit sharing are included in the scope of the study, and the interactive relationship between the factors is explored.

The three-dimensional (3D) "government-market-society" inter-constructive analytical framework strengthens the interaction and synergies among various stockholders and factor endowments. By integrating Fischer's theory of co-production of ecosystem services, the traditional static "nature-economy" dichotomy is transformed into a dynamic and synergistic framework of "identification-creation-sharing". This approach particularly emphasizes the dynamic and synergistic nature of the composite system, fostering a more comprehensive understanding of their interdependencies and functional mechanisms. By integrating Fischer's theory of ecosystem service co-production, we upgraded the traditional static "nature-economy" dichotomy to an "identify-create-share" framework of dynamic synergy in a composite system; in particular, we emphasized the mechanism of interactions between multiple stakeholders and rational actors (government, enterprises, village collectives, villagers, etc.), factors of production (system, capital, technology, labor), and ecological factors (resource endowment, environmental carrying capacity), to illustrate the social logic of the transformation of ecological values and its underlying mechanisms.

The "government-market-society" 3D inter-constructive analytical framework, grounded in the institutional paradigm, examines the institutional embeddedness within the dialectical inter-constructive process. It considers policies, regulations, and governance modes as endogenous variables, and systematically examines their role in ecological project design, operation, and the shaping of the ecological value through creation, identification and sharing. Drawing on the practical experience of the case study of the "Bishui Dongluo" project, the construction of an "ecology-plus" industrial system has enhanced economic growth, ecological protection, and cultural inheritance. This effort demonstrates the practical realization of the concept that "lucid waters and lush mountains are invaluable assets" and reinforces the principles of ecological prosperity and shared development.

Ecological value identification, creation and sharing are integral to rural ecological projects; however, their influence extends beyond these phases to other related aspects. Yantian is located in the Lixia River area, with a features of low-lying water network and an alluvial

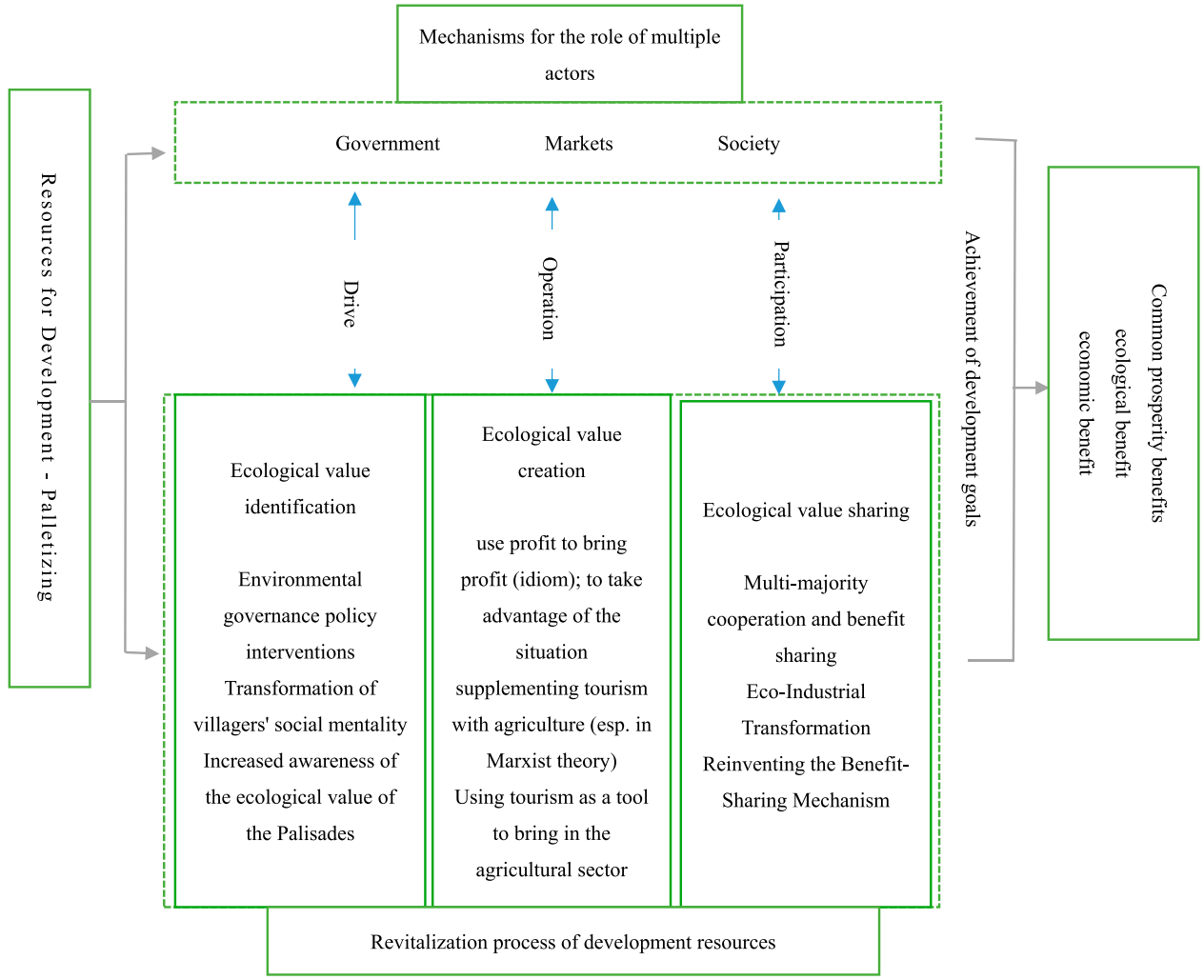


FIGURE 2
Analytical framework of this study.

plain, and the ecosystem of Yantian is of high ecological and cultural value. Additionally, its proximity to the Yangtze River Delta and planned integration into the Greater Shanghai Metropolitan Area provide strategic advantages for ecological agriculture, ecological services, and green industries. In the sharing phase, all parties are guaranteed to benefit from the project development, promoting ecological enrichment and common prosperity, so this division helps to grasp the key aspects of the development of the Palletized Ecological Project, and promotes the project to be carried out effectively and realize sustainable development.

# 3 Results

The "3D construction" and collaborative governance involving the government, market, and society constitute the core of creating and sharing rural ecological value. Their practical logic is characterized by synergy, dialectics, and inter-construction. As a result, in the new era, the pivotal aspect of creating rural ecological value and enabling dividend - sharing is to optimize the institutional mechanisms and policy frameworks that support this "3D inter-construction" and collaborative governance model. Therefore, the key to the creation of ecological value and dividend sharing in the new period is to improve the institutional mechanism and policy system in favor of the government, market and society's "3D inter-construction" and synergistic governance. The government facilitates rural ecological value creation and dividend sharing through policy support and institutional design. The markets drive efficient allocation by transforming ecological value into economic gains. Society reinforces legitimacy through multi-stakeholder collaboration and interest articulation. Organizational structure of the study is depicted in Figure 3.

## 3.1 Administrative driving mechanisms: policy support and resource integration

As the first dimension of the "3D mutual construction" of government, market and society, the administrative drive mechanism realizes the integration of green elements and the

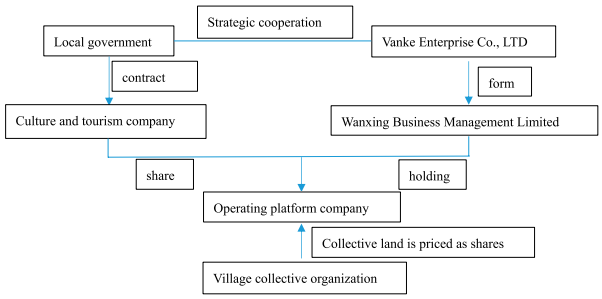


FIGURE 3
Organizational structure of the study.

transformation of ecological resources through innovative top-level design and institutional arrangements and promotes the activation of rural ecological value and sustainable development. The government guides ecological project development by providing policy support and resource integration, ensuring institutional safeguards and enabling equitable sharing of ecological dividends in rural areas. The government provides a new ecological development framework for the rural ecological dividend sharing through the discounted price of collective land into shares, the market entry of collective construction land, and the "counter-renting and reverse contracting" and other forms of support. At the same time, through the collective land into shares at a discount, collective construction land into the market, "counter-rental reverse contract" and other forms, for the development and operation of ecological projects to provide material resources and institutional guarantee. From the practical experience and concrete results of Dongluo Village's "Bishui Dongluo" project, Dongluo Village in Xinghua City, through the "government + social capital + village collective" cooperative management mode, the village collective land use rights as shares, and Vanke Group to develop ecological development projects. The village has realized the connotative use and efficient allocation of collective land resources. The government ensures the alignment of the "Aqua Dongluo" project with national strategic goals through policy support, resource integration, top-level planning, and market supervision. This oversight prevents over-commercialization, safeguards environmental carrying capacity, and mitigates potential ecological risks.

Administrative drive and policy support from the institutional foundation and operational framework of the "3D inter-construction" process. In facilitating rural ecological development, local governments provide systematic policy support through top-level design, policy guidance, institutional arrangements, infrastructure development, and public services, ensuring the effective activation of ecological values and project implementation. In Dongluo Village, the government has facilitated rural revitalization through top-level design and policy guidance, establishing clear value frameworks and action plans. This includes the "3D inter-construction" approach to integrate new capital into rural development. The government, through the formulation of rural revitalization strategies and related supporting policies, has provided clear value guidelines and action frameworks for the "3D mutual construction" in the process of "new capital going to the countryside. The Jiangsu Provincial Party Committee and Provincial Government introduced the Action Plan for the Construction of Characteristic Rural Villages in Jiangsu Province, emphasizing the integrated development of material and spiritual, tangible and intangible, service and governance, and economic and ecological aspects to advance a "new era of the countryside" in Jiangsu. The government support Dongluo Village ecological development through financial subsidies, administrative coordination, special funds and resource integration. As the first dimension of "3D mutual construction," financial subsidies, special funds, and project support ensure ecological value activation. For example, the Xinghua Culture and Tourism Group, on behalf of the municipal government, funds village infrastructure. Additionally, the administrative coordination mechanism streamlines the "Bishui Dongluo" project facilitating housing storage and demolition through a dedicated working group that engages villagers, clarifies policies, and enhances community participation.

Factor activation and resource integration are the material basis and practical carrier of the "3D mutual construction". From the perspective of specific paths and practices, the introduction of market-oriented allocation mechanisms and branded operation modes has facilitated the efficient allocation of advantageous ecological resources and green development factors in the countryside (Wang, 2022). Dongluo Village has leveraged "new capital to the countryside" and a professional operation team to implement an innovation of "government + social capital + village collectives" cooperative model. This approach has revitalized green resources, integrated the scattered collective land, and laid a solid foundation for the "Aqua Dongluo" project. Additionally, a light asset operation mode to realize the rural high-quality ecological resources assets. Dongluo Village has transformed its high-quality ecological resources into comparative advantages for green development through factor activation and resource integration. Vanke Group has applied an "acupuncture renovation" strategy, preserved the village's traditional architecture and landscape while ensuring organic renewal. Furthermore, innovative branding and marketing strategies have strengthened the cultural foundation of "3D mutual construction". The "Eighty-eight Warehouses" brand, developed by Vanke Group, has expanded market reach for ecological agricultural and tourism products through order-based agriculture and high-end boutique homestay.

Lastly, social participation and community empowerment will enhance the endogenous impetus and sense of subjectivity of the "3D mutual construction". Enhancing social action and public participation enhances the effectiveness of "3D inter-construction" governance. Improving the participation mechanism and empowering the endogenous nature of community development can help to improve the endogenous impetus and reinforce the initiative within the framework. Therefore, sound social action and public participation mechanisms empower the endogenous nature of community development and help to enhance the endogenous power and sense of subjectivity of the "3D mutual construction". From the practical process of the "Aqua Dongluo" project, the improvement of the close interest linkage mechanism is conducive to the enhancement of the endogenous motivation of villagers' participation. Dongluo Village, through land transfer, cooperative construction and benefit-sharing mechanism, ensures that villagers

in the "Aqua Dongluo" project develop to obtain a stable economic income, and enhance the enthusiasm of villagers to participate in the project and sense of identity. Secondly, enhancing the ability to operate in the market and make a sustainable living helps to strengthen the main position and the spirit of ownership of social participation and community empowerment. Dongluo Village provides villagers with skills training and knowledge transfer through a variety of training activities such as the Farmers' Night School and the Agricultural Technology Extension Lecture Hall, which enhance villagers' ability to operate in the marketplace and make a sustainable living. Thirdly, Dongluo Village improves community self-governance capacity and grassroots governance system, laying a good organizational foundation and institutional guarantee for social participation and community empowerment. Dongluo Village improves the social governance mechanism, enhances residents' self-governance and grass-roots consultation capacity, and strengthens the villagers' sense of identity and access to the "Aqua Dongluo" project.

## 3.2 Market operation mechanism: ecological value activation and sharing

As another important subject of the "3D inter-construction", the market also plays an important role in activating the ecological and economic value of the countryside and sharing the dividends, especially in terms of the factor allocation mechanism and the innovation of the project operation mode, the market has a significant comparative advantage compared with the government and the society (village collectives and villagers). The "new social capital" is an important main body of the market, and plays an irreplaceable role in promoting the "3D mutual construction" virtuous cycle, and its core objective and action orientation is to maximize the realization of economic value, while practising corporate social responsibility, in particular, Its core objective and action orientation is to maximize economic value while practicing corporate social responsibility, especially implementing the new development concept of green, inclusive, sharing, openness and innovation. Vanke Group is a typical representative. From the perspective of comparative advantages, the marketization concept and its operation mechanism have significant comparative advantages in strengthening the brand influence of ecological projects, enhancing the marketing ability of projects, and activating the economic value of high-quality ecological resources sustainably (Zhang, 2014).

In the process of the "3D inter-construction" of government, market and society, enterprises, as the advocates of the interests of the market entities, guarantee the benign operation and sustainable evolution of the "three-dimensional inter-construction" through the resource conversion mechanism. In terms of Dongluo Village's real-life experience, through the "3D mutual construction" operation mode of government, market and society, Dongluo Village has successfully transformed green elements and ecological resources such as palletized fields into a "treasure pot" for village income generation and farmers' employment; and through the innovation of dividend-sharing mechanism, Dongluo Village has been able to guarantee the healthy operation and sustainable evolution of "three-dimensional mutual construction". Through the innovative dividend sharing mechanism, it guarantees the healthy operation of the "3D mutual structure" of the government, the market and the society, especially the protection of the legitimate rights and interests of the ordinary villagers from being infringed upon, and further enhances the synergistic benefits of the government, the market and the society based on the strengthening of the effect of social participation. Therefore, the practical logic of the market operation mechanism to promote the economic transformation of ecological value and benefit sharing mainly includes the following aspects.

The market mechanism is a booster and gas pedal of the "3D mutual construction" of government, market and society, especially in the transformation of high-quality ecological resources in the countryside and the activation of green elements, the market mechanism is conducive to enhancing the activation of elements and the transformation of resources (Lin, 2024). Take the *Bishui Dongluo* project as a case study, Vanke Group implements an innovative "government + social capital + village collective" cooperative management model, integrating commercial capital into sustainable rural development. Vanke oversees the project's overall strategy, planning and operations through an assets-light approach, promoting the synergistic development of eco-agriculture, rural tourism and related industries. This model enhances resource allocation, optimizes integration mechanisms and improves operational efficiency and market competitiveness. Additionally, Vanke Group strengthen project's long-term sustainability by leveraging branding and market-driven strategies to align stakeholder interests within a cohesive development framework. The independent development of the "88 Cang" brand, through order-type agriculture and high-end lodging, enhances the value of ecological products and tourism services while increasing the project influence and social acceptance within Dongluo Village.

The cultural and tourism integration and industrial ecological enrichment provide new kinetic energy, new direction and new concepts for the government, market and society, and boost the diversified conversion of the value of high-quality ecological resources in the countryside. For example, during the operation of the "Bishui Dongluo" project, Vanke Group independently developed the "Cingdao" B&B (Bed & Breakfast) project to improve the quality of B&B services and the competitiveness of the tourism market, and to continuously improve the institutional mechanism and policy system of the government, the market, and the society to jointly build, share, and govern. Besides, the innovative market operation mode is conducive to perfecting the ecological dividend-sharing mechanism and laying down the interest foundation and mechanism guarantee for the "three-dimensional mutual structure" of the government, market and society. The market operation mechanism not only helps the economic transformation of the value of high-quality ecological resources in the countryside but also ensures that villages, villagers and other stakeholders can realize the Fear of Toledo optimization in the process of "new capital to the countryside" through the innovation of the distribution of benefits and dividend sharing mechanism (Li et al., 2024).

In Dongluo Village, firstly market-driven operations are exemplified by Vanke Group guidance in land equity and

dividend reinvestment. This approach enables the village active participation in the development and operation of the "Aqua Dongluo" project integrating rural capitalization into a market-oriented framework. Among them, the village collective concentrated the scattered contracted land of the villagers in the form of "anti-rental and reverse contracting", and invested 5.4 million Chinese yuan (CNY) in the joint venture company at a discounted price of 27 mu of collective land, thus forming a community of interests with the local government and Vanke Group. Secondly, Vanke Group realizes the market allocation of ecological resources and agricultural products through order agriculture and stable contractual relationships. At the same time, Vanke Group provides guaranteed income for the growers who participate in contract farming to ensure that villagers can still obtain stable sales income when the market fluctuates. Thirdly, the Vanke Group guided villages to form cooperatives to reduce transaction costs and improve the efficiency of cooperative management. Vanke Group guided Dongluo Village to set up a professional farmers' cooperative to organize villagers to participate in the "Aqua Dongluo" project, thus enhancing the degree of organization of villagers and expanding their income channels.

Innovative market operation mechanisms can help to enhance social participation and collective action capacity, and strengthen the synergistic effect of the "3D inter-construction" of government, market and society. In the process of "new capital going to the countryside", the government plays the role of top-level design, and the social forces, mainly village collectives and villagers, play a participatory and synergistic role, while the market is the practitioner of new quality productivity, with significant comparative advantages (Li et al., 2025). Therefore, the innovation of market operation mechanism is conducive to enhancing the synergistic effect of the "3D mutual structure" of government, market and society. Taking the "Bishui Dongluo" project initiated by Vanke Group as an example, the specific practices and practical logic of market mechanism innovation that empowers social participation and collective action mainly include: firstly, it empowers community participation and villagers to enhance their capacity of sustainable livelihood; during the development process of the "Bishui Dongluo" project, Vanke Group has made a great effort to promote the development of the "Bishui Dongluo" project. During the development of the 'Bishui Dongluo' project, Vanke Group prioritized villagers' participation and sustainable livelihood enhancement as the core focus, leveraging market-oriented technical training and benefit linkage mechanisms to ensure their involvement and equitable sharing of benefits. This approach aimed to cultivate a supportive policy and institutional environment that empowers villagers to actively engage in the project's development and operations. Secondly, empowering community autonomy and collective action. In the process of empowering community participation and enhancing villagers' sustainable livelihood capacity, Vanke Group takes community autonomy and collective action as the orientation, and actively integrates into the process of villagers' autonomy and grassroots consultation through participation in villagers' representative meetings and joint meetings. Embedded social legitimacy strengthens the sustainability of the project development and operation, thus providing systemic support for "3D mutual construction" among government, market, and community. Innovative market operation mechanisms can help to improve social participation, collective action, and synergy within this framework.

## 3.3 Social participation mechanisms: cooperation of multiple subjects and expression of interests

As another important subject of the "3D mutual construction", social subjects play an important role in community participation, collective action and expression of interests, especially in the process of "new capital to the countryside", how to ensure that villagers, village collectives as the core of the social subjects, to share the fruits of project development and ecological dividends. In particular, in the process of "new capital to the countryside", how to ensure that the social subjects, including villagers and village collectives, can share the development results and ecological dividends of the project (Li et al., 2024). Therefore, the social participation mechanism can enhance the social legitimacy of the rural ecological development project through the improvement of the policy system of collaborative governance and expression of interests of multiple subjects, and lay a good social foundation for the "3D mutual construction" of the government, the market and the society. From the practical experience of Dongluo Village, the positive interaction between the government, enterprises, village collectives and villagers is the key to the success of the "Aqua Dongluo" project. Dongluo village collective through the "party branch + cooperatives + farmers" organizational mechanism and business model. With the party building to lead the mechanism to organize the villagers to jointly operate, and be deeply involved in the "Aqua Dongluo" project development and operation process, and Vanke Group to form a close-type benefit. Dongluo Village integrates scattered land through "anti-rental and reverse contracting," leveraging collective land as a resource for discounted equity participation in the Aqua Dongluo project. This approach strengthens the social legitimacy of "3D mutual construction" and ensures sustainable operation. Enhancing village governance and self-governance mechanisms, particularly within collective economic organizations and villagers' groups, is crucial for increasing participation in project development and equitable sharing of ecological dividends. The social participation mechanism and multi-stakeholder cooperation are integral to the "3D inter-construction" model. In the Aqua Dongluo project, the effectiveness of this mechanism is driven by key factors, including stakeholder collaboration and structured interest expression.

Notably, a coordinated governance action framework has been constructed based on social participation mechanisms and the cooperation of multiple actors. The social participation mechanism, with village committees, village collectives and villagers as the main actors, plays an important role in the process of the project. From the specific practice of Dongluo Village, on the one hand, Dongluo Village through community empowerment and villager's empowerment, the village collectives and villagers participate in depth in the "Aqua Dongluo" project development and operation to lay the main foundation and ability to guarantee. For example, Dongluo Village carries out skills training and organizes study tours to other advanced regions such as Jiangsu,

Zhejiang and Shanghai to improve the governance capacity of village economic organizations and the market management capacity and management consciousness of villagers, to improve the main position and bargaining power in the transaction with Vanke Group, and to truly help reshape the subjectivity of the social participation in the "three-dimensional inter-construction". On the other hand, Dongluo Village introduces Vanke Group's cooperative management through resource integration and subject cooperation, and provides funds, technology and management experience for the "Aqua Dongluo" project through the cooperative management mode of "government + social capital + village collective", which provides a good basis for the "3D mutual construction". The "3D mutual construction" lays a good material foundation and technical guarantee; especially through the introduction of Vanke Group's advanced marketing and brand design concepts, it optimizes the allocation of high-quality ecological resources and the integration mechanism of green development elements and improves the market competitiveness and sustainable operation basis of the "Aqua Dongluo" project. A synergistic governance framework requires a social participation mechanism and multi-stakeholder cooperation. It is also necessary to innovate the benefit linkage and fair distribution mechanism to ensure that the villages, village collectives and villagers receive equitable benefits from green industries and ecological projects while safeguarding lawful rights and fostering proactive engagement.

Innovative social participation and interest expression mechanisms can help to promote the sharing and fair distribution of benefits, laying a good foundation of subjects and social legitimacy of "3D mutual construction" among government, market and society. This ensures stable employment, opportunities and sustainable income for villagers and continues to improve the welfare level and the quality of life of the villagers amid rural capital investment. In particular, it is necessary to ensure that ordinary villagers can obtain stable employment opportunities and sustainable income in the process of "new capital going to the countryside", and to continuously improve the welfare level of the village and the quality of life of the villagers in the process. From the practical experience of "Bishui Dongluo" and the effectiveness of the project, a sound mechanism for collective interest expression and feedback on villagers' demands lays a good organizational foundation and institutional guarantee for the innovation of the social participation mechanism and the interest expression mechanism. The mechanism for collective interest expression and feedback of villagers' demands helps the government and enterprises to make adjustments and optimizations according to the feedback and specific demands of the villagers. The collective interest expression and villagers' demands feedback mechanism helps the government and enterprises to adjust and optimize according to villagers' feedback and specific demands. For example, Dongluo Village has formed a grass-roots autonomy and consultation model of "civil affairs by the people, civil affairs by the people, civil affairs by the people" through the "four deliberations and two openings", village meetings, representatives' meetings, and village rules and regulations, to enhance the villagers' understanding of the "Aqua Dongluo" project. This will enhance the villagers' sense of identity, pride and acquisition of the "Aqua Dongluo" project. On the other hand, enhancing social trust among enterprises, society and other stakeholders is also an important element of the social participation mechanism and interest expression mechanism, not only because social trust helps to reduce transaction costs among different subjects, but more importantly, because enhancing social trust among enterprises, society and other stakeholders helps to improve the sustainability and endogenous growth of the "3D mutual structure". More importantly, it is because enhancing social trust among enterprises, society and other stakeholders can help improve the sustainability and endogenous momentum of the "3D inter-construction" (Huang, 2023). In a nutshell, to enhance the "three-dimensional inter-construction" of government, market and society, and to lay a good foundation of subjects and social legitimacy, it is necessary to innovate the mechanism of social participation and the mechanism of interest expression.

Finally, strengthening the synergistic effect of the social participation mechanism and the cooperation of multiple subjects will help to promote the revitalization of rural industries and the sustainable development of ecology, laying a foundation of interests and a mechanism to guarantee the sustainability of the practice of "3D inter-construction" among the government, the market and the society (Chen and Yu, 2024). Specific to the real experience and practice pattern of Dongluo Village, on the one hand, Dongluo Village promotes villagers' active participation in village self-government and project development and operation by improving the mechanism of interests and public participation, enhancing villagers' market management ability and deliberation ability, and at the same time, improving villagers' economic rights and benefits and social welfare, to lay a good foundation for the synergistic effect of enhancing the social participation mechanism and cooperation of multiple main bodies. On the other hand, Dongluo Village, through the sound synergy of the main body and cooperative management mechanism, enhances the sustainability of social participation and mobility, for the government, the market, and society, "3D mutual structure" to lay the organizational foundation and institutional safeguards, especially Dongluo Village, through the "government + social capital + village collective In particular, Dongluo Village, through the "government + social capital + village collective" cooperative management mode, promotes the synergistic development of ecological agriculture, rural tourism, industrial revitalization and governance modernization. In a nutshell, to promote the revitalization of rural industries and the sustainable development of rural ecology, it is necessary to strengthen the synergistic effect of social participation mechanisms and the cooperation of multiple main bodies, and to lay a foundation of interests and institutional safeguards for the "3D mutual construction" of the Government, the market and society.

At present, the research on ecological value, especially the development of ecological value, is often scattered, without forming a complete theoretical system, which leads to a lack of in-depth understanding of the development and utilization of the ecological environment, and it is difficult to put forward comprehensive and effective solutions. This study constructs a systematic analysis framework, not only from the natural environment, but also a comprehensive analysis of how the village with palletizing resources converts ecological value into economic value. At the same time, some stay at the theoretical level of discussion, applied to the in-depth analysis and verification of practical cases.

# 4 Discussion

Ecological restoration and governance have become the key bottlenecks restricting green and sustainable rural development. In Dongluo Village, balancing ecological protection with project development has yielded both environmental and economic benefits. Local governments, facing fiscal constraints, play a pivotal role in facilitating green development through ecological projects. The influx of capital into rural areas necessitates effective collaboration among governments, village committees, and residents to ensure project sustainability. Innovative social participation mechanisms are essential to distribute ecological dividends equitably, ensuring that benefits reach ordinary villagers. Safeguarding villagers' rights and fostering their active involvement are vital for the project's social fairness and overall success.

Dongluo Village in Qianduo Town, Xinghua City, represents a microcosm of ecological value development, illustrating the complex interactions among government, market, and society in rural ecological projects. This study examines these interactions across four key dimensions—local government, enterprise-industry collaboration, villager benefit-sharing, and industrial integration—to highlight a sustainable pathway for rural modernization. The findings underscore that multi-stakeholder engagement fosters ecological governance and economic development, aligning with theoretical perspectives on rural sustainability (Pretty, 2003; Ostrom, 2009). Local governments play a pivotal role in transforming ecological value into economic benefits, alleviating fiscal pressures while promoting sustainable economic growth. Through policy frameworks, resource integration, and governance innovations, local governments facilitate the interplay between ecological conservation and economic development (Liu et al., 2020). The case of Dongluo Village demonstrates how policy support, financial incentives, and regulatory oversight can enhance the long-term viability of ecological projects. Ecological compensation mechanisms, a crucial governmental intervention, ensure the sustainability of environmental projects by aligning economic incentives with conservation goals (Landell-Mills and Porras, 2002; Wunder, 2005).

Enterprises contribute financial and technical expertise, playing a crucial role in market-driven ecological transformation. Public-private partnerships, particularly models like "government + social capital + village collective," enhance resource efficiency and promote sustainable rural economies (Xu et al., 2018). The integration of social capital facilitates brand-building and industrial linkages, converting ecological value into economic assets while ensuring inclusive benefit-sharing mechanisms for local communities (Liu and Ravenscroft, 2017).

Industrial integration is a key strategy for maximizing ecological value. Dongluo Village exemplifies this approach through the convergence of ecological agriculture, rural tourism, and cultural industries. These synergistic models, such as "ecology + agriculture" and "ecology + tourism," create diversified income streams, enhance local employment opportunities, and strengthen rural economies (Marsden, 2009; Wilson, 2010). By extending industrial value chains, ecological projects contribute to long-term economic sustainability while maintaining environmental integrity. A well-structured benefit-sharing mechanism is critical for ensuring social equity in ecological project development. Dongluo Village implements land shareholding, cooperative models, and equitable distribution frameworks to secure stable economic returns for residents. Furthermore, capacity-building initiatives such as skills training and community empowerment programs enhance villagers' participation and benefit-sharing capabilities (Pretty and Smith, 2004). Such inclusive governance approaches mitigate rural income disparities and foster endogenous motivation for sustainable development.

The sustainable integration of ecological and economic systems requires institutional innovation, aligning government-enterprise-community collaboration with local resource endowments and economic dynamics. A dynamic equilibrium is achieved through policies tailored to local realities, resource complementarities, and comparative advantage-driven strategies (Ostrom, 2010). As ecological value gains broader recognition, the convergence of administrative, market, and social actors underscores the need for holistic rural governance models that harmonize economic growth with environmental stewardship (Liu et al., 2021). Dongluo Village exemplifies how integrated ecological governance can drive rural modernization through synergistic stakeholder collaboration. By leveraging government policy, market mechanisms, and community participation, rural ecological projects can achieve long-term sustainability. The aforesaid discussion reinforces that effective ecological governance is contingent upon institutional adaptability, economic viability, and inclusive social engagement. Future research should further explore scalable models for replicating these success factors across diverse rural contexts.

# 5 Conclusion

This study constructs a three-dimensional (3D) analytical framework to examine the interplay between government, market, and society in rural ecological development, exemplified by the case of Dongluo Village in China. The historical and dynamic examination of ecological value in the village reveals that its creative transformation has been key to revitalizing rural development. The success of the *Aqua Dongluo* project highlights the significance of the synergistic interaction between the government, enterprises, village collectives, and residents in aligning rights, responsibilities, and benefits. This collaborative model, underpinned by innovative benefit linkages and ecological government strategies, maximizes rural ecological value while achieving economic and social benefits. The governance framework integrates policy support, market mechanisms, and societal cooperation to contribute to foster sustainable ecological development. Given the geographic overlap between ecological highlands and economically depressed rural areas, leveraging ecological resources and industry opportunities is essential. Rural ecological value transformation should be tailored to local conditions, emphasizing modern ecological agriculture where suitable and promoting eco-tourism through resource-based development, thereby strengthening the ecology-to-economy transition.

To replicate the success of Dongluo Village, it is crucial to strengthen the institutional mechanisms that link government, market, and society. Policymakers should prioritize the creation of policies that support resource integration, facilitate the market-based activation of ecological value, and encourage multi-stakeholder partnerships that enhance social legitimacy.

Investment in innovative ecological governance frameworks that incentivize local participation and benefit-sharing will be critical to sustaining long-term rural development. Additionally, further research is needed to assess the scalability of the *Aqua Dongluo* model across diverse rural settings in China and other regions with similar socio-economic contexts. At the policy level, fostering collaboration between governmental bodies, local enterprises, and communities should be institutionalized to ensure the continued success of rural ecological projects. This can be achieved by incentivizing cross-sector cooperation and promoting policies that align ecological benefits with economic growth. Integrating sustainable development goals into local governance frameworks will also provide the foundation for advancing ecological civilization and achieving balanced rural development.

## Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

## Author contributions

QZ: Formal Analysis, Investigation, Project administration, Writing–original draft. SC: Conceptualization, Funding acquisition, Investigation, Writing–original draft, Writing–review and editing. XL: Methodology, Writing–review and editing.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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The author(s) declare that no Generative AI was used in the creation of this manuscript.

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