

Pathway and Countermeasure of Farmers' Livelihood Transformation in the Ecological Development Area of Northern Guangdong Province from the Perspective of Ecological Protection

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Abstract [Objectives] To explore pathways and countermeasures for transforming farmers' livelihoods in the way of reducing their dependence on land while promoting sustainable development and alleviating ecological degradation. [Methods] A combination of field research, literature review, and policy analysis was employed to identify key factors affecting farmers' livelihoods and potential strategies for transformation. [Results] The study found that developing ecological agriculture and modern agriculture, promoting agricultural transformation and upgrading, cultivating alternative industries, strengthening ecological engineering construction, and establishing diversified ecological compensation methods and supporting policies are effective strategies for transforming farmers' livelihoods. [Conclusions] Implementing these strategies can help alleviate the contradiction between ecological protection and farmers' livelihood development, promoting coordinated development of both. This approach not only benefits farmers but also contributes to sustainable environmental management and biodiversity conservation.

Key words Ecological protection, Farmers' livelihood transformation, Pathways and countermeasures, Ecological development area

1 Introduction

In the context of large-scale ecological restoration projects, the ecological development area of northern Guangdong faces dual pressures: the need for ecological protection and the challenge of promoting farmers' livelihood development. Farmers' traditional reliance on land-based livelihood strategies often has negative impacts on the environment. In 2019, the Guangdong Provincial Party Committee and the Provincial Government issued the *Guiding Opinions on Building a New Regional Development Pattern of "One Core, One Belt, and One Area" to Promote Coordinated Regional Development throughout the Province*, which highlighted the primary task of the ecological development zone in northern Guangdong to prioritize ecological protection and construction, aiming to achieve green development while ensuring ecological security^[1].

In recent years, as ecological protection strategies have been steadily implemented, measures such as returning farmland to forests and protecting natural forests have increasingly posed pressures on farmers' livelihoods. Mitigating the contradiction between ecological protection and farmers' livelihood development, assisting farmers in transitioning away from traditional livelihood models, and reducing the negative impact of their livelihood strategies on the ecological environment have become paramount tasks for rural ecological revitalization and the ecological construction of

a "Green and Beautiful Guangdong". Therefore, accurately grasping the major issues facing ecological protection and farmers' livelihood transformation in the ecological development zone of northern Guangdong, and exploring paths and strategies for farmers' livelihood transformation from the perspective of ecological protection, are of significant theoretical and practical importance for consolidating existing ecological construction achievements, maximizing the synergistic effects of both, and promoting the coordinated development of ecological protection and farmers' sustainable livelihoods.

2 Necessity of farmers' livelihood transformation

The necessity for farmers' livelihood transformation in the ecological development zone of northern Guangdong is profound. This region serves as a critical ecological security barrier and water source protection area within Guangdong Province, constituting a significant component of the national key ecological function zone. Currently, 21 counties and cities are included within this zone. Historically, due to a fragile ecological backdrop, unfavorable agricultural production conditions, and sluggish rural economic growth, farmers have primarily relied on traditional farming and livestock breeding practices, thereby exhibiting a profound land-dependency.

However, in recent years, as extensive ecological restoration and construction measures have been implemented, large former sloping farmland and forest areas have been encompassed within protected zones. Consequently, farmers' livelihood activities have been constrained to varying degrees, leading to some land-deprived farmers even facing dire livelihood challenges. This has given rise to a prominent contradiction between ecological protection and farmers' livelihoods. In order to sustain their

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existence, some farmers have resorted to deforestation or steep-slope cultivation, which have become significant threats to the efficacy of ecological restoration. Therefore, it is both essential and pressing for farmers to extricate themselves from the reliance on their traditional livelihoods and embark on a path of livelihood transformation.

3 Main problems faced by farmers in their livelihood transformation

3.1 The fragility of the regional ecological environment and its severe constraints on the transformation of farmers' livelihood strategies

The ecological environment and its resource endowment are the indispensable basic conditions for the development of regional economy. The rocky desertification land in the ecological development area of northern Guangdong is widely distributed, with a fragile ecological environment, large mountainous area, rugged and fragmented surface, limited per capita farmland land, and difficulties in large-scale development of land resources, making it difficult for agricultural production to form scale economy effect^[2]. Due to the constraints of ecological environment and resource endowment, most farmers rely on traditional planting and breeding industries for their main income, and their livelihood mode is relatively simple, which is not only difficult to increase their income, but also difficult to transform their livelihood.

3.2 The fragility of farmers' overall livelihood capital and the significant challenges in transitioning livelihood strategies

Livelihood capital serves as a fundamental cornerstone for farmers' economic activities and a pivotal support in their livelihood transformations. Nevertheless, amidst the challenges posed by a vulnerable natural environment and lagging socio-economic development, many farmers residing in the ecological development zone of northern Guangdong confront a myriad of constraints. Specifically, these farmers exhibit poor endowments in natural capital, a dearth of human capital, limited accumulation of material capital, a fragile structure of social capital, and a scarcity of financial capital. Such deficits significantly hinder their ability to pursue non-agricultural and diversified livelihood options, thereby posing considerable difficulties in transitioning their livelihood strategies.

3.3 Stagnation in industry development and challenges in farmers' employment transition

The advancement of industrial development serves as a crucial catalyst for promoting farmers' transition and employment opportunities. Nevertheless, in the ecological development zone of northern Guangdong, which is a region experiencing later stages of development within the province, the development of its three primary industries lags significantly. Firstly, the progression of distinctive and modern agricultural practices is lagging, resulting in inadequate support for the agricultural industry chain, limited extensibility, an underdeveloped agricultural product deep-processing technological support system, and consequently, low economic returns. Secondly, agricultural product processing enterprises display low levels of industrial production, commodity rates, technological content, and added value of agricultural products. Additionally, there is a scarcity of market-competitive products and brands. Thirdly, owing to constraints

such as funding, technology, human capital, and infrastructural deficiencies, an integrated development framework and technical service system encompassing the primary, secondary, and tertiary industries has yet to be established, thereby impeding farmers' ability to achieve sustained and stable income growth through employment transitions^[2].

3.4 The imperfection of ecological compensation mechanism hinders sustainable livelihood transformation for farmers

While the implementation of ecological compensation policies aims to elevate farmers' livelihoods and encourage their active engagement in ecological protection, it remains a challenge due to several deficiencies in the mechanism in the ecological development zone of northern Guangdong. Firstly, the scope of compensation is narrowly focused on large-scale environmental conservation initiatives such as the conservation of natural forests, wetlands, and farmland restoration to forest, thus neglecting the needs of smaller-scale but equally important projects. Secondly, the compensation standards fail to consider the dynamic and phased nature of ecological restoration, resulting in a standardized approach that does not effectively address diverse scenarios. Thirdly, the compensation modalities lack diversity and sustainability, often relying heavily on cash subsidies, which, while providing short-term relief, cannot constitute a sustainable basis for farmers' long-term livelihood transformation^[3]. This lack of diversification means that once the compensation funds are exhausted, farmers tend to revert to traditional production and lifestyle patterns, thereby undermining the effectiveness of ecological protection efforts and impeding their own sustainable livelihood transformation.

4 Pathway and countermeasure of farmer's livelihood transformation from the perspective of ecological protection

4.1 Enhancing livelihood capital and empowering farmers' transformational capabilities

The accumulation of livelihood capital serves as a fundamental pillar for farmers to select their means of subsistence and is a crucial determinant of their capacity for livelihood transformation. Acknowledging the prevalent challenges in the ecological development zone of northern Guangdong, such as the scarcity of human capital, inadequate natural resources, low levels of material wealth, weak social networks, and a dearth of financial resources, it is imperative to implement strategic interventions.

Firstly, the promotion of rural vocational education and the enhancement of employment skills training are essential to elevate the human capital of the farming community. This involves equipping farmers with the necessary knowledge and skills to adapt to the evolving demands of the agricultural sector.

Secondly, the natural capital of farmers can be augmented through initiatives such as land remediation and the implementation of ecological engineering projects. These efforts aim to improve the quality and productivity of the land, thereby enhancing its value as a resource.

Thirdly, the material capital of farmers can be bolstered by developing infrastructure in key areas such as transportation, energy supply, and communication networks. Additionally, the con-

struction of farmland water management systems is vital for ensuring the sustainability of agricultural practices.

Fourthly, financial capital can be increased through the establishment and refinement of financial credit systems. This will provide farmers with better access to credit facilities, which are essential for investing in their livelihoods.

Lastly, the establishment of community organizations, such as rural cooperatives and associations, is crucial for fostering social capital among farmers. These organizations can facilitate collective action, improve access to information and resources, and enhance the farmers' ability to negotiate and influence decision-making processes.

By focusing on these areas, we can effectively increase the stock of livelihood capital and empower farmers to transform their livelihoods in a sustainable and resilient manner.

4.2 Advancing agricultural modernization and balancing ecological conservation with livelihood enhancement The modernization and upgrading of agriculture stand as a pragmatic and enduring approach to simultaneously foster income growth for farmers and safeguard the ecological environment. In the ecological development zone of northern Guangdong, traditional farming practices such as planting and breeding have long been prevalent, characterized by low organizational levels, exerting significant strain on ecological preservation efforts. Addressing this, the advancement of agricultural transformation and upgrading emerges as a critical strategy to mitigate the inherent tension between ecological stewardship and the livelihood development of farmers.

Firstly, there is a pressing need to vigorously cultivate eco-friendly agricultural models that harmonize economic, social, and environmental benefits. Initiatives such as agroforestry, integrated livestock and fruit farming, and pig-marsh-fruit-vegetable systems should be promoted. These practices not only catalyze the ecological transition within the agricultural sector, but also reinforce ecological protection achievements, enhancing agricultural quality and bolstering farmer incomes.

Besides, the exploration of innovative integrations between agriculture, culture, and tourism should be actively pursued. The creation of leisure agricultural products with distinctive regional characteristics, such as sightseeing parks, experiential gardens, farmhouse lodgings, and agricultural technology museums, will stimulate the synergistic growth of the agricultural industry and rural eco-tourism.

In addition, it is essential to guide farmers in enhancing the organizational efficiency of agricultural production through collaborative business models like "leading enterprises + bases + farmers" and "companies + cooperatives + farmers." By extending the industrial chain around distinctive and advantageous products, the aim is to increase their added value and strengthen their market competitiveness. Through these concerted efforts, the agricultural sector can be transformed into a more sustainable and profitable venture, aligning ecological integrity with the prosperity of the farming community.

4.3 Fostering diverse industries and enhancing the livelihood transition of farmers The promotion of alternative industries is instrumental in driving the multifaceted transformation of

farmers' livelihoods, encompassing economic, societal, environmental, and cultural dimensions. In the ecological development zone of northern Guangdong, current agricultural practices predominantly consist of traditional cultivation and animal husbandry, with a significant reliance on natural resources such as farmland and forest land. This dependency poses challenges for the pursuit of further ecological preservation initiatives. It is imperative to actively encourage and facilitate a shift from conventional livelihood approaches to the development of alternative industries that are well-suited to the local context. Such industries can fundamentally enable the redeployment of farmers into new employment sectors, thereby reducing the ecological footprint and creating favorable conditions for environmental conservation and rehabilitation.

Firstly, enhancing the development of rural infrastructure, particularly in the construction of small towns and marketplaces, is essential. There should be a concerted effort to bolster the export of labor services and the growth of the tertiary sector, thereby diminishing the direct ecological impact of agricultural activities^[4]. Following this, the utilization of indigenous resources to cultivate the processing sector for green products, including specialty aquaculture, high-quality vegetables, Chinese medicinal materials, and economic forest fruits, is crucial. This will expand the livelihood scope for farmers by extending the industrial chain and broadening the market reach for agricultural produce.

Moreover, capitalizing on the region's rich tourism assets to develop distinctive tourism sectors, such as cave exploration, canyon rafting, agritourism, wellness retreats, and cultural heritage tourism, is vital. This approach will foster a diversified evolution of farmers' livelihoods and minimize the repercussions of ecological protection policies on their way of life.

4.4 Enhancing ecological engineering and integrating ecological protection with rural livelihoods The northern Guangdong ecological development zone, encompassing 21 counties (cities) designated as national key ecological functional areas, necessitates an urgent consolidation of ecological conservation principles with the concept of regional coordinated advancement. Achieving an organic synthesis between ecological preservation and the sustenance of rural livelihoods is a critical objective.

To begin with, the scale and scope of ecological engineering initiatives must be expanded, with a particular focus on land consolidation. This approach will not only enhance the conditions for rural production and living but also lay the groundwork for sustainable livelihood development among farmers. By doing so, we can create an environment conducive to the long-term viability of agricultural practices that are in harmony with ecological health.

Subsequently, it is essential to amplify efforts in public awareness, education, and policy guidance. This involves nurturing the capabilities of local farmers to engage actively in ecological stewardship. By fostering the growth of ecological industries such as sustainable agriculture, eco-friendly breeding practices, green industry, and eco-tourism, we can bolster the resilience and adaptability of rural livelihoods. This, in turn, will facilitate a gradual yet profound integration of ecological preservation with the economic and social well-being of farming communities.

4.5 Cultivating diverse ecological compensation mechanisms and policies for mutually beneficial livelihood and ecological advancement

The execution of ecological compensation policies serves a dual purpose; it compensates for the economic disadvantages incurred by farmers due to their commitment to ecological initiatives^[5], and it elevates their standard of living. This, in turn, fortifies the foundation for the evolution of agricultural livelihoods. As such, the formulation and application of ecological policies must be meticulously aligned with the interplay between ecological preservation and the sustenance of farmers' livelihoods.

It is imperative to adopt a farmer-centric approach, devising and refining a spectrum of ecological compensation mechanisms and supportive policies. These should be designed to foster both ecological conservation and the enduring prosperity of rural economies. Furthermore, it is essential to broaden the recipient base and the scope of ecological compensation to encompass a wider array of farmers engaged in ecological stewardship^[6]. By doing so, we can reinforce the collective efforts in promoting, endorsing, and safeguarding ecological integrity, while concurrently ensuring that the livelihood transformation of farmers and the imperative of ecological protection are realized in a mutually advantageous manner.

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(ii) It is recommended to strengthen the infrastructure construction, improve transportation conditions, supplemented by supporting service facilities. The eastern region should take advantage of its own transportation and economic advantages, improve the corresponding industrial services, expand the scale of rural primary, secondary and tertiary industries, and enhance the ability of industry to resist risks and realize continuous development. The central and western regions should mainly focus on the construction of infrastructure and land transportation in order to attract foreign investment and further expand the market.

(iii) It is recommended to pay attention to the development of science and technology and the introduction of talents, vigorously develop smart agriculture and "Internet +" agriculture, and enhance the development momentum of industrial integration. In addition, it is necessary to implement a more active and open talent introduction policy, actively build cooperation platforms with universities and high-quality enterprises, provide incubation space for high-quality agricultural entrepreneurship projects, and promote high-quality development of integration of three rural industries.

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