

Analysis of Agricultural and Rural Development of Resource-Based Areas: Taking Huainan City, Anhui Province as an Example

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Abstract: The implementation of the “Two Mountains” concept in resource-based areas and achieving mutual development between regional industrial economies and agriculture and rural areas has been a major challenge. This article analyzes the relevant research on ecology and the overall economic development of society. Based on the difficulties faced in ecological, economic, and social development, this paper summarizes the alternatives for driving the development of agriculture and rural areas. These alternatives include planning demonstration areas to minimize the risk of relocation, exploring governance models centered on “ecological restoration + cultural and tourism industry,” and “governance of subsidized areas + complementary fishing and lighting.”

Keywords: Resource transformation; Agriculture and rural areas; High-quality development; Route

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1. Introduction

The exploitation of resources in coal mining areas has a significant impact on local agriculture, the natural environment, and socio-economic development. As resources deplete and development strategies shift, the pressing challenge is how resource-based regions can better implement the “Two Mountains” concept. Achieving a win-win situation for regional industrial and economic development, as well as high-quality development in agriculture and rural areas, represents a crucial and immediate issue faced in current development endeavors.

Huainan City is striving to transform into a new-energy city. The decline of its coal mine resource endowment and prominent environmental problems have propelled a shift in its development direction. The key node to achieve this transformation is to achieve high-quality rural and agricultural development in coal mining areas. The transformation and development of the Huainan region are guided by the “Two Mountains” concept. The innovative practices and successful experiences in resource transformation and development in the Huainan region represent a new application of the “Two Mountains” concept and a grassroots initiative for its

development.

This paper presents an in-depth on typical agricultural and rural areas in the Huainan coal mining area. The significant challenges encountered encompass issues related to natural resources, the development of the coal industry, advancements in agricultural industries, and rural economic and social aspects. Additionally, there are institutional obstacles, requirements, and the need for institutional support faced by farmers, rural areas, coal enterprises, and governments in the process of reform and development. The path of achieving a win-win situation between the industrial economy and high-quality development of agriculture and rural areas in coal mining areas is outlined. Targeted policy recommendations are provided for further optimization and development. Successful examples of promoting the development of regional industries, agriculture, and rural areas are studied. This analysis is not only beneficial for the further development of agriculture and rural areas in the Huainan region but also acts as a reference for the rural and agricultural development in similar areas.

2. Current status of related research

Huainan has been used as an example to analyze the effect of excessive mining intensity and improper underground mining methods. The article states that the mining area in Huainan has collapsed seriously, causing land resource depletion and environmental problems. This has not only severely impacted the local economy, but also intensified the contradiction between people, land, agriculture, and other industries. A three-dimensional system index system of “economy, society ecology” has been constructed to outline multidimensional relationships. The coordinated development and evolution laws of the three multidimensional relationships were then studied, so as to promote the coordinated development of the region.

In terms of national rural revitalization, the “Five Modernizations” challenges have been analyzed by a researcher, including the rapid non-agriculturalization of agricultural production factors, the rapid aging and weakening of rural social entities, the depletion of village construction land, severe pollution of rural soil and the aquatic environment, and severe poverty in rural areas. He also proposed the establishment of a coordinated system of promoting industry and enriching the people in rural areas, as well as the construction pattern and organic structure of villages and towns. Researchers have proposed to promote rural transformation and achieve urban-rural integration through the “five major constructions” concept (industrial prosperity, ecological livability, rural civilization, effective governance, and affluent life).

As for research on issues related to rural revitalization and development in Huainan, it has been mentioned that Jianghuaiyun propels the development of Huainan. The approach involves seeking development through innovative mechanisms within a favorable and interactive urban circle. Researchers have suggested prioritizing village-level collective economy development in counties and districts, with a focus on poverty alleviation through party building. This strategy aims to promote rural revitalization and advance the development of a village-level collective economy across the entire city. In 2021, the Huainan Finance Bureau issued a government procurement policy to support the revitalization of rural industries, relying on the “832 platform” to purchase agricultural and sideline products in poverty-stricken areas.

Through the above research, it can be seen that both national and Huainan-related studies have focused on the overall economic development of society and emphasized the importance of ecology. In recent years, carbon neutrality and carbon peaking have also been emphasized as the environment plays a crucial role in economic development. With the shift in China’s energy structure, the coal economy in Huainan is undergoing changes, and the benefits derived from coal factories shifting from urban to rural areas are diminishing. The development of agriculture and rural areas needs to be transformed, and sustainable agricultural development should be the new direction of Huainan City’s growth.

3. Challenges faced in the development of agriculture and rural areas

3.1. The pressure of ecological construction and sustainable development

Human activities have led to many environmental problems, which caused an emphasis on ecological construction. Coal currently occupies an irreplaceable position in China's energy consumption structure. According to statistics, the proportion of coal in China's disposable energy production and consumption has remained at around 70% for a long time. The environmental damage caused by coal resource extraction has posed great challenges to China's ecological construction and sustainable economic development. By 2020, China's coal consumption accounted for 56.8% of energy consumption, while the global coal energy consumption in the same period accounted for only 26%^[1]. There is still much room for improvement in terms of green and ecological development. It is particularly important to strengthen the ecological construction of coal resource-based cities in order to achieve healthy and sustainable economic and social development. Anhui is located in the East China region and is a major coal-producing province with abundant coal resources. In 2020, coal accounted for 69.8% of its total energy consumption, and coal-fired power generation accounted for 86.9% of it^[2]. Huainan is one of the main coal-producing areas in Anhui Province. The urban development of Huainan is highly dependent on coal resources. Therefore, the depletion of coal resources poses great challenges to the economic and social development and ecological construction of the city.

3.2. The challenge of reducing arable land area

Huainan City is located on both sides of the Huai River and the Huaibei Plains in Anhui Province, with a high population density and limited arable land area per capita. Coal mining forms a large number of collapsed areas further reducing the arable land area per capita. The extent and depth of coal mine subsidence resulting from unit coal production are influenced by the topography and geological structure of the coalfield. South of the Huai River, where coal mining occurs in steeply inclined vertical grooves, the subsidence depth is considerable, yet the subsidence rate is relatively low. The collapse rate for every 10,000 tons of coal mined is approximately 0.11 hectares. Conversely, in the mining area north of the Huaihe River, characterized by flat terrain, numerous thick coal seams can be extracted. The underground coal seams are gently inclined with flat groove structures, resulting in a higher collapse rate. For every 10,000 tons of original coal mined in this area, a subsidence of 0.27 to 0.30 hectares of land occurs, leading to more substantial surface subsidence^[3]. With the establishment of a billion-ton coal base and the intensification of coal resource mining, the extent of goaf collapse areas is anticipated to grow. By the years 2020 and 2050, the collapse area is projected to expand to 463.97 square kilometers and 981.51 square kilometers, respectively. Within this, the hazardous areas impacting arable land resources are estimated to cover 287.41 km² by 2020 and increase to 602.42 km² by 2050^[4].

3.3. Damage to agricultural and rural development

The collapse of these areas has resulted in significant damage to the ecological environment and has altered conditions favorable for agriculture. Villages and the ecological environment have been disrupted, leading to the displacement of many farmers and substantial impacts on the economic and social development of the region. The establishment of a new agricultural structure and economic and social order is still pending, leaving local residents without shelter, employment, and access to water resources. This has severely affected the production, livelihoods, and social stability of local farmers. The loss of essential land for survival, coupled with challenges in daily life, has left a considerable number of idle labor forces, introducing factors of instability to society. This directly affects the harmonious development of the rural economy, society, urban and rural areas, as well as the livelihoods of workers and peasants.

4. Comprehensive governance of harmonious coexistence between humans and nature

Adhering to the principles of people-oriented development, harmonious coexistence between humans and nature, and sustainable development is crucial. Balancing ecological, economic, and social benefits is essential. It is necessary to comprehensively manage ecological and social systems, aiming to foster the high-quality development of agriculture and rural areas.

4.1. Carefully planning the demonstration area to minimize the risk of relocation

Aligning with a people-oriented approach, it is imperative to scientifically devise a comprehensive management plan for coal mining subsidence areas. This plan should integrate risk-averse relocation strategies with efforts towards ecological environment restoration, enhancement of urban image, and the introduction of sustainable industrial practices. A relocation and resettlement method of “adjacent to the mining area gate, expanding rural towns, relying on political centers, and rebuilding resettlement new cities” has been proposed to create a livable and business-friendly living environment. Following the concept of “one-time planning and phased construction,” the Fenghuang Lake Resettlement Area is set to be the largest demonstration area for coal mining subsidence evacuation and relocation in Anhui Province, covering a planned area of 6 square kilometers, with 2.8 km² allocated for residential areas. Currently, nearly 50,000 people have been relocated and settled in the area.

4.2. Actively exploring new models of ecological restoration

It is important to adhere to government and enterprise leadership and implement ecological restoration projects in coal mining subsidence areas. Governance centered on “ecological restoration + cultural and tourism industry” was explored, and nine coal mining subsidence areas along with Huaixi Lake coal mining subsidence areas were turned into urban ecological parks, comprehensively restoring the ecology of the areas and improving environmental quality. Among them, the comprehensive treatment project for coal mining subsidence areas in the nine major mining areas covers a total area of 9.3 km². The once-devastated coal mining subsidence areas have been transformed into wetland parks, sightseeing parks, etc. Since 2018, hundreds of national second-level protected animals like Mandarin ducks have resided here for the winter, making it a popular leisure spot for citizens. The project construction has been selected as a typical case of the 40th anniversary of cooperation between the Chinese government and the World Bank.

4.3. Exploring a new path of “sunshine” transformation

Taking advantage of the opportunity to construct national advanced technology photovoltaic demonstration bases, there is an active exploration of the “sunken area governance + complementary fishing and lighting” model. The objective is to establish green energy bases in coal mining sunken areas, transforming what was once considered “burdens” into wealth and converting “waste” into resources. This approach aims to achieve the harmonization of economic and social development with ecological benefits. Shoreline environmental remediation and restoration initiatives will be implemented in unstable subsidence areas like Fengtai County and Panji District. Additionally, floating photovoltaic systems will be developed based on local conditions.

Disclosure statement

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