

Socio-Economic and Demographic Changes in Rural Development in Eastern China — Comparative Studies

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doi:10.56397/SSSH.2024.04.07

Abstract

This study focuses on eastern China and samples the villages of Xinsi and Qingshan in Shandong Province to explore rural socioeconomic and demographic changes and their interaction with policies. Amid global urbanization, China's rural population has migrated to cities on a large scale, causing challenges such as "rural emptying," aging, environmental issues, and inadequate infrastructure. The government has implemented a number of policies aimed at modernizing agriculture, improving farmers' welfare, and reducing the gap between urban and rural areas. The objective of the study was to assess the effectiveness of rural development policies, particularly in response to demographic and socio-economic changes, and the interaction between local policies and practices. Combining macroeconomic policy analysis, agricultural planning, land-use data, demographics, field visits and case studies, this paper compares the two models of rural development in inland and coastal areas. The study reveals that China's rural areas are undergoing demographic shifts, with labor migration leading to "hollowing out," while promoting diversification and compound transformation of the agricultural economy, such as the rise of non-agricultural industries and the development of rural tourism. At the policy level, China's rural strategy has undergone an evolution, emphasizing agricultural modernization, optimization of industrial structure, and infrastructure construction, while current policy emphasizes innovation, sustainability, and inclusion, reflecting a "people-oriented" and "solving the problems of agriculture, rural areas and rural areas." The policy effect is affected by regional differences, highlighting the configuration of China's diverse geography, economy, and culture in the path of rural development and policy response. The cases of Xinsi and Qingshan villages show how rural communities can innovate multifunctional development models based on resource characteristics, connect with or challenge policy frameworks, and explore new avenues of development. Xinsi Village can actively promote the development of the surrounding service industry through cooperation with local enterprises, while Qingshan Village is expected to take advantage of coastal advantages to develop marine economy, rural tourism and modern agriculture, while protecting and inheriting the local culture.

Keywords: rural development, China, socio-economic transformation, multifunctionality, demographic change

1. Introduction

With the acceleration of globalization and urbanization, the transformation of the rural socio-economic structure and population migration have become the focus of widespread attention in academic circles. In particular, East China, as an economically developed area in East China, presents a complex and unique trajectory of changes in rural areas under the influence of multiple factors, such as improving industrial structure, urbanization, population migration, and ageing. The purpose of this study is to analyze in depth the socio-economic and

demographic changes of rural development in eastern China, and to reveal its internal laws and regional differences through comparative research.

1.1 Bottom

At the global level, industrial improvement and urbanization are intertwined, which has a profound impact on rural socio-economic structure (Chen Liuqin, 2005). Studies in Europe and Beyond (George, 1973; Frutos et al., 1994; Thompson, 2002) reveals the role of technological innovation and economic transformation in shaping patterns of urbanization. In China, large-scale rural-urban migration is particularly significant, a trend that stems not only from the pursuit of higher urban living standards, but also from the acceleration of industrialization and urban population agglomeration (John, 2011). As a result, the social structure and geographical spatial pattern of rural areas have undergone a profound redevelopment, and the role of geographical location factors in the survival and development potential of villages has undergone a fundamental transformation.

1.2 Purpose and Importance of the Study

In the face of multiple challenges, such as population loss, increasing aging, environmental degradation, and inadequate infrastructure, there is an urgent need to develop specific development strategies and adaptive governance measures in rural China (Li Hanlin, 2014). The Chinese Government has introduced a series of policies aimed at modernizing agriculture, improving the standard of living of rural residents and alleviating rural poverty, with a view to achieving urban-rural development integrated into the process of rapid urbanization. However, there are significant differences in the effect of policy implementation between different regions, reflecting the unique influence of China's geographical, economic, and cultural diversity on rural development path choice and policy response.

The purpose of this study is to explore the socio-economic and demographic changes of rural development in eastern China, and to reveal development patterns, characteristics of population flows, policy effects, and interactions between different regions through comparative research. Through the case study of Xinsi and Qingshan villages in Shandong Province, this study will reveal how rural communities have explored and developed multifunctional development models in line with local characteristics, in addition to traditional agriculture, in the context of economic modernization and scientific and technological progress, and how these models interact with existing policy frameworks and even challenge their limitations, providing an empirical basis for understanding rural development dynamics and optimizing policy design and implementation.

2. Rural Areas and Rural Development

Rural areas are essential, they contribute natural resources to the economic cycle. These areas are characterized by low population density and are dominated by agricultural activities, swimming, fishing, logging, and mining.

In eastern China and even across the country, rural socio-economic and demographic changes are complex dynamic phenomena under the combined effects of urbanization, adjustment of industrial structure, political orientation, and market forces (Zhou Limia, 2013).

2.1 Migration and Demographic Change

Population migration and structural change are direct reflections of rural socio-economic changes. In the process of urbanization, a large amount of rural labor flows into cities, forming a significant phenomenon of "rural emptying" (Liu Vengue, 2023). Gua Ying (2020) conducts a study of Jiangsu Province and revealed that the outflow of the rural population has led to severe aging of the lagging population, labor shortages and increased pressure on public services such as education and health care, and the significant impact of the hollowing out on rural economic development, social services and the protection of cultural heritage. The study highlights the importance of implementing rural revitalization strategies to address the challenges posed by rural emptying, such as declining community autonomy and organizational activities due to population decline and aging (Abdullah N, Zinedine A Z & Idris N H, 2023). At the same time, Zheng Boeing's (2022) study on ancient villages in Guangdong Province also noted that population loss accelerates the decline of traditional villages. The scale, speed and pattern of population migration have a significant impact on economic development, the provision of social services, resource efficiency and the protection of villages in rural areas.

2.2 Socio-Economic Transformation and Diversification of Economic Models

With the advance of urbanization, the rural social and economic structure has undergone profound changes. Qiu Boeing (2005) noted that the rural economy has gradually moved from a single agricultural economy to a diversified and composite economy, and that new economic forms such as the adjustment of the agricultural industrial structure, the development of non-agricultural industry and rural tourism have emerged, which inject vitality into the rural economy. For example, Zhu Xuemei's (2022) research on national traditional villages in Xiaoyi City shows a model based on the combination of village consolidation and economic development based on the protection of traditional villages, and achieves the twin goals of protection and development. In addition,

Wei Shouhua (2023) discussed the application of the concept of smart contraction in the reconstruction of rural space and proposed to address the challenges caused by the decline of the rural population through the optimization of village design, the integration of utility facilities, and the efficient use of land resources, to achieve the sustainable development of the rural economy.

2.3 Policy Response and Institutional Innovation

Policies are an important driving force in guiding rural socio-economic transformation and demographic change. Hong et al., (2022) reviewed the evolution of Chinese population policy and revealed the impact of policy adjustment on rural migration and fertility behavior. Zhaohui, (2022) and other studies emphasize the profound role of urbanization strategies and rural revitalization policies at the national level, as well as village planning and land management system reform at the local level in rural population mobility, economic development, and spatial morphological evolution. Liu et al., (2009), noted the importance of policy guidance and institutional innovation in addressing the problem of depletion and promoting the activation and utilization of historical and cultural resources.

3. Geographical Factors and Rural Development

Geographical, physical and human factors play an important role in the potential economic development of an activity in a given space; Aspects such as accessibility and the centrality of settlements are crucial. Proximity to urban centres is conducive to the development of quality-focused agricultural models (Mazurek Hm, 2018). It has also affected the potential demand for tourism services. However, in the reality of rural areas, there are some peripheral places without attributes that are positively valued by tourists. Taking into account the diversity of rural spaces (Pinilla & Sáez, 2017), adapting territorial policies and rural development plans to local geography is essential to optimize the efficiency of public resources and meet the economic and social needs of rural communities. There has been a shift from a model that requires large agricultural assets to a more productive model that allows the existence of populations dedicated to other sectors that are not focused on food production. The impact of urbanization and agricultural modernization has led to a realignment of rural systems. (Ramírez A N T, 2010) In Europe, where population loss in rural areas is seen as a challenge, Europe has focused rural development on multifunctional and economic diversification of rural areas, through community participation and social inclusion. Countries such as Spain have implemented strategies to curb the loss of people from small towns. In China, Zhang Fugang and Liu Yansui (2008) shed light on the dynamics and patterns of regional rural development, noting that China's rural development policies focus on promoting agricultural modernization, optimizing industrial structure, strengthening infrastructure construction, and guiding rational population mobility. Through the in-depth implementation of the rural revitalization strategy, China is committed to building a new agricultural management system, improving the efficiency of agricultural production, and paying attention to the improvement of rural utility facilities and ecological protection of the environment, so as to achieve comprehensive economic and social progress in rural areas. Tu Shuangshuang et al. (2015) studied the mechanism and model of village and city construction and rural development, emphasized equal emphasis on urbanization and rural new construction in rural development with Chinese characteristics, discussed the differences and adaptability of village and city construction and rural development models in different regional contexts, and conducted an in-depth analysis of China's rural development process and regional comparison based on China's Rural Development Index, showing the tiered characteristics and regional differences of China's rural development, and providing empirical support for the formulation of specific rural development strategies.

4. Rural Development Strategies and Guidelines

4.1 China's Rural Development Policy

China's rural development policy focuses on agricultural modernization, optimization of industrial structure, and improvement of infrastructure, and seeks all-round development. This includes the creation of a new agricultural management system and the focus on ecological protection. China's rural development policy emphasizes solving rural problems, agricultural modernization and urban-rural integration. It is based on the principles of innovation, territorial cohesion, the environment, China's integration into the global environment (taking into account globalization) and, from a social point of view, the equitable distribution of benefits among the population (Table 1).

Table 1. Principles of China's Rural Development Strategy

Beginning	Description
Innovation	Promote scientific and managerial innovation.

Beginning	Description
Coordination	Ensure balanced and regionally coordinated development.
Green	Protect the environment and promote sustainable development.
Apertura	Integrate China into the world economy and develop open agriculture.
Share	Ensure that the benefits of rural development are equitably distributed.

4.2 Rural Revitalization

The “Rural Revitalization” strategy implemented in China ¹ aims to substantially promote the overall improvement of the rural living environment by implementing the concept of socialism with Chinese characteristics in the new era, so as to achieve a fundamental improvement in the quality of life of the population. This strategic initiative is not only a key starting point for improving the living standards of rural residents, but also an important way for China to take the lead in connecting with the global economic system, seizing the advantages of local resources, and building a pattern of developing internal and external linkages. In the long term, Rural Revitalization is committed to creating a long-lasting and vibrant rural community development model, with the aim of building a set of sustainable rural housing and ecosystems that can not only reflect the characteristics of the times, but also maintain vitality in the long term, in order to ensure the harmonious coexistence of the economic environment, social and ecological development in China’s modernizing rural areas. The realization of this vision is due to the careful design and vigorous implementation of China’s rural development strategy, which includes profound changes and innovative measures in the rural property rights system, population structure, industrial structure, environmental protection, and public services.

Reform of the property rights system and optimization of population distribution: Implement the land contract and confirmation of land rights, household registration and family property reform, give farmers stable land rights, promote large-scale agricultural operation, guide the flow of population in an orderly manner, optimize the allocation of human resources, and improve the efficiency of agricultural production. (Zhao Ming et al., 2022).

4.2.1 Industrialization Process and Population Mobility

Industrialization promotes the relocation of the rural population to the cities, especially in the large cities and industrial centers of the east (Deng Wen, 2020), the government protects the rights and interests of migrant workers through the policy of citizenship, and implements the strategy of rural revitalization to attract factors of return to the countryside to avoid “emptying”. (Mazumdar D., 1987)

4.2.2 Rural Development Model and Policy Orientation

Focused on improving the quality of life of rural residents, with an emphasis on innovation and entrepreneurship, it is similar to the concept of the European Rural Development Strategy, but pays more attention to the connection between agriculture and rural areas and promotes agricultural modernisation.

4.2.3 Urban-Rural Integration and Coordinated Regional Development

Promote integrated urban-rural development, break the dual structure and achieve the integration of planning, industry, infrastructure, public services and social governance. Implement regional development strategies, reduce regional disparities and improve the overall level of rural development.

China’s rural development model, which aims to improve the quality of life, foster innovation and entrepreneurship, and promote social cohesion and community development, is similar to the principles of the European Rural Development Strategy, but focuses more on the link between agriculture and rural areas. While China’s policy and the EU’s Common Agricultural Policy (CAP) ² take into account issues related to environmental protection, the European Development Programme focuses more on the development of non-agricultural activities. China’s rural development is guided by Chinese socialist ideology in the new era, and

¹ See the strategy proposed by Comrade Xi Jinping in his report to the 19th National Congress of the Communist Party of China on October 18, 2017. The report of the 19th National Congress of the Communist Party of China noted that the problem of agriculture and rural farmers is a fundamental issue related to the national economy and people’s livelihoods, and we should always take the solution of the “three rural problems” as the top priority of the work of the whole Party and implement the rural revitalization strategy.

² The Common Agricultural Policy (CAP) is the agricultural policy of the European Union. It implements a system of agricultural subsidies and other programs. It was launched in 1962 and has since undergone several changes to reduce the cost of the EEC budget (from 73% in 1985 to 37% in 2017) and aims at rural development.

its policies focus on agricultural modernization, infrastructure improvement, and industrial demand considerations, emphasizing territorial cohesion and integrated urban-rural development, including the establishment of a new agricultural management system, environmental protection and the provision of rural public services.

4.3 Historical Stage

Prior to the New Rural Concept, China's rural development policy had undergone decades of adjustments. Its evolution can be divided into four main phases, each with its own characteristics and policy objectives.

4.3.1 Founding of the People's Republic of China (1949-1978)

- Agrarian reform (1950s): The implementation of the agrarian reform movement, the abolition of feudal land tenure, the allocation of "the cultivator has his land" and the revival of peasants' enthusiasm for production.
- Agricultural cooperatives and people's communes: the transition from mutual aid groups to high-level cooperatives and people's communes, seeking to increase productivity through collectivization, despite mixed results.

4.3.2 Reform and Opening up (1978-1980)

- Household Contractual Responsibility System: The institutional innovation approved by the central government was first implemented in Xiaogang village, Anhui Province, to liberalize rural productivity and increase grain production and farmers' incomes.
- The rise of municipal enterprises: The emergence of many enterprises in rural areas has contributed significantly to the development of the rural economy.

4.3.3 Socialist Market Economy (1990-2000)

- Urban-rural integration: Gradually reform the hukou system, allow farmers to move to cities, promote the transfer of surplus rural labour, and accelerate the urbanization process.
- Land circulation and large-scale development: the circulation of land contract management rights began, large-scale agricultural operations appeared, and the structure of the agricultural industry was profoundly adjusted.

4.3.4 Construction and Development of New Fields (2006-Present)

- Rural Revitalization Strategy: Since 2006, significant investments have been made in rural infrastructure, public services and ecological improvements, with the aim of strengthening agriculture, beautifying rural areas and enriching farmers.
- Developing modern agriculture: promoting agricultural scientific and technological innovation, improving the efficiency and quality of agricultural production, and moving towards agricultural industrialization and modernization.
- Integrated urban-rural development: Its objective is to reduce the gap between urban and rural areas, strengthen the development of rural education and health care, and establish a unified market for land for construction.

4.4 Current Rural Development Policies

The above phases reflect the evolution of China's rural policy, from initial land reform efforts to recent strategies for rural revitalization and integrated urban-rural development. China seeks to improve not only agricultural production and rural economy, but also farmers' quality of life and urban-rural cohesion, emphasizing the importance of innovation, sustainability and inclusion in rural development. At present, China's rural development policy is guided by the thought of socialism with Chinese characteristics in the new era. This multidimensional approach aims to address key challenges and promote all-round rural development, respecting the five fundamental dimensions that reflect the vision for the future of China's rural areas.

China's rural development policy focuses on agricultural modernization, industrial optimization, and infrastructure construction. These strategies are comparable but distinctive, compared to other international models, for example, between China and Europe; Have a commitment to local environmental and participatory development plans (CAP Regulation, 2023-27). However, despite the differences between China and Europe, rural development includes economic, social, environmental and cultural improvements; However, it is true that the situation and policies vary greatly from country to country.

Rural development policies are detailed in important documents such as the Communist Party of China's Rural Revitalization Strategy and Rural Revitalization Strategic Plan (2018-2022).¹ They reflect Xi Jinping's

¹ See the Strategic Plan for Rural Revitalization (2018-2022) issued by the Communist Party of China Central Committee and the State Council.

understanding and interpretation of socialism with Chinese characteristics for a new era¹ on the issue of rural development, and are of great significance in guiding China to build a modern socialist country. The key points are shown in Table 2.

Table 2. Key Points of China's Rural Development Policies

Key Points	Description
People Orientation	Focus on 'people-oriented' development, respecting the position of farmers and promoting their well-being.
Solving the 'Three Rural Problems'	Improvement of rural infrastructure, increase of agricultural production capacity, and improvement of living standards through the construction of new rural areas.
Agricultural Modernization	Development of modern agricultural technology, support for agricultural science and technology, and ensuring food security.
Integrated urban-rural development	Reduction of the urban-rural divide, improvement of rural public services, and equalization of basic services between urban and rural areas.
Five Development Concepts	Innovation, Coordination, Green, Openness, Sharing: Guidelines for the Transformation and Modernization of Rural Industry.

5. Research Methods and Data Sources

5.1 Research Methodology

Through the macro analysis of the data. The feasibility of the policy for the study area is verified, and QGIS human-computer interaction is used for the main content of the research to perform data visualization and show the situation of the study area more intuitively.

Field interviews and field visits: Taking into account the particularity of data acquisition in some parts of China, the authors conducted field visits. In Xinsi and Qingshan villages, several days of on-site research, including in-depth interviews with village representatives and community members, were conducted to gather first-hand information on policy implementation, infrastructure construction, land management, agricultural production, and residents' living conditions. Interviewees included managers of village committees, rural households, non-farm workers, and local business leaders, ensuring that the sources of information were diverse and comprehensive.

Zouping Xinsi Village and Qingdao Qingshan Village Field Research

Xinsi Village: From 20 to 25 January 2023, the authors went on a three-day field trip in Xinsi village, where they directly observed the production and living conditions of three representative families and understood the impact of the policy on farmers' livelihoods, land use, and employment structure.

Qingshan Village: From January 27 to February 5, 2024, the authors conducted a seven-day in-depth investigation in Qingshan Village, where they visited three rural households and contacted the relevant managers of the village committee to gain information on the village's overall development plan, the allocation of utility facilities and the industrial development strategy.

Through the comprehensive application of the above research methods, this study aims to build a multi-level and multi-dimensional analytical framework, systematically classify the implementation process, influencing mechanism, and actual effect of China's rural development policies in specific case areas, and provide a scientific basis for further understanding and evaluation of China's rural development strategies.

5.2 Research Data and Sources of Information

5.2.1 Nationwide Data

Official statistics: Official statistics regularly submitted by China's National Bureau of Statistics and the Chinese government to international organizations (United Nations) are used as baseline data to assess the

¹ Thought on Socialism with Chinese Characteristics for a New Era is a guide for the whole Party and people across the country to strive for the great rejuvenation of the Chinese nation. Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era is contemporary Chinese Marxism, Marxism in the 21st century, and the essence of Chinese culture and the Chinese spirit, making a new leap in the Sinicization and modernization of Marxism.

macroeconomic impact of policies.

Population Census data: Based on data from China's Seventh Population Census, this paper analyzes the evolution of agricultural modernization indicators (land use area, changes in crop planting structure), access to basic health and education services, and economic restructuring of the agricultural and industrial sectors in the context of asset structure and demographic changes.

5.2.2 Data at the Local Level

Land use: Shandong Province's land use data from 1985 to 2021 comes from the Environmental Science and Resources Data Center of the Chinese Academy of Sciences (<http://www.resdc.cn/>). The data is mainly based on remote sensing satellite data such as Landsat TM/ETM and GF-2, and through interactive human-computer interpretation, seven numbers of China's land use database were completed every five years from 1985 to 2015.

Public services: Focus on the development of education and health facilities, as they are critical to the quality of life in rural areas. Consult local archives, government reports, and related literature to understand the number, distribution, quality of services, and their relationship to policy interventions.

Resulted

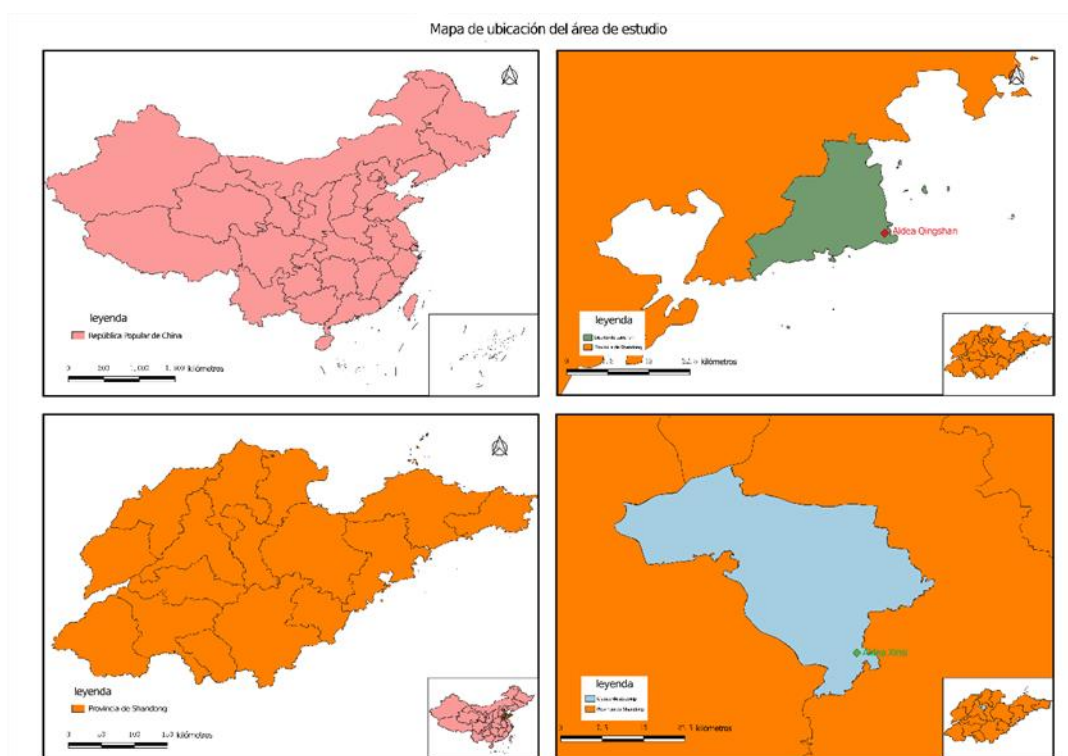


Figure 1. Location of Xinsi Village and Qingshan Village

Map Data Source: The map data comes from the Environmental Science and Resources Data Center (<http://www.resdc.cn/>) of the Chinese Academy of Sciences.

Xinsi Village, Zouping City: Located in Zouping City, this village has undergone a major transformation towards modern agriculture and economic diversification. At the end of 2022, the urbanization rate of Zouping, with a population of about 774,700, was 69.48%, reflecting the city's population growth and the rapid development of the sub-district and administrative city.

Qingdao Qingshan Village: This fishing village, which is part of Qingdao, has successfully integrated tourism and aquaculture into its economy, branding itself as a model of sustainable development. Qingdao is a major coastal resort city, with a population of 10,342,100 at the end of 2022, and is the economic hub of Shandong Province.

5.3 Population Development

According to the results of the seventh national population census published in 2021, China's urbanization rate reached 63.89% and has gradually entered a high level of urbanization. In contrast to the trend of active urbanization, China's rural areas show a negative picture of continued contraction. In the context of China's rural

contraction, a number of problems have emerged, such as the outflow of rural populations, the deterioration of rural infrastructure and public services, and the value of rural landscapes has declined.

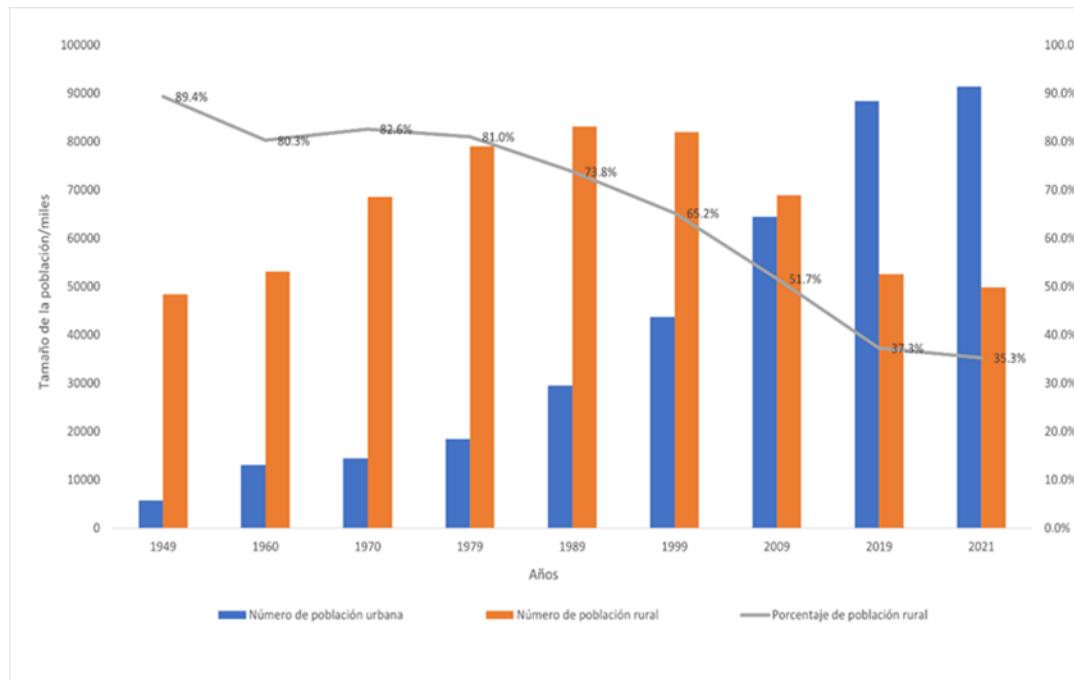


Figure 2. The Proportion of Urban and Rural Population in China, 1949-2021

Source: National Bureau of Statistics of China.

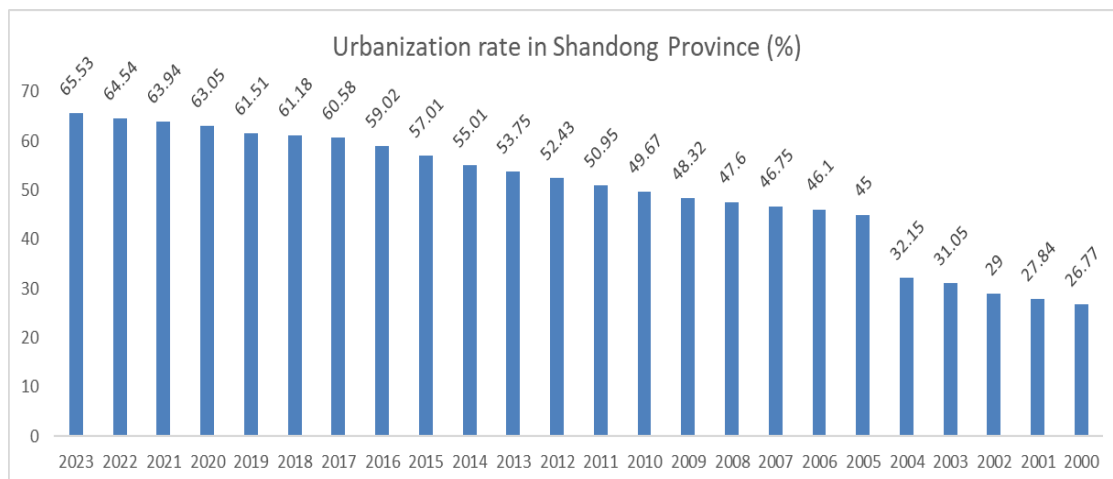


Figure 3. Urbanization trend in Shandong Province from 2000 to 2020

Fuente: Oficina Nacional de Estadística de China.

According to available data, the proportion of rural population in Shandong Province has continued to decline, from more than 70 per cent to 34.47 per cent, reflecting the trend of large-scale migration of the rural population to urban areas. The study shows that rural settlements in highly urbanized provinces expanded initially, but declined after 2015, mainly at the expense of arable land. (Xu Yong, 2023) This change has had a profound impact on the rural social economy, which manifests itself in the scarcity of labor resources, the intensification of aging, the decline in agricultural productivity, the lack of public service resources, and the hollowing out of communities, etc., combined with the author's research and research, the rate of urbanization in the administrative area at the Zouping county level where the village of Xinsi is located. It has reached 69.48% by the end of 2022, vividly reflecting the rapid and deep urbanization process in the region. This process has had a

significant impact on the village of Xinsi, which has had to find a new way out, as a large area of land has been expropriated for urban construction, and the original agricultural jobs in the village of Xinsi have been greatly reduced. The resulting large-scale flow of labour has become a significant phenomenon in Xinsi village. In order to achieve greater economic benefits and urban lifestyle, young workers have left the village to leave, mainly concentrated in the surrounding cities to find employment opportunities, this trend has led to the obvious problem of aging population and loss of labor in Xinsi village. In contrast, although Qingshan Village also faces the challenge of population development trend, but with the unique advantage of being close to tourist attractions, its total population has always remained at the level of about 2,500 people, which is relatively stable. Qingshan Village is actively adapting to the situation, vigorously developing the rural tourism industry, making intelligent use of the unique geographical location, promoting the constant improvement of the tertiary industry, and successfully curbing the phenomenon of a large outflow of rural population. By delving into its internal resources, Qingshan Village has successfully attracted many young people from the village to return to participate in the development of rural tourism and related service industries, effectively solving the problem of rural labor loss and maintaining a relative balance between the economic vitality of the community and the population structure.

5.4 Land-Use Dynamics and Economic and Social Transformation

By analyzing the land use data of Shandong Province over the past 20 years, the author compares the land use situation in the study area to reveal the existing land problems in rural areas at this stage.

From 2000 to 2005

During this period, the area of cultivated land transferred out of Shandong Province was 1,571 km², of which about 78.36 per cent was converted to construction land, 19.86 per cent to water bodies, 0.95 per cent to forest land, 0.83 per cent to unused land, and no transfer to pasture took place. At the same time, the newly added cultivated land area was 749 km², which came mainly from grassland (65.15%), unused land (25.5%), water bodies (6.68%), construction land (2.14%) and forest land (0.53%). Overall, the main flow of cultivated land during this period was construction land, while new cultivated land came mainly from the conversion of grassland and unused land.

From 2005 to 2010

During this period, land use in Shandong Province was relatively stable. The area of cultivated land transferred was 1,010 km², of which 87.52 per cent was converted to construction land, 10.79 per cent to water bodies, 0.99 per cent to forest land, 0.69 per cent to unused land and there was no transfer to pasture. During the same period, 39 km² of other land types were converted to cultivated land, mainly grassland (5 km²), water bodies (16 km²), construction land (5 km²) and forest land (5 km²). At this stage, the loss of cultivated land continues to flow mainly into construction land, with pastureland, water bodies and construction land being the main sources of crop land replacement.

From 2010 to 2015

During this period, the area of cultivated land transferred out of Shandong Province was 857 km², of which 86.11 per cent was converted to construction land, 8.87 per cent to water bodies, 1.75 per cent to forest land, 1.17 per cent to unused land, and no conversion to pasture took place. In turn, the area converted from other types of land to cultivated land was 139 km², which came mainly from construction land (69.78%), water bodies (22.30%), forest land (1.44%), grassland (2.16%) and unused land (1.44%). During this period, cultivated land continued to flow to construction land in a large proportion, and construction land and water bodies were the main sources of cultivated land supplementation, and the area of buildable land in Shandong Province expanded significantly from 2020, with an increase of 11,949% (Wang Meng & Sun Xiaofang, 2019). This is mainly due to the encroachment of cultivated land, as about 95% of new land comes from cultivated land (Liu H, Chen M & Chen H, 2022). The sustainability of land use and habitat quality in Shandong Province also highlights the impact of political and socio-economic factors on the land-use transition, especially from 2010 to 2020. (Wu Li, Hou Xiyong & Xu Xinliang, 2013)

5.4.1 Land Use in Xinsi Village

Almost all cultivated land was expropriated by the government for the construction of enterprise plants, and only more than 30 acres remained. Villagers' economic activities have shifted to non-agricultural fields, such as catering, renting housing and businesses in development areas, and labour has flowed mainly to the surrounding towns. It is consistent with the trend of conversion of cultivated land to construction land in Shandong Province, reflecting the large resource occupation of cultivated land in the process of industrialization and urbanization.

Land use in Qingshan Village: Only a small number of tea trees remain, and tourism is the dominant economy. Make use of geographical location and natural resources, develop marine aquaculture, promote Laoshan tea and

other special products, realize multifunctional and composite land utilization, and create an ecotourism brand. This model takes into account both ecological and economic benefits, and reflects the integration of agriculture and tourism characteristic to achieve rural economic prosperity and sustainable land use under the condition of limited cultivated land resources.

5.5 Resources and Services

5.5.1 Educational Resources

The state of educational resources in Xinsi and Qingshan villages can be analyzed from the aspects of school distribution, accessibility of educational resources, and the provision of basic and higher education.

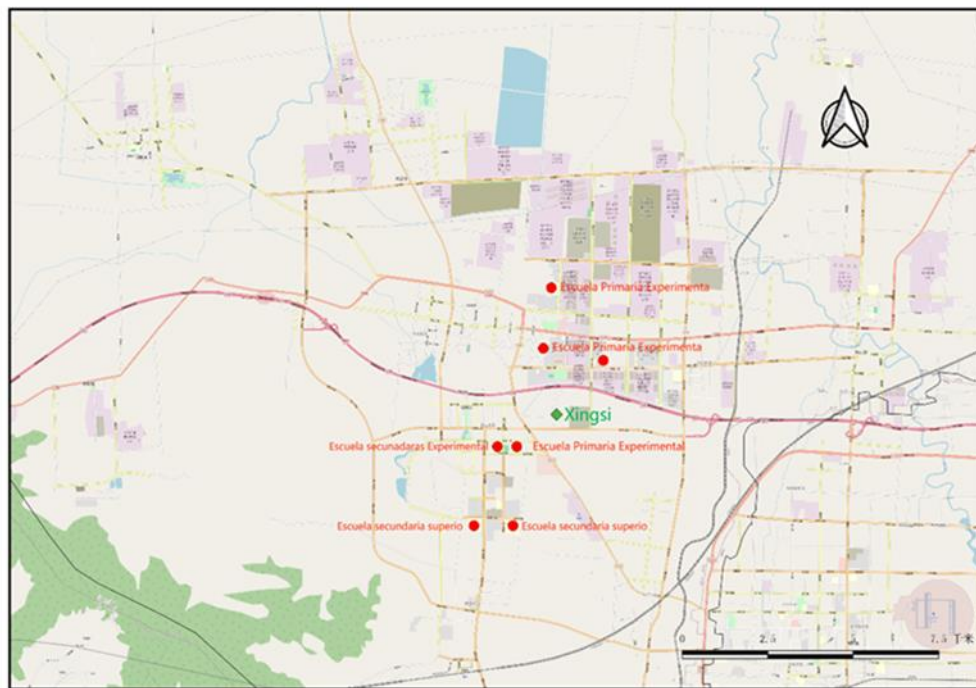


Figure 4. Distribution of educational resources in Xinsi village

Map Data Source: QGIS, OSM Standard Layer.

School distribution: Schools in Xinsi village are concentrated 2.5 kilometers from the village, and students have to walk, bike, or take a car to get to school, which is feasible for most students, but is a burden on young people or those with inconvenient transportation. There are primary and secondary schools in the village to ensure the supply of basic education, and the secondary school is located a little further away and has a longer travel time.

Access to educational resources: At the basic education stage, students in Xinsi village can go to school near the village, reducing the cost and travel time. The distance between secondary schools increases travel time, and if there is good public transport or parent pick-up, the accessibility of educational resources can be ensured.

Educational level: Xinsi village provides integrated education for primary and secondary schools to meet the needs of basic education. High school has limited resources, with only one school having outdated facilities, and students are limited in their higher education options, which may require them to travel elsewhere, resulting in increased costs (transportation, housing, etc.) and academic continuity and family support.



Figure 5. Distribution of Educational Resources in Qingshan Area

Map Data Source: QGIS, OSM Standard Layer.

Educational Resources in Qingshan Village: There is a Qingshan primary school in the village, and there are 5 secondary schools in the Wanggezhuang sub-district office in Laoshan District, so the supply of basic education is sufficient, and students do not need to go to school remotely.

Accessibility: In the basic education stage, educational resources are concentrated and it is advisable for students to enroll in the nearest school. At the higher education stage, it is more than 30 kilometers away from the two senior high schools in Laoshan district, and the long travel time affects the efficiency of learning and family life, which may cause some students to drop out of their studies or choose boarding school due to inconvenient transportation, which increases the financial burden.

Educational level: Xinsi village has access to basic education resources and displacement issues in secondary school, while Qingshan village has abundant and accessible resources in basic education, and higher education students are affected by geographical obstacles. The two locations need to improve the optimal allocation of educational resources, the improvement of educational equity and the problems of distance education, and possible solutions include the optimization of public transport, the increase of school buses, distance education or cooperation in the management of schools.

In summary, there are obvious differences in the distribution and accessibility of educational resources between Xinsi Village and Qingshan Village. Students in Xinsi Village can enroll in the nearest school at the basic education stage, but face certain displacement problems at the secondary school stage, while Qingshan Village shows high accessibility to resources at the basic education stage, but at the higher education stage, students and their families must overcome major geographic barriers due to the distance from senior high school. There is room for further improvement in the optimal allocation of educational resources, increasing educational equity and solving the problem of distance education. Possible solutions include optimizing public transport services, adding school bus routes, distance education or school cooperation, etc., to adapt to the realities of different peoples and ensure that all students have access to accessible and quality educational resources.

5.5.2 Health Resources

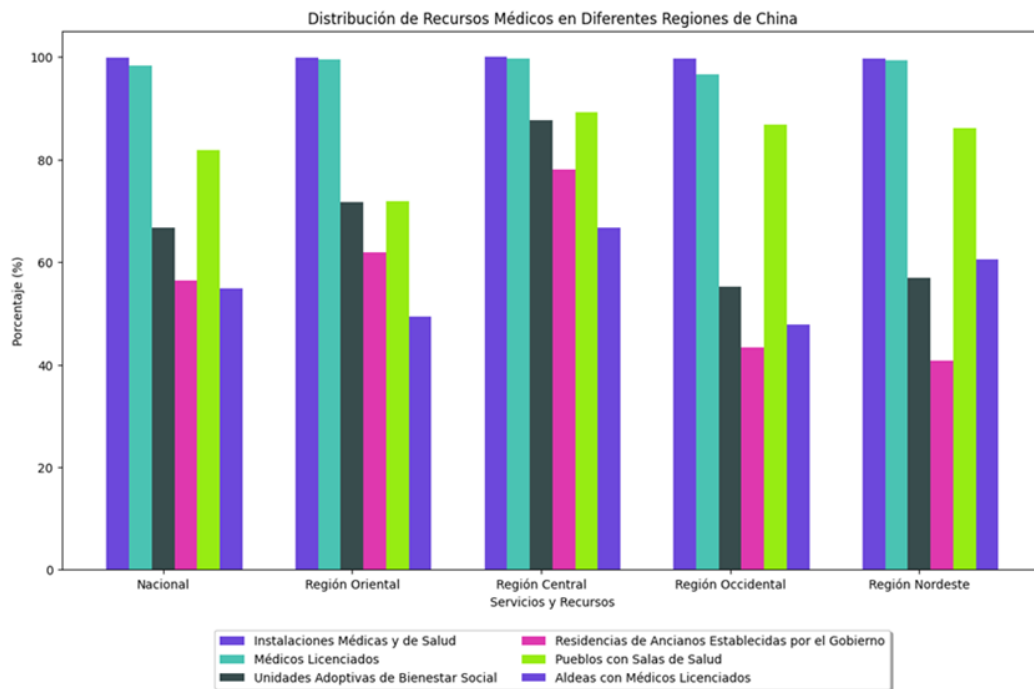


Figure 6. Distribution of medical resources in China

Source: National Bureau of Statistics of China.

The distribution of medical resources between urban and rural areas is extremely uneven: 80 per cent in urban areas and only 20 per cent in rural areas, and the gap is reflected in many aspects such as institutions, equipment, quality of staff and services.

There are obvious differences between regions: top-tier cities such as Beijing, Shanghai, and Tianjin have the most abundant medical resources, while Jiangxi, Anhui, and Guizhou have relatively scarce medical resources. Although the overall level of the central and western regions is close to the national average, there is still a shortage of medical resources in the various provinces.

The government has invested heavily in medical institutions and health centres, accounting for more than 90 per cent of the total, reflecting the importance it attaches to building basic medical networks, while the government has underinvested in other services, such as social welfare and adoption units, indicating that resource allocation is focused on different service areas.

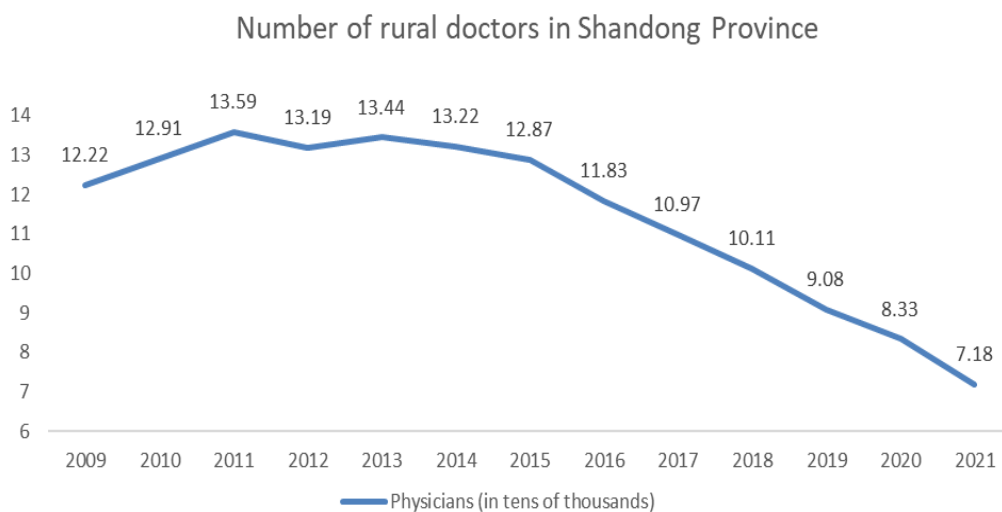


Figure 7. Distribution of medical resources in China

Source: National Bureau of Statistics of China.

According to available statistics, the total number of rural doctors in Shandong Province has shown a continuous downward trend. From the initial 135,900 to 71,800 in 2021, the decrease is significant, reflecting the annual loss of medical human resources in rural areas. Key tipping point: The tipping point came between 2014 and 2018, when the number of rural doctors plummeted from 134,400 to 90,800, a drop of more than 30%. This indicates that the rate of loss of rural doctors has accelerated significantly during this period, which may be closely related to the acceleration of urbanization, the slow improvement of rural medical conditions, and the wage gap.

5.5.3 The Specific Performance of Medical Resources in the Two Villages of Shandong

Xinsi Village

High incidence of geriatric diseases and poor medical facilities: The elderly population of Xinsi village generally suffers from chronic diseases, but there is a lack of specialized clinical hospitals and adequate medical facilities to meet the needs of the elderly population for long-term medical treatment and emergency treatment. This problem is most evident in the context of the continued decline in the total number of rural doctors in the province, which aggravates the situation of the elderly population who find it difficult to seek medical treatment.

Overload of primary health-care institutions: Although there are municipal and sub-district community primary health-care institutions providing services, the proportion of the population served by medical personnel is about 473 to 1, which is much higher than the provincial average. In the context of the continuous decline in the total number of rural doctors in the province, primary medical institutions in Xinsi village may face a more

severe shortage of medical human resources, further increasing the pressure on medical services and hindering the effective response to chronic disease management, preventive health care and public health emergencies.

Qingshan Village

Dual services of community clinics and hospitals: There is a clinic in Qingshan village, which provides basic medical services to more than 2,500 people in the village, while the sub-district office community hospital offers a wider range of services, covering a total of 48,900 people in 108 nature villages, forming a gradient of medical resources. Although Qingshan Village has more abundant medical resources than Xinsi Village, its medical resources may also be affected by the continuous decline in the total number of rural doctors in the province, resulting in a decrease in efficiency and quality of service.

5.5.4 Service Radius and Coverage Efficiency

Although Qingshan Village has more medical resources than Xinsi Village, the number of doctors serving a single doctor may still be high due to the large population base. For residents of remote villages, the actual distance to community hospitals and the cost of transportation can affect the convenience of medical treatment. In the context of the continued decline in the total number of rural doctors in the province, these problems may become more prominent, further affecting access to medical services. In summary, the data of rural medical personnel in Shandong Province confirms the lack of medical resources in the villages of Xinsi and Qingshan. Against the backdrop of the continuous decline in the total number of rural doctors in the province, the villages of Xinsi and Qingshan are facing more prominent problems, such as the high incidence of geriatric diseases, poor medical facilities, overload of primary medical institutions, service radius and efficiency of coverage. Promote the integration of medical care and elder care and the diversification of services and other comprehensive measures to improve the medical conditions and level of health protection of rural residents.

Table 3. Improving basic conditions in Xinsi and Qingshan villages

Aspect	Xinsi Village	Qingshan Village
Living conditions	Significant improvement in living conditions.	Remarkable transformation with rapid economic development.
		Construction of modern homes.
		Quaint and welcoming surroundings.
Economic development	Increase in annual revenue.	Successful diversification of revenue streams.
	Diversification of revenue streams.	Promotion of local tourism.
	Decrease in the rural population.	Boosting marine agriculture and aquaculture.
Educational resources	Difficulty in accessing school due to distance.	Challenges in accessibility to secondary education.
		Limiting geographical barrier to educational opportunities.

Aspect	Xinsi Village	Qingshan Village
	Scarcity of teaching materials.	
Medical Resources	Prevalence of geriatric diseases. Scarcity of basic medical resources.	Limited availability of medical services. Community hospital in Shangjie office. Distance and accessibility issues.

5.6 Examples of Adaptation and National Policy Development in Xinsi and Qingshan Villages

When facing the problems of population loss and aging, the village of Xinsi should pay attention to how to maintain and improve the quality of life of villagers through policy innovation and social support to achieve sustainable development. Possible measures include: optimizing the allocation of educational resources and improving the level of educational services, especially at the higher education stage, solving the problem of distance education, strengthening the investment of medical resources and improving the conditions of medical services to cope with the increase in medical demand caused by the ageing population; encourage and support the development of non-agricultural industries to provide employment opportunities for returning workers, and implement environmental restoration and protection measures to prevent land degradation and environmental pollution, and maintain the ecological function of agriculture.

When promoting the development of tourism and aquaculture, Qingshan Village should pay attention to the following points: first, formulate and implement strict environmental protection policies to prevent excessive commercialization from harming the ecological environment, second, strengthen the construction of educational and medical facilities and improve services to meet the growing needs of residents, third, strengthen community culture building, protect and inherit local cultural heritage, and enhance community cohesion, and fourth, explore innovative management models, such as the establishment of community cooperatives, to guide villagers to participate in tourism and aquaculture operations, and share the fruits of development.

In summary, the villages of Xinsi and Qingshan have experienced different socio-economic transformations and demographic changes in rural development, and they face their own challenges and opportunities. In the process of industrialization, Xinsi Village needs to solve the problems of population loss, ecological environmental protection and community development, while Qingshan Village needs to find a balance between tourism development, environmental protection and improving community service. The adaptation and development strategies of the two villages should closely combine their respective regional characteristics and resource endowments, and achieve a harmonious coexistence of economy, society and environment through policy guidance, social support and community participation.

6. Discussion

Through an in-depth analysis of the villages of Xinsi and Qingshan in eastern China (taking Shandong province as an example), this study reveals the reality, internal dynamics, and specific coping strategies of rural socioeconomic and demographic changes. The results reveal the challenges faced by Xinsi Village in the process of rapid industrialization, such as labor loss, aging, and environmental degradation, as well as Qingshan Village's concern to balance economic development, environmental protection, and improving public services, while relying on marine resources to achieve economic diversification and tourism development. Below is an in-depth analysis of these findings, a comparison with existing literature, and a discussion of the implications for the future development of rural China.

6.1 In-Depth Exploration of the Mix of Policies and Practices

Unlike some literatures that focus on theoretical discussion or single-case analysis, this study pays special attention to the close integration of policy and practice into the analysis. Through a comprehensive investigation of the effect of national and local policy implementation at all levels, combined with field research data, this study makes a more comprehensive, three-dimensional assessment of policy impact. This approach not only reveals how policy orientation affects rural socio-economic changes in practice, but also provides empirical support for assessing policy effectiveness and fills in the lack of practical concern that may exist in simple theoretical discussion or single case analysis.

6.2 Stand out in the Local Perspective

In the comparative study of Xinsi Village and Qingshan Village, this study emphasizes the importance of local perspective. Unlike some studies that focus on macro policies or universal laws, this study takes an in-depth look at the impact of regional characteristics, local resource endowments, and specific socio-economic conditions on specific topics such as rural landscape evolution, protection of agricultural heritage, and selection of rural

economic development models. The application of this local perspective helps to reveal the key role of regional differences in rural development, enriches the understanding of the diversity of rural social and economic changes, and compensates for the discussion of particularities at the micro and local levels that can be ignored by the macro perspective.

6.3 A Unique Interpretation of China's International Vision and Experience

This study integrates an international perspective into the comparative analysis, especially based on the comparison of China's rural development with that of other countries and regions such as Europe, and highlights China's unique path and experience in agricultural modernization, urban-rural integration, and institutional innovation. This localized interpretation in the global context not only helps to objectively assess the achievements and challenges of China's rural development, but also provides a valuable frame of reference for China's rural areas to learn more from international experience and innovate development strategies. Compared to studies that focus solely on national experience or look at international cases in isolation, the cross-cultural comparison of this study provides a broader theoretical perspective for understanding the uniqueness and universality of China's rural development.

7. Conclusion

This study provides an in-depth analysis of socio-economic and demographic changes in rural China, as well as the actual effectiveness of rural development policies, focusing on the role and impact of policies in the rural transformation process. In this study, the macro data analysis method combined with QGIS data visualization was used to compare and analyze the interaction between the effect of policy implementation and local practice in two different rural development scenarios, inland and coastal areas, taking Xinsi Village and Qingshan Village as examples.

The results show that over the past two decades, China's aging rural population has increased due to accelerating urbanization, loss of rural labor, population age structure, and fertility rate (Chen C, Li J & Huang J, 2022) and has also put pressure on public service systems such as education and healthcare, and the cohort study of the mountainous rural natural population in Shandong Province showed that the average age of participants was 54.45 years and they suffered from common chronic diseases such as hypertension and diabetes (Fang Y, Zhang Y & Li Z, 2022) has also accelerated the decline of traditional villages. However, population migration has also brought opportunities, leading the rural economy to move from a single agricultural model to a diversified and complex economy, and new forms of business such as agricultural industrial restructuring, non-agricultural industry development and rural tourism have flourished, becoming a new growth point for the rural economy.

At the political level, Shandong Province's rural transformation and development are driven by the interaction between people, land and industry, and regional differences require tailor-made sustainable development strategies (Li Tingting & Long Hualou, 2015) China's rural development policy has evolved from land reform to rural revitalization strategy, with agricultural modernization, industrial optimization and infrastructure construction at the core, with the aim of improving agricultural production, improving the quality of life of farmers and reducing the gap between urban and rural areas. The current policy emphasizes innovation, sustainability and inclusion, and follows the development concepts of "people-oriented", "solving the problems of agriculture, rural and rural areas", "agricultural modernization", "urban-rural integration" and "five-in-one", and strives to promote innovation in agricultural science and technology, the improvement of the environment, the equalization of public services and the construction of a new agricultural management system. It is found that in the process of policy implementation, the effect of the policy presents regional differences, reflecting the unique influence of China's geographical, economic, and cultural diversity on the choice of rural development path and policy response.

Case studies from the villages of Xinsi and Qingshan reveal how rural areas can explore and develop multifunctional development models with local characteristics based on traditional agriculture, which offer new possibilities for rural development while responding to or challenging existing policy frameworks. Due to the large-scale reduction of cultivated land, Xinsi Village should rely on the industrialization foundation of local enterprises, strengthen the connection with enterprises, and pursue further development to achieve transformation, while Qingshan Village can continue to explore the development of marine economy linkages, rural tourism and modern agriculture with the advantages of the coastal economic belt and at the same time protect and inherit local cultural resources to achieve dual economic and cultural revitalization.

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