DOI 10.15302/J-SSCAE-2019.01.010

Development Path and Mode for Rural Revitalization in Qinba Mountain Area under the Nature Reserve System

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Abstract: This study aims to solve practical problems in the Qinba Mountain Area, including the scattered spatial distribution of rural residents, its prominent conflict with nature reserves, the outflow of rural populations, the weak industrial economy, and the loss of environmental resources. Based on the idea of constructing a reserved natural area system with national parks as its backbone, we propose a development path for rural revitalization and differentiated development modes, which are in accordance with regional features and which marry protection with development. A rural revitalization strategy suitable for the Qinba Mountain Area is also actively explored through specific measures including the adjustment of the rural residential space, development of a rural green industry, construction of a rural characteristic landscape, and improvement of the rural service system. The results of this research reveal that the coordinated and sustainable development of ecological protection, cultural heritage, and rural revitalization can be realized in the Qinba Mountain Area by effectively coordinating the development relationship between villages and nature reserves.

Keywords: Qinba Mountain Area; nature reserve system; rural revitalization; development model

1 Introduction

The Qinba Mountain Area is an important ecological barrier in the upper reaches of the Yangtze River. It is rich in various natural resources, and is known as the "National Green Lung." It also exhibits complex ecological environment characteristics of East, West, North and South China [1]. Its total land area is 3.086×10^5 km^2, and the projected area of its natural reserves will account for about 40% of the total area. The total population of the region is 61.64 million people, with a permanent population of 40.21 million. The urbanization rate of the permanent population is 32.75%. There are 31 520 administrative villages, and the rural population is 27.04 million, including 7.12 million people living in poverty. In June 2019, the General Office of the Communist Party of China (CPC) Central Committee and the General Office of the State Council issued the *Instruction on the Establishment of the Nature Reserve System with National Parks as the Main Body* (hereinafter referred to as the Instruction), further prioritizing national reform via sustainable ecological development and the maintenance of a national ecological security system. The establishment of a nature reserve system with the national park as its central focus is a major measure to implement Xi Jinping's thoughts on ecological civilization, and constitutes a major reform task proposed by the 19th CPC National Congress. As an important national ecological main functional area, the Qinba Mountain Area is an exemplary area to explore and practice the reform outlined in the Nature Reserve System of China. At present, a natural reserve system has been

Received date: December 02, 2019; **Revised date:** January 09, 2020

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Funding program: CAE Advisory Project "Research on the Green and Circular Development Strategy of the Qinba Mountains (Phase II)"

Chinese version: Strategic Study of CAE 2020, 22 (1): 96–110

Cited item: Lei Huixia et al. Development Path and Mode for Rural Revitalization in Qinba Mountain Area under the Nature Reserve System. S*trategic Study of CAE*, https://doi.org/ 10.15302/J-SSCAE-2020.01.010

constructed preliminarily, which is composed of the Giant Panda and Shennongjia National Parks and many natural reserves, scenic spots, and natural parks. However, this area of China has complex and difficult geographical attributes, for example, weak spatial connection, scarce land resources, and fragile ecosystems. This also means that the region has limited industrial development, disordered management, and dated facilities. Most of the rural economic development is lagging, contributing to the largest contiguous poverty-stricken area in China [2]. How to achieve poverty alleviation in rural areas under the premise of ecological protection has thus become the focus of this region.

Based on the concept of "landscape, forest, land, lake, and grass" life community, the goal of land space planning is not only to balance the spatial needs of various industries and communities but also to reconcile the contradictions between different stakeholders. At the same time, the 19th National Congress of the CPC put forth the Rural Revitalization Strategy of "industrial prosperity, ecological livability, rural civilization, effective governance, and rich life," and guided the orderly progress of rural modernization from the perspectives of industry, ecology, culture, governance, and talent. However, at present, there is a lack of theoretical research on rural revitalization under the green development goal, and research on the practical strategies of rural revitalization by relevant achievements needs to be developed further [3]. Guided by the concept of ecological civilization construction, this paper attempts to analyze the legal relationship and appropriate boundary between the revitalization and development of the Qinba Mountain Area and the nature reserve system, with the National Park forming the backbone of the system, thus clarifying the best development path and mode for rural revitalization in Qinba Mountain Area under the nature reserve system. Based on both theoretical and practical studies, this paper presents specific strategies to promote the coordinated development of regional ecological protection and rural revitalization, and provides practical experience and scientific guidance for rural development in mountainous areas in China.

2 Construction of nature reserve system

The Qinba Mountain Area contains myriad natural resources, including a world natural heritage site, two national parks, 40 national nature reserves, 61 national forest parks, 12 national geoparks, 11 national wetland parks, and 13 national scenic spots. The purpose of this study is to promote the cause of natural protection; to fully guarantee and strengthen the basic attributes related to protection effectiveness, such as protection intensity, protection area, and the protection of nature; and to establish and improve the natural reserve system built from the backbone of a national park in the Qinba Mountain Area. First, we improved the classification standard of the nature reserve system in the Qinba Mountain Area and divided it into four types: national park, nature reserve, scenic spot, and nature park. Second, based on the analysis and construction of corridors indicated as suitable ecological environments for species, we propose to combine the Qinling Mountains and Funiushan National Parks, and to add natural reserves, scenic spots, and natural parks, to further improve the spatial connectivity of these natural corridors. By integrating and improving the natural reserve system, a new spatial distribution relationship can be formed. Based on this new nature reserve system, this paper analyzes the current situation of rural development in the Qinba Mountain Area and the relationship between rural development and the nature reserve system, to fully realize the revitalization and development of rural areas in the Qinba Mountain Area and the primary task of ecological environmental protection and development.

3 Current characteristics and problems

3.1 Characteristics of current villages pattern

The Qinba Mountains spread across a wide area and have an uneven distribution of regional resources. At the same time, significant regional differences exist in its natural resources and social and economic development. The spatial distribution characteristics and construction mode of rural residential areas vary greatly. Spreading out from the distribution points of larger villages, including those at the north foot of the Qinling Mountains, Hanzhong Basin, and Ankang basin, are the main village aggregation areas. The degree of village aggregation is relatively high in the hilly areas of North Sichuan, North Chongqing, East Henan, and East Hubei. In addition, the density of villages in the Longnan Mountain Area of Gansu Province, the Funiu Mountain Area of Henan Province, and the northern foot of the Bashan Mountain Area is generally high, while in other areas, there is a pattern of less concentration and more dispersion (Fig. 1).

Based on the analysis of village density statistics at the county level, we conclude that the average village density of each district and county is 0.18/km^2, and the number of districts and counties with densities of 0.08–0.2/km^2 forms the largest density group, at 65, which accounts for 54.64% of the total. The numbers of districts and counties with

DOI 10.15302/J-SSCAE-2019.01.010

densities less than 0.08 and greater than 0.32 are 16 and 13, accounting for 13.44% and 10.92% of the total, respectively, and the degree of village agglomeration at the county level is not high.

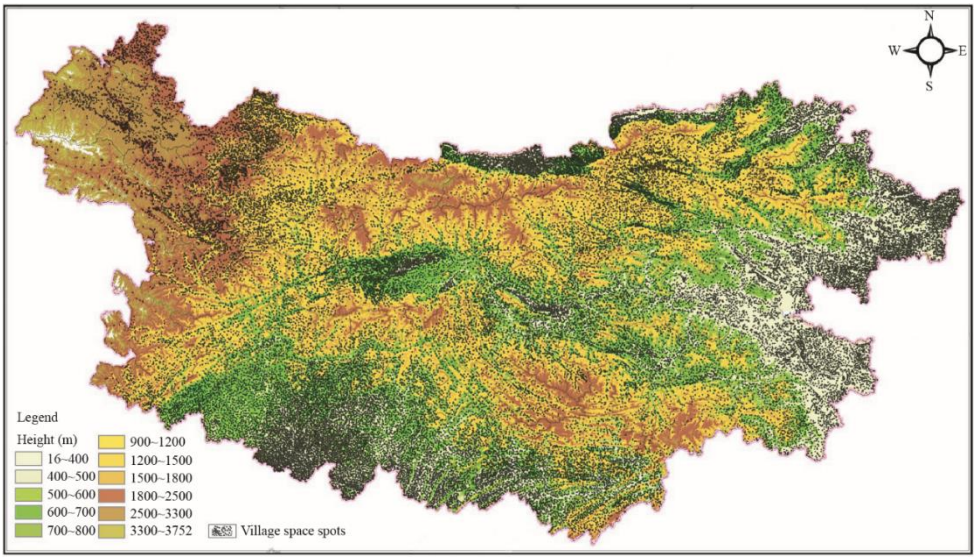

Fig. 1. Distribution of villages in the Qinba Mountain Area.

To further clarify the influence of intensity and dispersion degree of each village on its surrounding geographical location in the Qinba Mountain Area, the continuity of its density change layer and the spatial distribution pattern between "wave crest" and "wave trough" were studied [4]. Based on the core density analysis of the village distribution within the ArcGIS platform, we found that the distribution of villages in the Qinba Mountain Area is characterized by large dispersion and small concentration. As shown in Fig. 2, the regions with high nuclear density are distributed mainly in the northern foot of the Qinling Mountains, the southern foot of the Daba Mountains, the Huicheng basin, the Hanzhong Basin, the Ankang basin, and the eastern edge of the Qinba Mountains in Henan and Hubei, with the nuclear density mostly greater than 1800. The regions with low nuclear density are mainly Taibai County, Ningshan County, Foping County, Zhuoni County, Diebu County, and Shennongjia Forest District, with most of their nuclear densities being less than 500.

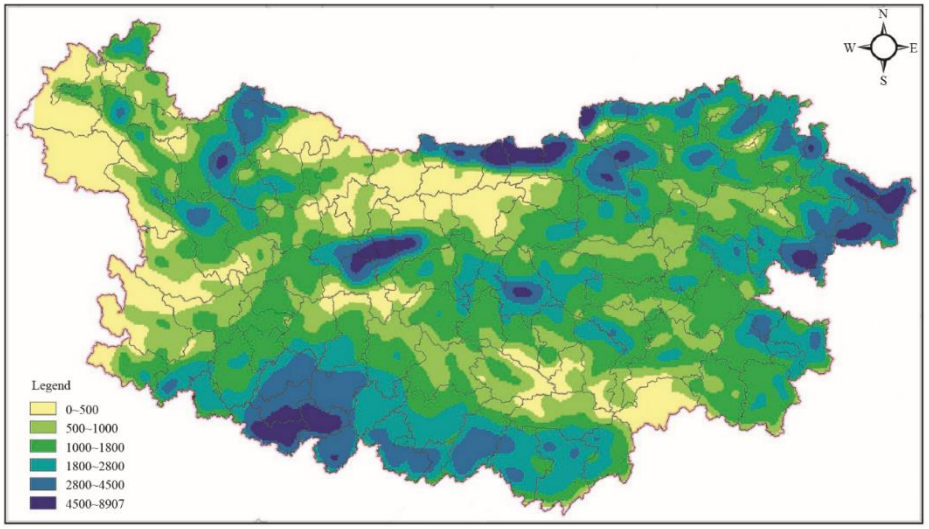

Fig. 2. Core density analysis of villages in the Qinba Mountain Area.

3.2 Development of villages

3.2.1 Scattered layout, and prominent contradiction between the spatial distribution and nature reserve

Owing to the vertical and horizontal geographical and topographical conditions of the Qinba Mountains, the villages in this area are concentrated in the buried hill basin area, and the surrounding areas of the city are dense and gradually sparse, which are distributed generally in clumped concentrations. According to relevant research, the settlement types of counties in the Longnan area are also generally single-courtyard and small-scale settlements, and only a small number of large- and medium-sized settlements are distributed throughout each county [5]. The small-scale and decentralized distribution of villages not only results in a low degree of intensive land use but also increases the difficulty of infrastructure allocation.

Although the Qinba Mountain Area has the basic characteristic that the deeper the mountain area, the smaller the village density, and the flatter the terrain, the greater the village density, a large number of villages are still present in some high-altitude mountain areas, especially in and around many nature reserves. Even within areas of national parks and national nature reserves that have high ecological sensitivity, the village density is higher than that in other areas (Fig. 3). However, owing to their remoteness, barren land, sensitive ecology, traffic barriers, and other reasons, these villages generally have poor economic, cultural, and social structures. On the one hand, establishing a nature reserve system will impact the traditional livelihood of the countryside, changing its industrial structure and production mode. On the other hand, the extensive production and construction mode of the countryside and the numerous human activities may damage wildlife habitats and the integrity of the ecosystem, posing a serious threat to the ecological environment, emphasizing the conflict between human development and the environment.

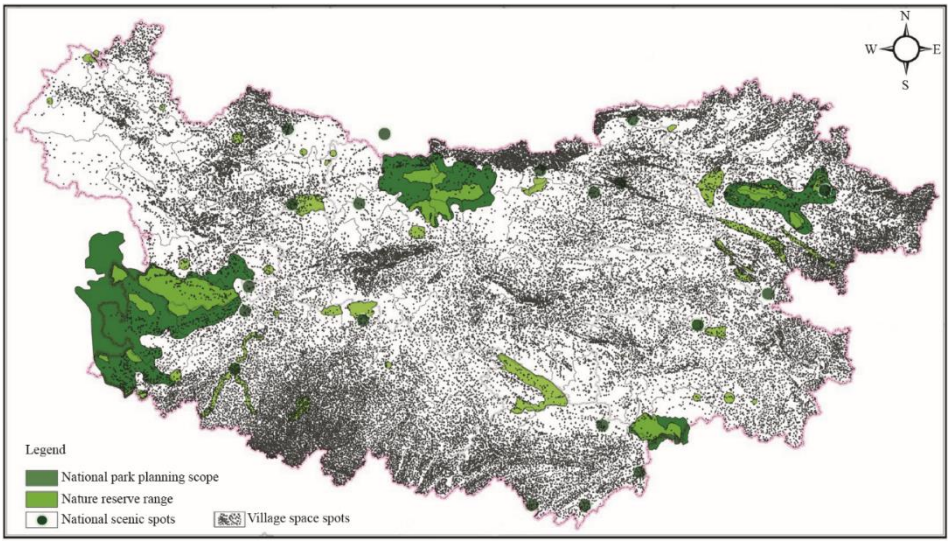

Fig. 3. Distribution of villages and nature reserves in the Qinba Mountain Area.

3.2.2 Shrinking rural population, idle land and facilities, and the hollowing of villages

Most areas of the Qinba Mountains are mountainous, and their hollowing rate is the highest of all types of areas [6]. The widespread poverty caused by scarce land resources and weak rural economies forces a large portion of the labor force to leave their immediate villages to maintain their livelihood, while most remaining villagers lack the capacity for labor. This trend is then followed by the increasingly significant problems of household abandonment and the hollowing out of villages. For example, in the Daba Mountain Area, of the total 1700 administrative villages, the rural permanent population accounts for only 46.77% of the total rural population, which is significantly hollowed out [7]. For the Qinba Mountain Area, economic recession is the internal driving force of labor migration, and the hollowing of villages caused by population loss further diminishes local economic development, thus creating a vicious circle of rural labor shortage and unbalanced development and construction demand.

3.2.3 Limited industrial development and difficulty in mitigating poverty

The Qinba Mountain Area is restricted by geographical and ecological factors. The existing traditional agriculture and forestry industry is mainly small scale, based on family scattered management, and lacks driving effect. The regional traffic is not smooth, technical information is blocked, resource consumption is high, and ecological pressure is monumental, resulting in a low contribution rate of this secondary industry and low sustainable competitiveness. At the end of 2015, the impoverished population in the Qinba region accounted for 12.8% of the national impoverished

DOI 10.15302/J-SSCAE-2019.01.010

population [8]. In 2018, the poverty-stricken population of Southern Shaanxi in the Qinba Mountain Area accounted for more than 50% of that of the Shaanxi Province, and the deeply impoverished villages accounted for more than 90% of the poverty in the Shaanxi Province. By superposing the distribution pattern of villages and poor counties in the Qinba Mountain Area, we determined that most of the villages are impoverished, such as those in the Longnan Mountain Area, Sichuan, and northern Chongqing (Fig. 4). The proportion of villages in chiefly poverty-stricken counties across the whole region is 62.5%. The task of poverty alleviation at the rural level is very arduous.

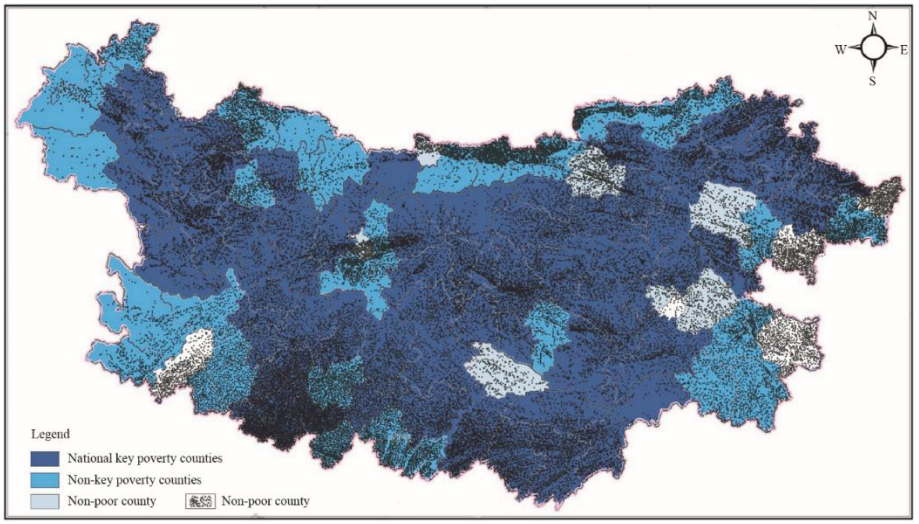

Fig. 4. Distribution of villages and poor counties in the Qinba Mountain Area.

3.2.4 Interference of human activities, disordered rural construction, and rapid decline of ecological environment and landscape quality

The Qinba Mountain Area is rich in tourism resources and has abundant stunning natural scenery. Ecotourism and rural tourism can be an important starting point for poverty alleviation. Myriad scenic spots and natural parks within the area can be transformed into important tourism attractions. Owing to current urban development, the awareness of ecological conservation in the villages of the Qinba Mountain Area is still weak, garbage and sewage are common, human activities are excessive, and environmental resources are overloaded, all of which pose a threat to the integrity of wildlife habitats and ecosystems. In addition, there are many other problems in many areas, such as disordered rural environment, high building volume, and abrupt colors. There is a large gap between upholding legal environmental requirements and the consequences of urban development, especially in all kinds of nature reserves, which has a negative impact on the development of the ecotourism industry.

4 Development relationship between villages and nature reserves

In the face of the increasingly prominent contradiction between social and economic development and ecological environment protection in the Qinba Mountain Area, it is necessary to accurately analyze the relationship between the ecological protection requirements of the nature reserve system in the Qinba Mountain Area and the development of rural spaces, industry, style, governance, and other aspects, to prioritize green development, rural revitalization, and regional coordinated and innovative development.

In the Instruction, the types of nature reserves are defined scientifically and explicitly. Based on this, the establishment of the nature reserve system in the Qinba Mountain Area has changed the supply–demand relationship between natural resources and traditional rural development, but various types of nature reserves have certain functions, positions, protection requirements, management mechanisms, and related safeguard measures. The differences between them have led to the formation of different management and control subregions, each of which has objective developmental relationships of exclusion, integration, and symbiosis in terms of ecological management and control requirements, and rural production, living and business activities, methods, and construction requirements.

The main purpose of the national park system is to protect the national representative natural ecosystems, which are also the most ecologically important areas, have the most unique natural landscapes, and are the most abundantly

biodiverse. These ecosystems have a wide range of protection, a complete ecological process, and the highest level of ecological protection and requirements. The spatial scope of this study is divided into core conservation areas, ecological conservation areas, recreation display areas, and traditional utilization areas.

In nature reserves, there are typical natural ecosystems, natural concentrated distribution areas of rare and endangered wild animals and plants, and areas with special significance of natural heritage, which carry a certain experimental function of transition to the national park level, and their protection requirements are relatively loose compared with those of national parks. The research divides its spatial scope into core areas, buffer areas, and experimental areas.

Scenic spots and natural parks are areas with important natural ecosystems, natural relics, natural landscapes, and some cultural relics, which are of ecological, ornamental, cultural, and scientific value. Their ecological protection intensity and requirements are relatively lower than the former two, and their spatial scope is divided into core areas and development areas.

Based on the requirements for ecological protection, development restriction, and resource supply of all kinds of nature reserves in the Qinba Mountain Area, as well as the development strategies for the spatial development, economic industry, landscape environment, and governance means of rural areas in the strategy of rural revitalization, the relationship between the resource supply of different zones in various types of nature reserves and the development demand of rural space, industry, style, and governance within their scope is visually analyzed (Table 1).

Table 1. Comparison of resource supply in nature reserves and development demand of rural revitalization.

Nature reserves	Type	Relationship	Possibility of rural construction and development activities
National parks	Core conservation area	Repulsion	Migration, prohibition of rural construction activities.
	Ecological conservation area	Integration (strictly limited)	In combination with the situation, expansion of the production scope is not allowed, to maintain the existing construction scope; pollution and potential pollution activities are removed; and the public facilities and infrastructure supporting facilities, as well as the renovation of architectural features are strictly controlled.
	Recreation display area	Integration (tourism activities)	Carry out recreational tourism, scientific research exhibition, ecological experience, and other public welfare tourism activities.
	Recreation display area	Symbiosis (tourism and production activities)	Folk characteristic cultural tourism, ecological recreation, sightseeing, vacation, agricultural production, tourism business activities, and resource utilization activities (pollution-free)
Nature reserve	Core area	Repulsion	No human access (except for scientific examinations), immigration, and relocation.
	Core area	Integration (strictly limited)	In combination with the situation, expansion of the production scope is not allowed, to maintain the existing construction scope; pollution and potential pollution activities are removed; the public facilities and infrastructure supporting facilities, as well as the renovation of architectural features are strictly controlled; and scientific research activities are carried out.
	Experimental area	Symbiosis (tourism and production activities)	Certain developmental, construction, and human activities are allowed in combination with regional characteristics and natural resources, but it is necessary to ensure low interference with the environment (no pollution) of special species.
Scenic spots	Core area	Integration (specific tourism activities)	The construction of living, tourism service facilities and infrastructure, agricultural production activities, and improvements in living environment (style coordination) may be carried out; polluting production activities are forbidden.
	Core area	Symbiosis (tourism and production activities)	Folk characteristic cultural tourism, ecological recreation, sightseeing, vacation, agricultural production, tourism business activities, and resource utilization activities (pollution-free).

Table 1 reveals that the ecological transformation of high-quality, high-value, and high-abundance natural resources, industrial development, and lifestyle also makes it possible for the nature reserve system and rural development to coexist and promote each other's development. This coexistence can achieve the integration of the nature reserve system and rural revitalization and development, and promote the sustainable development of the Qinba Mountain Area.

DOI 10.15302/J-SSCAE-2019.01.010

To achieve the win–win developmental goal of the Qinba Mountain ecological environment protection and regional social poverty alleviation plan, the entire Qinba Mountain Area will be categorized as a collaborative development demonstration area, led by the construction of ecological civilization in the central and western regions of China.

5 Development path for rural revitalization

Based on the analysis of the relationship between the nature reserve system and rural development in the Qinba Mountain Area, the basic principles of "protection as the key, moderate development, resource mining, intensive utilization, combination of management and control, reform and innovation" are established for the revitalization of rural development, and four development paths are formed.

5.1 Brand building of the Qinba Mountains

The brand value system of the Qinba Mountains shall be built, and the ecological and cultural values contained in the Qinba Mountains as seen relative to the entire industrial chain shall be added to realize the upgrading of "resources, products, commodities" and the value-adds of unit products brought about by improvements in quality and market recognition, thus improving the per capita income of rural areas without the expansion of development and utilization areas. While meeting the needs of economic development, we should simultaneously reduce human activities as much as possible, actively carry out the conversion of farmland to forests and grasslands, renovate infrastructure and landscape environments, identify and build potential ecological corridors, and minimize the conflict between protection and development.

To accelerate the promotion of brand influence, typical villages in different types of natural conservation areas were selected, and diversified village construction pilots were established in combination with ecological protection requirements. Theories and strategies were implemented into actual development and construction projects through the problem–feedback–optimization practice path.

5.2 Differentiated development modes of villages

Differences in the ecological sensitivity, protection level, and functional orientation of all kinds of protected sites in the nature reserve system of the Qinba Mountain Area will put forward different requirements for the rural construction and development within the area [9]. According to the differences in ecological sensitivity and environmental carrying capacity, management and control should be classified, graded, and staged, and a corresponding rural development model and strategy should be constructed.

(1) Classified control: According to the requirements of different nature reserves, the construction and guidance shall be carried out by classification. The core areas, villages, and protected areas are mutually exclusive, so migration and relocation shall be carried out. Other areas shall adopt different industrial development modes, such as relocation, tourism, characteristic agriculture, and handicraft production, according to the rural history and culture, development potential, and development conditions.

(2) Hierarchical control: According to the rural scale, construction and production conditions, in combination with land spatial planning, hierarchical relocation, and development guidance, shall be further carried out.

(3) Phased control: According to the degree of difficulty and influence, this will be implemented in stages.

5.3 Upgrading of the industrial model

The Qinba Mountain Area has the largest population in the main functional areas of the national ecotypes. The unreasonable distribution of population density and villages leads to the more prominent contradiction between people and land [10]. Faced with the natural geographical isolation, poor transportation, and lack of land resources in the Qinba Mountains, the transformation and replacement of the rural industrial model is imperative under the high standards of ecological protection.

5.3.1 Replacement of the production mode

Under the brand effect, the original self-sufficient agricultural products will be transformed into branded characteristic commodities, which will replace the original agricultural production and operation modes. High-value-added Chinese herbal medicines and agricultural and sideline products will be developed. Meanwhile, the industrial chain will be extended. Based on the ecological agriculture and forestry industries, a green, circular agricultural–forest–livestock–pharmaceutical–industrial–trade–service integrated industrial cluster based on the

integration and cooperation of the three major industries will be constructed (Fig. 5).

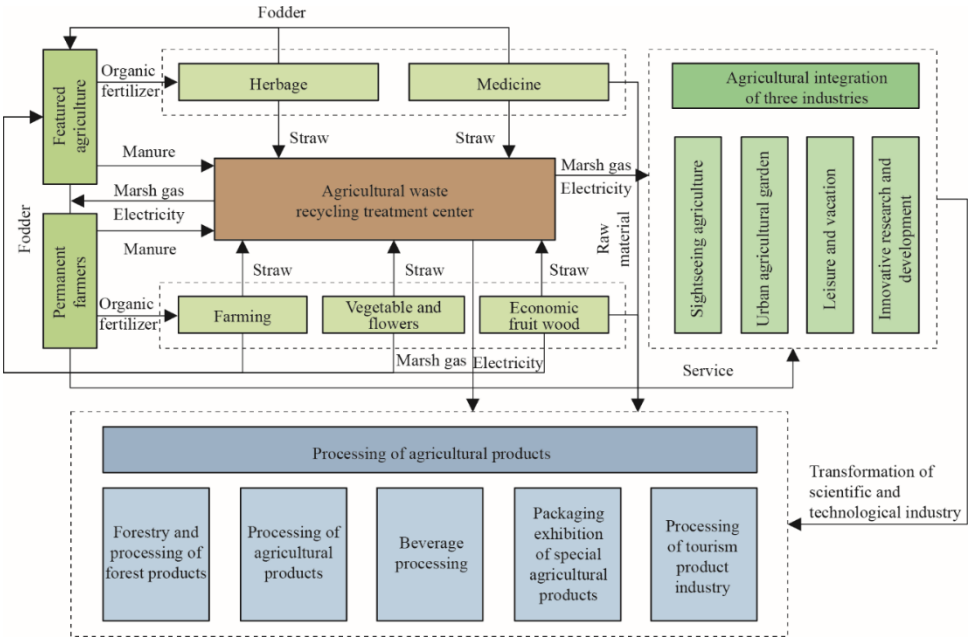

Fig. 5. Circular economy of agriculture, forestry, animal, and medicine in the Qinba Mountain Area.

5.3.2 Replacement of people and space

According to the rural environmental conditions and characteristics, tourism development potential and its own development potential, and population migration (to different degrees) will also cause changes in the rural land structure and spatial development mode [11]. By retaining the original living space to develop high-end leisure products and tourism service facilities, the villagers will be burdened with housing and land rental fees and business dividends. At the same time though, the villagers can participate in the operation and maintenance of these new industries to increase their incomes. In essence, the pressure of ecological protection and restrictions on rural development should be alleviated, and the flow and mutual transformation of resource elements between regions should be strengthened, to optimize the spatial structure of human development and the environment.

5.4 Adjustment of rural residential space

The establishment of the nature reserve system in the Qinba Mountain Area has formed a standardized and efficient management system, which unifies the management of nature reserves, performs the management responsibilities of nature reserves at different levels, implements differentiated management and control, and proposes management and control strategies for the optimization and arrangement of space and facilities from a regional perspective.

5.4.1 Agglomeration and polarization drive

From the perspective of urban–rural overall planning, villages with weak development potential, significant hollowing out, scattered distribution, poor development conditions, and low security, as well as villages relocated in the core area and related areas, will be polarized and further developed within the large villages with good developmental conditions and surrounding market towns, to realize the joint revitalization of replacing the small with the large and supporting weakness with strength.

5.4.2 Facilities optimization and integration improvement

To meet the needs of the transformation of the industrial development mode, based on rural settlement agglomeration development, the public service facilities in rural areas (such as rural tourism facilities, rural pension, and safety facilities) are improved comprehensively in terms of the type and scale of facilities.

6 Construction of development models of villages

Against the background of the construction of a national ecological civilization and the reform of the national park

DOI 10.15302/J-SSCAE-2019.01.010

system, it is inevitable to realize the green transformation of rural development in the Qinba Mountain Area, which will also be a difficult problem to implement in the context of rural revitalization. On the premise of ecological protection, fully considering the regional environment of the village and tapping the potential of industrial development, building a diversified green rural development model is an effective way to realize rural revitalization. With improvements in the ecological environment protection system and the transformation of the economic structure, the homogeneity and singleness of traditional rural spaces will be broken, showing the characteristics of multiple functions and complex spatial subjects [11,12]. The guidance of the development mode should adapt to this trend. Therefore, according to the ecological sensitivity of the region where each village is located, the protection levels of all kinds of nature reserves, topographies, and industrial statuses within the villages of the Qinba Mountain Area can be divided into five types: remote development, high ecology, recreation development, intensive development, and comprehensive development. The village development model shall be matched with its spatial attributes, and differentiated spatial management and control shall be formulated. Guiding measures are proposed from four aspects: space, industry, style, and management. The research presented herein discusses the models of various types of village development from two levels. The macro level focuses on the study of regional land and space attributes and the relationship between settlements. The micro level focuses on the functional optimization and land consolidation of individual villages and their surrounding areas. The basic unit of the rural settlement system is formed by integrating various modes.

6.1 Remote development model: villages within the core area of national parks and nature reserves

The remote development model is suitable for villages within the core area of national parks and nature reserves. Generally, these areas have high altitudes, large topographic relief, extremely sensitive ecology, and the highest level of ecological environment protection. All development, construction, and human activities in the area are strictly prohibited. Therefore, traditional avenues of resource utilization should be limited. The village population should be moved out to a suitable development area, the land should be converted to farmland, and the village should be dissolved gradually. The villages within these ecologically sensitive areas and in ecological network and corridor construction areas will be moved to gently sloping and flat dam areas (Fig. 6).

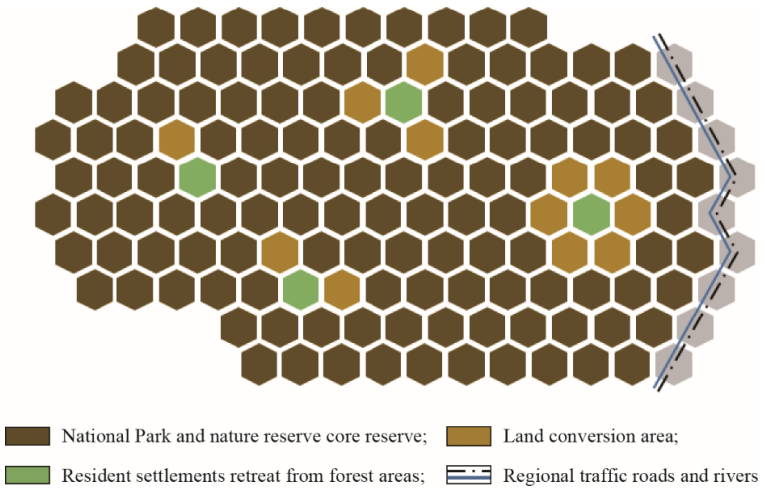

Fig. 6. Rural settlement system of the remote development model.

6.2 High-ecotype model: villages in areas suitable for recreational development in national parks and nature reserves

For the villages within the national park and nature reserve that are suitable for recreational development, part of their residential functions can be retained, but the traditional resource utilization mode of villages should be limited, including the development of agriculture and economic forestry. The village settlement is composed of a central village with certain public service functions, a small number of natural villages, small-scale farmland, economic forest area, and production service points. The settlement lies on a piece of ecological forest land and the natural mountains. While encouraging dispersion in space, it is necessary to strengthen the connection between each village and the nature reserves. The necessary tourism service function should be combined with the traditional settlement as much as

possible (Fig. 7).

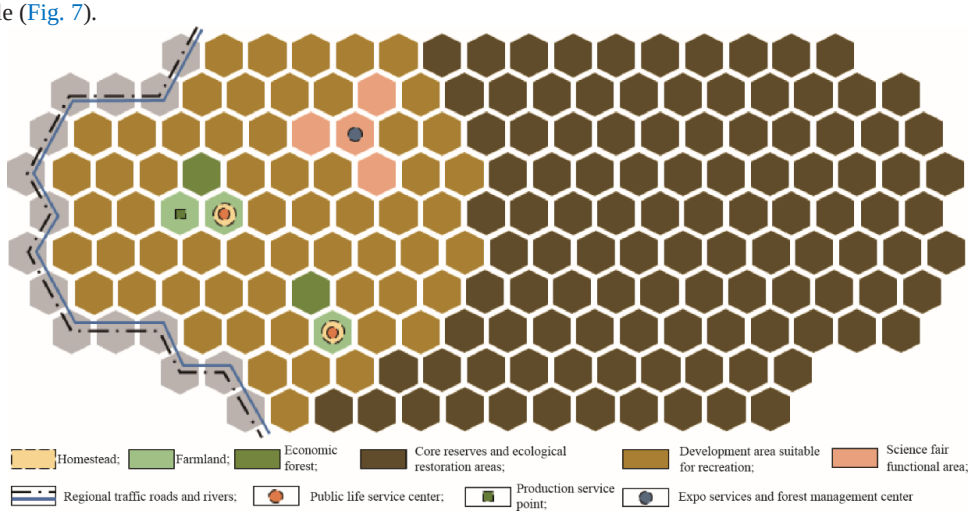

Fig. 7. Rural settlement system of the high-ecotype model.

At the micro level, in terms of space, the original residential areas will be minimized, farmland and economic forest land will be transformed into ecological forest land, and comprehensive service points with species exhibitions and park management functions will be allocated in the tourist area (Fig. 8). In terms of industry, the government should take the lead on forming a service industry focused on maintaining native species and popularizing science through exhibitions, to provide park maintenance for the remaining residents, and to develop the derivative industry of biodiversity protection to replace the traditional resource-consuming industries and build a protective ecological industry system. Regarding the aspect of style, this emphasizes the characteristics of nature and simplicity. The volume, form, and color of buildings should be coordinated with the environment to seamlessly reflect the natural and beautiful overall scenery of the area. In terms of management, we should establish a government-led protective management system and strengthen rigid ecological constraints. For example, the old county seat of Zhouzhi County in the Shaanxi Province is located in the experimental area of the natural reserve in the hinterland of the Qinling Mountains, surrounded by many natural reserves. Its tourism development goals are: (1) in a short term, to maintain the current conditions in the near future, improve the supporting facilities and environmental quality, and build characteristic villages; (2) in the long term, to transform and upgrade, move the entire village, and build an idyllic and pastoral-style deep-mountain seclusion resort and “paradise” in the hinterland of Qinba.

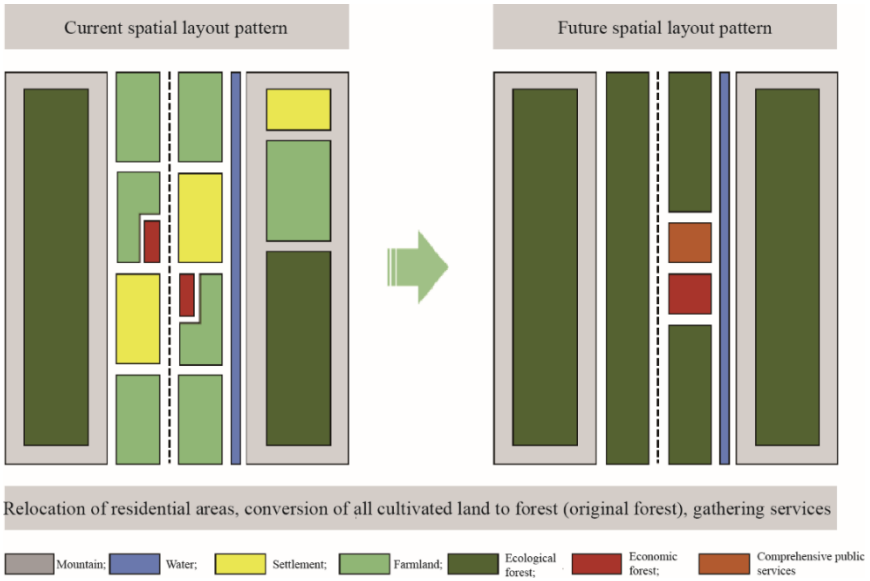

Fig. 8. Rural settlement of the high-ecotype model.

DOI 10.15302/J-SSCAE-2019.01.010

6.3 Recreational development model: villages in or around scenic spots and natural parks

The recreational development model is suitable for scenic spots and natural parks or surrounding villages. The ecological value and importance of the region is high, and its rich landscape and biodiversity resources make it an important tourist destination. In terms of function construction, the villages in or around the area should meet the needs of tourism development as much as possible, reduce agricultural production, undertake certain tourism service functions, restore the image of traditional villages, promote characteristic rural tourism, achieve poverty alleviation and prosperity, and promote the integrated development of villages and scenic spots. The villages within the peripheral ecological control area should implement the conversion of farmland to forest and green spaces, and carry out large-scale restoration and conservation of ecological forest land (Fig. 9).

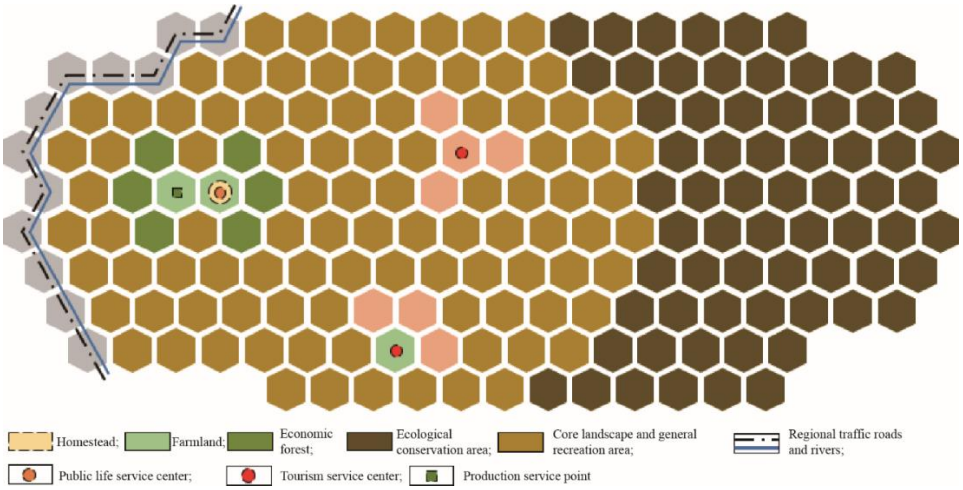

Fig. 9. Rural settlement system of the recreational development model.

Part of the homestead will be converted into tourism service facilities, parts of farmland and economic forests will be reserved and integrated, and existing construction land will be fully utilized and transformed into rural hotels, ecological farms, and leisure parks (Fig. 10). In terms of industry, the appreciation, scale, and experience of traditional agriculture should be enhanced. For the economic forest, people should select tree species with ornamental value and a coordinated style; establish a network of agricultural and forestry products and local exhibition and sales platforms; focus on the development of natural tourism, health vacation, cultural experience, outdoor activities, and other tourism service industries; and build the development mode of the "forest + tourism" ecological industry. In terms of style, people should ensure that architectural form and space shaping are consistent with the cultural themes of scenic spots and natural parks, strengthen the protection of the historical features of ancient villages, and enrich the cultural experience of tourists. In terms of management, people should establish a compatible management system of protection and development, along with government-led management and villagers' autonomy, and strengthen the coordinated development of the ecological environment and tourism industry. For example, Houzhenzi Town, Zhouzhi County, Shaanxi Province, is located in the Heihe National Forest Park. The current planning of the town adheres to the principle of "protection as the basis, control as the leading role, and development as the purpose," integrates land resources, adds tourism service facilities, and combines the advantages of tourism resources to build a characteristic carrier, forming a high-quality tourism destination in the greater Qinling Mountains, integrating vacation and leisure, cultural experience, and scientific exploration.

6.4 Intensive development model: national parks and villages outside nature reserves

At the macro level, the villages outside the national park and nature reserve should be guided by the government to transfer to key towns and central villages with better development conditions, form a chain-like or fishbone-like village settlement system that conforms with the mountain terrain relying on the regional traffic roads and river valleys. In terms of space, the central village (with complete public service facilities) is taken as the core, and numerous small-scale natural villages, small-scale farmland areas, and production points are distributed around it. Through the

transfer of land-use rights, leading agricultural and forestry industry companies will be introduced to carry out land integration and large-scale production, to improve the overall land-use efficiency. People should strengthen the connectivity of village settlements in terms of transportation, information, water supply, drainage, and other infrastructure, explore a circular economy and industrial cooperation mode of resource utilization, transformation, and reuse in mountain areas, including agriculture, forestry, and animal medicine, and form a village settlement system with mountain characteristics (Fig. 11).

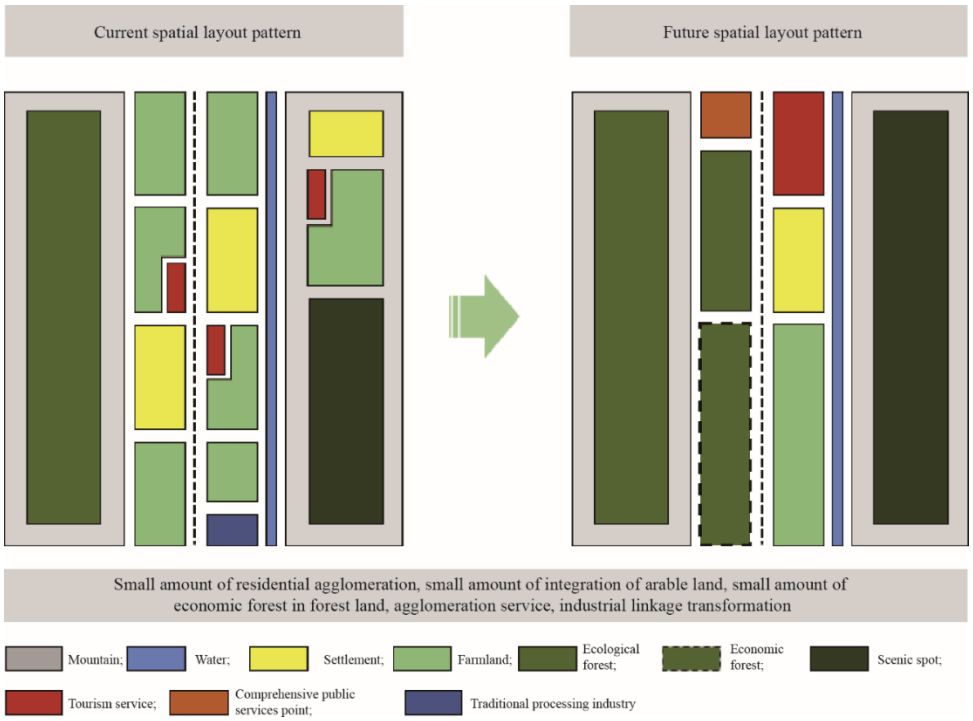

Fig. 10. Rural settlement of the recreational development model.

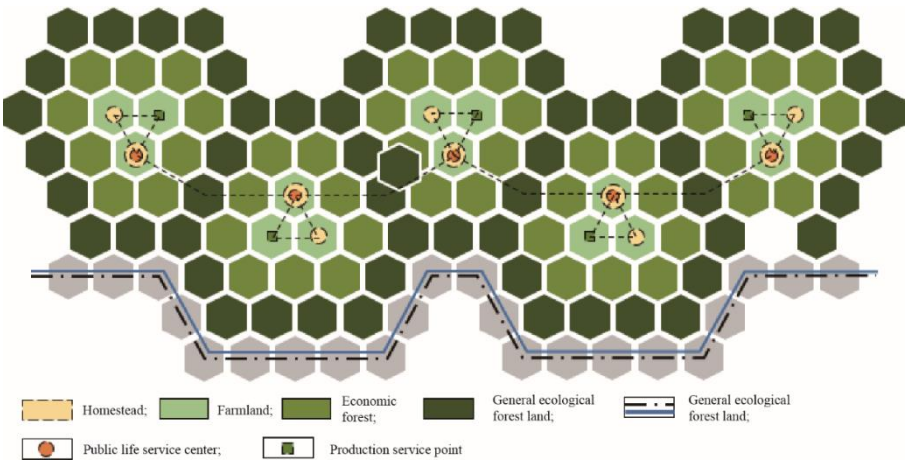

Fig. 11. Rural settlement system of the intensive development model.

At the micro level, in space, the government should encourage the integration and arrangement of agricultural and forestry land through land circulation, carry out large-scale agricultural and forestry production activities, and improve agricultural modernization, as well as actively explore the mode of the agroforestry complex with the integration of residence, vacation, leisure, and production (Fig. 12). In terms of industry, a comprehensive service platform

DOI 10.15302/J-SSCAE-2019.01.010

integrating information services, trade and business travel services, and science and technology promotion should be established by combining new technical means, to strengthen the brand effect of agricultural and forestry products, and form a green circular industry system of "agriculture + forestry + tourism + trade." Regarding the aspect of style, adaptability to the surrounding environment should be highlighted, and a characteristic environment intention space should be constructed in combination with the type of business. In terms of management, combined with its advantages in the development of the green recycling industry, the government should establish an ecological development management system with village autonomy as the main system and the government as the auxiliary system, and improve the chain of the recycling industry. For example, Ningshan County is a key ecological functional area in the Shaanxi Province, as well as a water source for the South-to-North Water Transfer and the diversion of water from Han to Wei, and a national poverty-stricken county. The development direction of villages in the county is based on ecological organic agriculture, supported by multi-field characteristic tourism, which drives the development of ecological sightseeing agriculture, promoting the first industry with the third industry, and advancing coordinated development.

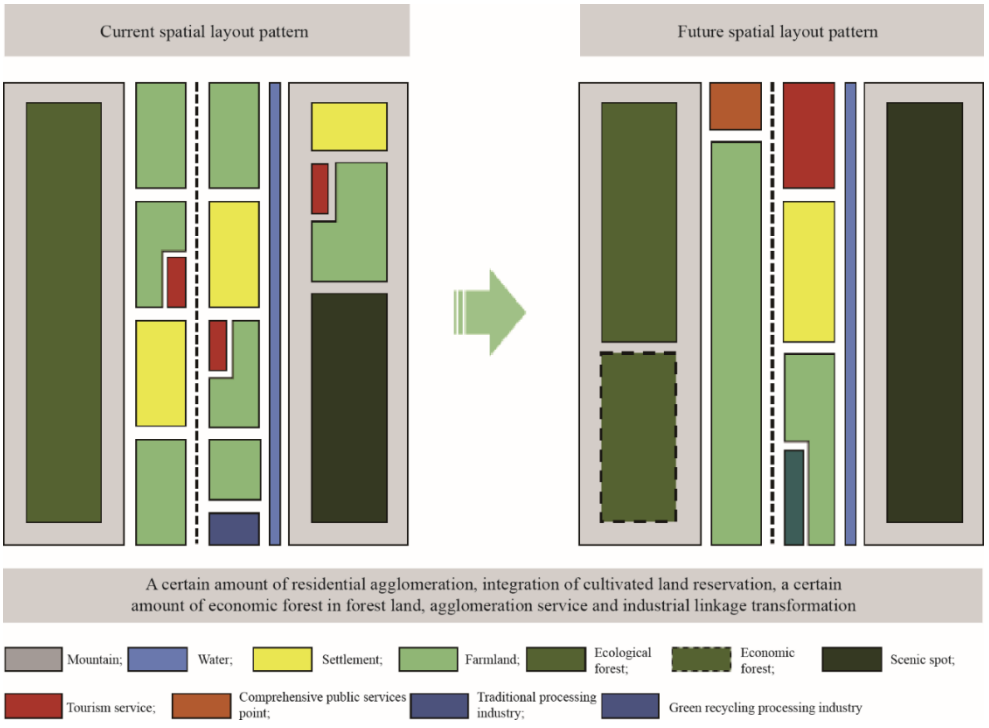

Fig. 12. Rural settlement of the intensive development model.

6.5 Comprehensive development model: villages in flat areas

The comprehensive development model is suitable for villages in general flat areas. This area is located in regions of valleys and plains, where the terrain is relatively gentle, with a sufficient water source, which is more suitable for the development of large-scale comprehensive science- and technology-based agriculture. At the macro level, people should optimize the layout of the village system, relying on the villages with better environmental conditions to form a well-equipped central village that plays a radiation-driven role. The surrounding area should be surrounded by general farmland to form a production unit around the natural village and connect with the central village through convenient transportation, to realize a large-scale green agricultural production space. Additionally, for some villages with convenient transportation and excellent environmental access points, the rural complex of agricultural tourism can be developed in combination with tourism resources to promote the sharing of service facilities and form a network rural settlement space system with an orderly scale, complete facilities, convenient contact, and efficient resources (Fig. 13).

At the micro level, the spatial aspect would focus on the layout and improvement of residential areas and the environment, integrate cultivated land through land circulation to develop modern agriculture, and improve the

infrastructure and environmental facilities inside the village (Fig. 14). In terms of industry, based on large-scale, standardized, and mechanized green scientific and technological agricultural parks, the governmen should extend the industrial chain to establish a high-end informatized trading platform, develop the agricultural cultural innovation industry (by integrating professional markets, folk agricultural parks, and cultural experiences), develop agricultural tourism actively, and build a modern scientific and technological agricultural industry system. In this manner, local, regional, and ecological resources are highlighted as a whole. Some villages with better environmental conditions can combine river water and large-scale sightseeing agricultural landscape resources to create a style intention of "field, water, and residence" integration. In terms of management, combining the advantages of land resources and industrial development, the government should establish a modern and ecological development management system of village autonomy, and strengthen the ecological and scientific development of the industrial system.

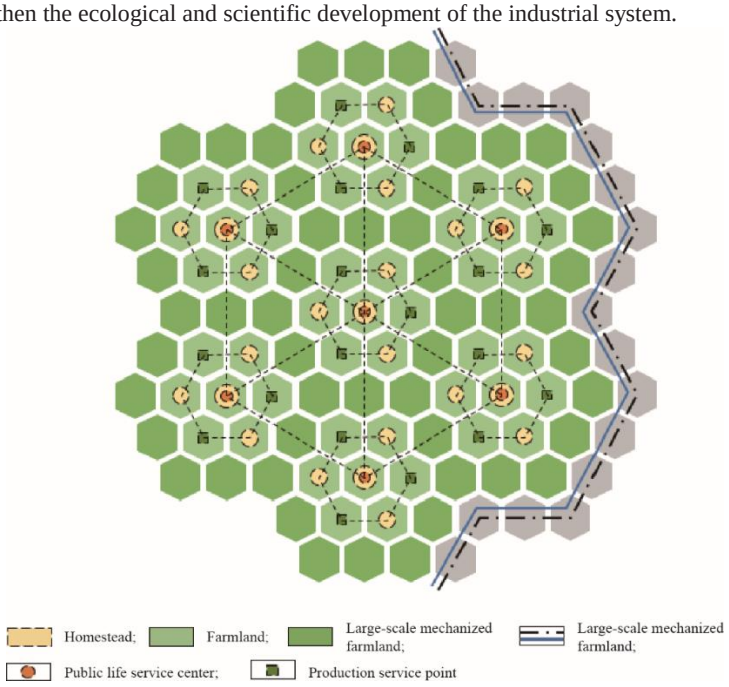

Fig. 13. Rural settlement of the comprehensive development model.

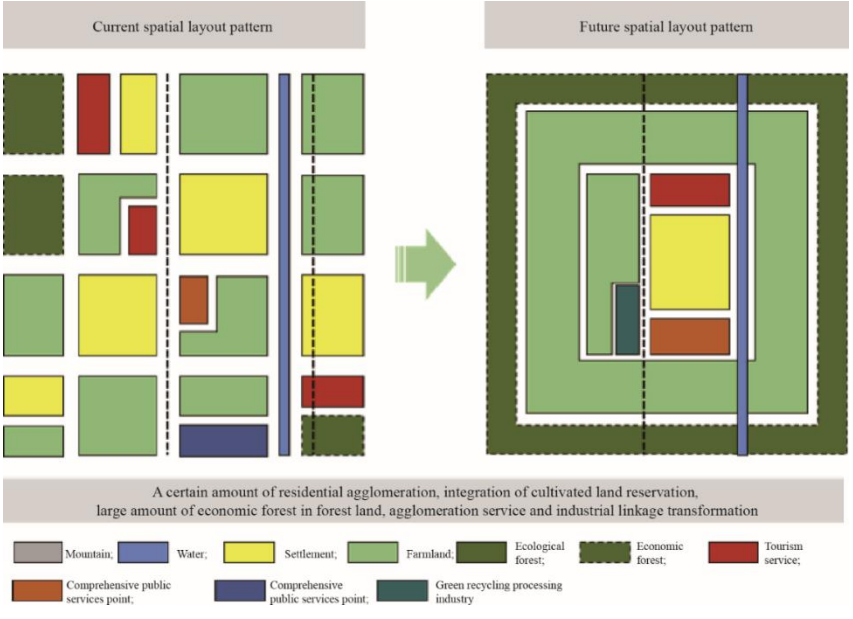

Fig. 14. Rural settlement via the comprehensive development model.

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Finally, under the guidance of a variety of development modes, the village settlements are combined organically in space to form a natural reserve system that conforms to the Qinba Mountain Area with the national park system as its backbone. This will then create a spatial pattern of shared human–environmental land of mountain villages with the surrounding ecosystems and promote regional green circulation and rural revitalization (Table 2 and Fig. 15).

Table 2. Development models of rural revitalization.

Village modes	Applicable area	Construction of macro settlement system	Micro residential construction	Industrial system	Style intention guidance
Remote development model	Within the core area of national park and nature reserve	Population moving out, land conversion to forest	Digestion of original residential and living areas, agricultural and forestry land, transformation of ecological forest land	Protected ecological industry	Strengthen the original ecology and plain features
High-ecotype model	Recreational development area within the scope of national park and nature reserve	Transfer villages in highly sensitive areas, properly retain traditional land functions and industrial types, and form small-scale and decentralized residential areas	Reduce the scale of residential area, reserve a small amount of farmland and economic forest, integrate the tourism service function, and improve the compatibility of facilities	Forest + tourism ecological industry	Coordinate construction form, color, and environment
Recreational development model	Within and around scenic spots and natural parks	Build the functions of agricultural production and tourism service center, control the implementation of conversion of farmland to forest, and restore and conserve ecological forest land	Integrate residential areas and farmland, transform residential areas into tourism service points, and develop rural hotels, ecological farms, and leisure parks by using existing construction	Agriculture + forestry + tourism + trade industry	Close to the theme of regional natural resources and increase interest
Intensive development model	General mountainous area	Form chain- or fishbone-like settlement system, strengthen infrastructure connection and industrial spatial cooperation	Integration of agricultural and forestry land circulation, realization of forestry scale production, development of forest economy and agroforestry complex	Modern technology	Intention of building a diversified industrial environment
Comprehensive development model	General flat area	Integrate cultivated land to build a large-scale and mechanized modern agricultural garden complex, and build a network and unit rural settlement space	The layout and integration of residential areas and the environment should be improved, the construction intensity should be increased appropriately, and the replacement land should be used to support the development of green processing, logistics, and rural tourism	Agricultural industry	Highlight the characteristics of localization, regionalization, and ecology

7 Conclusion

Owing to the significant variabilities in topography, resource availability, and environment, there are huge differences in rural construction between mountain areas and plain areas. To guide local development, people should curate a deep understanding of the characteristics of their regional environment, determine problems and conflict points, and devise a targeted goal. The Qinba Mountain Area has multiple important demonstrative values, such as carrying out the development concept of a national ecological civilization, achieving the development goal of rural poverty alleviation and prosperity, and practicing the development theory of “green water and green mountains are golden mountains and silver mountains.” Under the new national park system, the rural development of the Qinba Mountain Area faces new challenges and opportunities. Focusing on the theme of coordinated development of ecological protection and rural revitalization, this paper analyzes in depth the current characteristics and problems of regional village construction in the Qinba Mountain Area, puts forth a development path of rural revitalization and its differentiated development mode that conforms to the regional characteristics, coordinated protection, and development, and actively explores the “rural revitalization” suitable for this area. The last aspect is achieved through specific

measures such as rural residential space arrangements, rural green industry development, the construction of rural features, and rural service system improvements, so as to be able to effectively coordinate the development relationship between villages and national parks and reserves, and to promote the coordinated and sustainable development of ecological protection, cultural heritage, and rural revitalization in the Qinba Mountain Area.

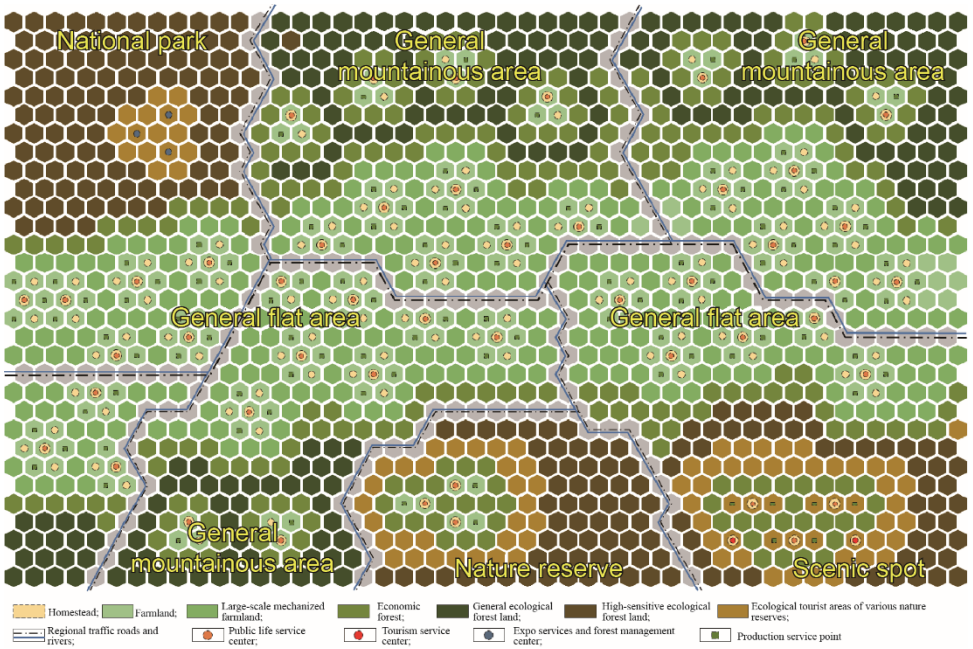

Fig. 15. Rural settlement system of the Qinba Mountain Area.

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