

# Research on Green & Circular Development Strategies for CFMS in the Qinba Mountains

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**Abstract:** There exist severe contradictions between agricultural development and ecology environment. Traditional agricultural production modes are difficult to be changed; in addition, the differentiation and fragmentation of agricultural resources hinder large-scale agricultural management and distribution. Agricultural products are numerous; however, they lack well-known brands and deep processing, diverse marketing channels, and sales platforms. For building a green and circular development system for crop farming, forestry, stock farming, and medicinal materials (CFMS) in the Qinba Mountains, we propose six development strategies. These strategies include improving mountains' ecological red line management and environmental quality; leading in science and education; developing ecological agriculture which depends on the harmonious cycle between crop and stock farming; creating famous brands for agricultural products with local characteristics; developing under-forest economy with local characteristics; and formulating processing and marketing strategies for agricultural products.

**Keywords:** Qinba Mountains; crop farming, forestry, stock farming, and medicinal materials (CFMS); green and circular development; agricultural production

## 1 Introduction

The total arable land of five provinces and one city in the Qinba Mountains is  $3.9183 \times 10^6$  hm<sup>2</sup>, which accounted for 24.22% of the national cultivated land. However, the farmlands in this region are mainly sloping fields, and those with a slope greater than 25° are still considerable [1–7]. Grain production is superior in this region and the crop planting area accounts for 55.6% of the total sowing area, with a grain output of  $3.04111 \times 10^7$  t. Moreover, grain is 468.29 kg per capita, which is higher than the national average (443.46 kg per capita) [1–6]. Although this indicates grain's self-sufficiency, there remains great distinction among different areas, with some areas experiencing a huge gap in grain supply. Therefore, one cannot ignore the grain security

of the Qinba Mountains. Agriculture in the Qinba Mountains has distinct features and great potential advantage. For example, this region contains important producing and distributing center for Chinese medicinal materials in China. The area and the annual output of the artificially cultivated Chinese medicinal materials in the Qinba Mountains are  $4.03 \times 10^5$  hm<sup>2</sup> and 124.14 t, respectively, and they account for 45.09% and 49.54%, respectively, of the five provinces and one city [1–6]. However, the deep processing of the medicinal materials is low. The Qinba Mountains is also a premium pork-producing region in China, with a total output of  $4.3557 \times 10^6$  t [1–6]; nevertheless, the scale of pig breeding in farming households is declining. The forest coverage rate of the region is 43.31%, and the amount of forest carbon sinks is approximately 6.78 gigatons carbon (GTC) each year,

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while releasing oxygen of  $1.063049 \times 10^{12}$  t each year. The annual amount of carbon sinks and oxygen in this region account for 7.04% and 8.66% of the national total, respectively [1–7]. Moreover, the GDP per capita in the region is 24 716 yuan, the per capita total value of output of crop farming, forestry, stock farming, and fishing is 6 370.12 yuan, and disposable income per capita is 7 391.9 yuan [1–6]. The use of chemical fertilizers in this region is as high as  $748.1 \text{ kg} \cdot \text{hm}^{-2}$  each year, which is nearly 1.5 times the national average [1–6]. In addition, pollution problems caused by rural domestic sewage, solid waste, and large-scale livestock breeding sources are widespread. Even worse, pollution is a serious threat to the quality of the region's water supply. Further, the woodlands are of medium quality, farmlands have low productivity, and the Qinba Mountains are prone to soil erosion.

## 2 Problems of agricultural development

### 2.1 Contradiction between agricultural development and ecology environment

A large population is supported by relatively little arable land in the Qinba Mountains. The per capita cultivated land is less than  $666.67 \text{ m}^2$ , and grain supply per capita is relatively less than the national average. Most areas in the region are sloping farmlands, and plow lands with slopes greater than  $25^\circ$  account for 70% of the total sloping lands, which results in high potential risk of soil erosion. Because of the limited cultivated area, the ecological problems, such as disorderly reclamation and deforestation, become more acute. Consequently, diversity in precious medicinal herbs is sharply declining and many species are at risk of extinction. Owing to natural restrictions, the rural economy is generally poor in this region, and the income per capita of most rural areas is far below the national average. Farmer income mainly depends on working as migrant workers. The total exported rural labor is approximately 14.0501 million people, which accounts for 21.63% of the total population of this region, 24.98% of the rural population, and 48.89% of the rural labor force [1–6].

### 2.2 Difficulty in transformation of agricultural production modes

Agriculture in the Qinba Mountains is still in the early stages of modern development and is traditional in nature. Large-scale land operation has seriously hindered modern agricultural technology popularization, resulting in low agricultural efficiency. However, most rural areas lack long-term programming and infrastructures, basic public services are lagging, and household waste, industrial refuse, and water contamination are difficult issues to be tackled. These problems limit further agricultural development in the region. Currently, the overall quality of

cultural and vocational skills of farmers is at a low level, and approximately 80% of laborers have no special technical skills; therefore, the region requires highly qualified agricultural labor force.

### 2.3 Operational scale and layout affected by differentiation and fragmentation in agricultural resources

The differences in the agricultural resources of the Qinba Mountains limit agricultural large-scale operation and development. Meanwhile, due to the segmentation effect of the local terrain, farmland fragmentation is obvious in this region. Therefore, small areas of farmland are a disadvantage for agricultural mechanization and increase manual labor. Moreover, because of overpopulation and less land, quantity in agricultural production is not an advantage in this region. Consequently, the region is agriculturally less competitive than is the flatlands region. Thus, to promote the integration and optimization of agricultural resources, it is important to encourage farmers to work in cities as well as, simultaneously, to accelerate rural land circulation and promote land concentration.

### 2.4 Variety of agricultural products with less well-known brands, deep processing, and economic benefit

The Qinba Mountains abound with various agricultural products, such as Chinese herbal medicines, edible mushrooms, and nuts. These products have high quality and potential market value. However, due to a lack of long-term planning, the markets are almost in disordered competition, agriculture is still underdeveloped, and farm products do not have high benefits. In addition, poor government regulation and lack of brand awareness cause a mix of good and bad products, which further damages consumer recognition and trust. Although some quality local brands exist in the region, the scale of the industry is small and enterprises do not enjoy a strong reputation nationwide. Another factor that greatly limits the industrialization and marketization of agricultural products with local characteristics is that the equipment for deep processing is insufficient, hampered by a lack of professional talent.

### 2.5 Weakness in sales channels and distribution platforms of agricultural products with local characteristics

E-commerce in the Qinba Mountains has developed rapidly; however, it is insufficient for satisfying industrial demands. The e-commerce model for agricultural products was successful, accelerating the supply chain of agricultural products toward urban consumers. For example, e-commerce models have a strong influence on Longnan regions of Gansu Province. The model overcomes the bottlenecks of the high mountains and long distances in the region, and enables the sale of high quality

agricultural products, such as *olea europaea*, pepper, and nuts, across the country. Thus, the advantages of e-commerce models for agricultural products are gradually emerging.

### 3 Objectives and ideas of agricultural development

#### 3.1 Development objectives

With regard to the objectives of agricultural development, first, we should implement the green and circular development concept, pushing the transformation of agricultural production and rural lifestyle in the Qinba Mountains, driven by science and technology innovation, regional coordination, and public participation. Second, we should construct a green and circular agriculture development system to realize the goal of ecological protection, agricultural benefits, and poverty eradication in the region. Third, we should build a new agricultural and ecological civilization, with a beautiful environment, safe ecology, efficient industry, and prosperous country. Finally, we aim to achieve the win-win goals of ecology safety and sustainable development of the green and circular agriculture industry. All of these efforts play a supporting role in establishing a national key ecological function zone in the world-famous Qinba Mountains.

This objective will be achieved in three stages. In the first stage, from 2016 to 2020, we plan to fully implement the concept of green and circular development; enhance the ecological red line management in water resource areas; promote the change of agricultural production mode and rural life-style in Qinba Mountains; build green and circular development system; and achieve ecological protection, improve agricultural benefits, increase farmers' income, and reach well-to-do life level. In the second stage, from 2021 to 2030, through scientific and technological innovation driving and regional coordinated development, we will steadily improve the industrial level of ecological agriculture and forest and the economic level of modern green and circular agriculture in mountain regions, significantly improve the quality and entrepreneurial ability of farmers, and steadily enhance the public participation in ecological protection. After that, we hope to achieve the new situation with beautiful environment, security ecology, high-efficient industry, prosperous rural, and preliminarily form an agricultural ecological civilization in the Qinba Mountains. In the third stage, from 2031 to 2050, we wish to continuously improve and maintain the Chinese agricultural ecological civilization level in the Qinba Mountains through innovative development and wide public participation. In addition, it is necessary for the four industries of agriculture, forestry, animal husbandry, and Chinese medicinal materials to provide basic support for the "win-win" situation between the development of green and circular industry and ecological security. All work will ensure the sustainable development of the national key

ecological functional zones and the glory of the world famous mountains of the Qinba Mountains.

#### 3.2 Development ideas

The development objective is to create a beautiful environment, safe ecology, efficient industry, and prosperous country; its core idea is to shift away from traditional agricultural production modes and rural lifestyles. The methods to improve science and technology innovation and green and circular development are overall planning, ecological prioritization, talent introduction, investment attraction, brand creation, marketing innovation, and industrial-model driving. The work focuses on four distribution tasks: ecological red line management regulations in the headwaters regions, efficient green and circular agriculture in the suburban areas of plain and river flatland areas, under-forest economy with local characteristics in the hilly areas, and the processing and marketing of agricultural products with local characteristics in the mountainous region. Further, it is necessary to construct a green and circular agriculture development system for the Qinba Mountains (Fig. 1) as well as create a new pattern of modern agricultural and ecological civilization in this region.

### 4 Key strategies of CFMS development

#### 4.1 Ecological red-line management and environmental quality improvement

Strict observance of the ecological red line is the baseline for constructing a strategic pattern of ecological security in the Qinba Mountains, is the basic guarantee to achieve the region's sustainable development, and is the basic premise to build the agricultural eco-civilization in this region. The following measures are proposed: establish leading and dominant mechanisms guided by the national non-commercial forests; use legislation, strict law enforcement, and institutionalized monitoring to strengthen the management of the forestation-deforestation red line; define responsibility, obligation, and authority; ensure promotion of woodland efficiency; convert land with greater than 25° slopes into forests, using red line management to forbid reclamation; and re-adjust the agricultural structure to solve the problems of farmers' subsistence and employment of those whose farmlands revert to woodlands. More than 40.21 million people live in the Qinba Mountains, and dwellings are always built along riverbanks. Hence, household sewage and rubbish are often dumped into the river and these pollutants are transported downstream. This has harmful effects on the quality of both the water and reservoir. Therefore, the "kitchen revolution" and "toilet revolution" must ensure that ecology changes for the better and improves rural green and circular development. These revolutions are reformations of the traditional view and life-

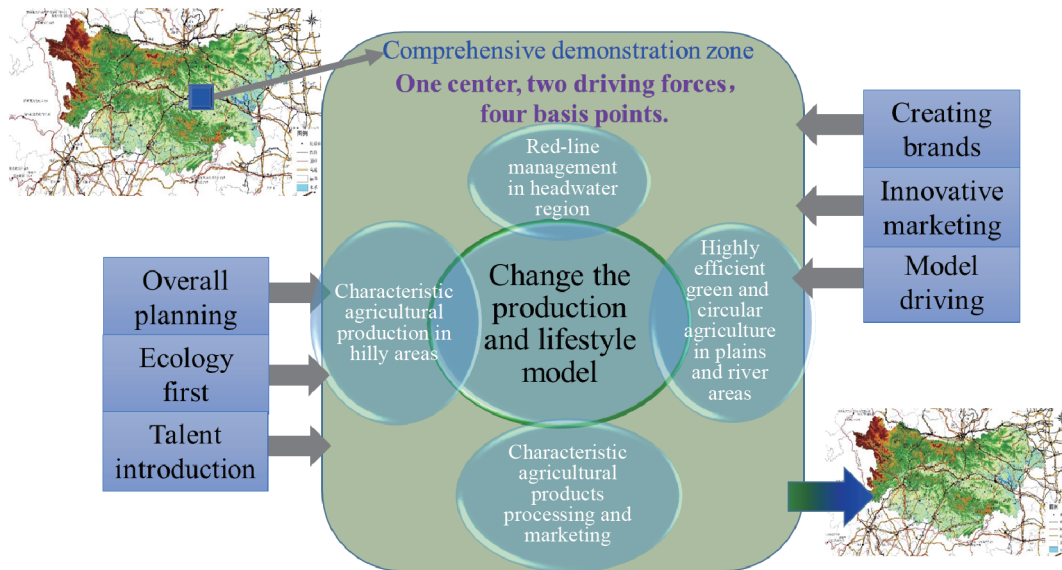


Fig. 1. Strategic framework of green and circular development for CFSM in the Qinba Mountains.

style, and are inevitable for the construction of a rural ecological civilization in the region. We suggest that the overall planning should be combined with the country's new rural construction work, and move forward steadily. As such, within 5 to 10 years, the treatment rate of sewage and human waste would rise from the current 30% to 80%.

#### 4.2 Strategy of science and education

Imparting quality education on green and circular development technologies and environmental law to farmers is also important. This not only benefits environmental awareness, but also imparts knowledge of green and circular technologies to farmers. The strategies of science and education involve: ① establishing a specialized teacher framework and vocational training base for farmers, conducting centralized training on green and circular technologies, and developing practices combined with demonstrations; ② introducing professional talent in science and technology, management, and education, according to the national poverty alleviation and technological assistance programs; ③ solving the shortage of talents and poor individual ability by "going out," and relying on outstanding science and technology institutions to conduct centralized training and cultivate professional talent; ④ developing a comprehensive experiment and demonstration zone, specifically including implementing primary and secondary environmental education, farmer training, environmental management and construction of headwaters regions, efficiently green and circular agriculture in suburbs and river flatland areas, under-forest economy with local characteristics in hilly areas, and the processing and marketing modes of modern agricultural products (the demonstration zone's objec-

tive is to develop both ecological security and green industry); and ⑤ organizing cadres and masses in and outside this region to visit and study in the demonstration zone. All above will play a leading role in science and technology to the Qinba Mountains' green and circular development.

#### 4.3 Creating famous brands for agricultural products with local characteristics

The Qinba Mountains has many cereals, oils and meats with special characteristics of agricultural products, such as fine-quality indica rice, black rice, coarse cereals, potatoes, oilseed rape, tobacco, pork, and chili. The native medicinal materials include *codonopsis pilosula*, *angelica*, *rehmannia*, *astragalus membranaceus*, *fritillaria*, *poria cocos*, *goldthread*, *eucommia ulmoides*, *gastrodia elata*, *radix paeoniae alba*, *chrysanthemum*, *achyranthes bidentate*, *dogwood*, *matrimony vine*, *rheum officinale*, *acanthopanax giraldii harms*, *rhizoma anemones altaicae*, *magnolia officinalis*, *honeysuckle*, and *hippophae*. The forest products with local characteristics include walnut, chestnuts, *sasanqua*, *olea europaea*, *amygdalus pedunculata*, oil-utilized peony, *vernica fordii*, *idesia polycarpa*, apricot, hawthorn, crisp pear, *hovenia acerba*, pomegranate, kiwifruit, cherry, *myrica rubra*, blueberry, tea, Chinese prickly ash, and *illicium verum*. The edible mushrooms in this region include *auricularia auricula-judae*, *tremella fuciformis*, *lentinus edodes*, oyster mushrooms, *flammulina velutipes*, *hericium erinaceus*, and *volvariella volvacea*. In this strategy, we need to make the characteristic agricultural products of the Qinba Mountains as the entry point into creating famous brands, use the unified "Qinba" or "Qinba Mountains" as brand, upgrade the development of the characteristic agriculture overall

in the mountain regions through the driving force of brand effect, and establish high-benefit agricultural production system in the Qinba Mountain region.

#### 4.4 Ecological agriculture development based on virtuous cycle between agriculture and animal husbandry

This strategy will emphatically conduct tasks that focus on the Qinba Mountains' intensive agricultural area in the flatlands and suburbs, such as Dazhou and Guangyuan in Sichuan Province; Sanmenxia, Luoyang, and Pingdingshan in Henan Province; Xiangyang in Hunan Province; and Hanzhong in Shanxi Province. The measures are: planning and designing to achieve balance between crop farming and animal husbandry, as well as collaborative development among ecological agriculture projects, products, and zones; conducting key engineering projects, for example, straw disposal factories, organic fertilizers, and bio-gas production, as well as ecological agriculture parks and characteristic marketplaces (the focus must be on the primary role of leading enterprises and farmer-owned organizations, supported by the role of local government); and, finally, developing a virtuous cycle between agriculture and animal husbandry, steadily improving organic agriculture production, and increasing the quality of agricultural products and agricultural benefits in this region.

#### 4.5 Strategy of under-forest economy

Relying on rich forestry resources, we should develop economic forests with local characteristics through scientific planning, including products such as Chinese prickly-ash, walnut, chestnut, Chinese lacquer tree, eucommia ulmoides, Chinese yew, and olive. Second, we must develop rational distribution of under-forest species, such as Chinese medicinal materials, edible mushrooms, special vegetables, and rare poultries. Finally, choosing suitable areas to develop the ecological protection model of the under-forest economy to achieve organic combination of forest cultivation, utilization, and protection is also important. These measures aim to promote the agriculture and forest industry, and expand the green and circular economy and sustainable development of forests in this region.

#### 4.6 Strategy of agricultural products' processing and marketing

Product processing and marketing guarantees the expansion of the regional green and circular economy and increases farmers' income. The first step is to improve the regional agricultural and forestry products' GMP certification, and adding value through an increase in deep processing. The second step is the processing of primary agricultural products, such as grain, oil, and meat, should be maintained as per current processing

capabilities and adjusted if needed. Third, we should focus on improving the intensive processing capacity of forestry products with local characteristics, such as gynostemma pentaphyllum, Chinese lacquer tree, eucommia ulmoides, Chinese yew, and olive. Fourth, we should attach great importance to improving the large-scale deep processing capacity of Chinese medicinal materials, and focus on environmental pollution caused by wastewater as well as residue discharged during product processing. For instance, the traditional method of acid hydrolysis to extract turmeric saponin produces large amounts of acidic wastewater. This wastewater results in serious water pollution and hinders the sustainable development of turmeric saponin industry. Therefore, improvement is imperative, and we should seek new environmentally friendly technologies to replace traditional methods, for example, developing biological fermentation technology. The fifth step is to construct a terminal market of Chinese medicinal materials. With the reliance on existing medicinal materials markets in Chongqing, Chengdu, Lanzhou, and Yuzhou, we propose building other terminal markets in the hinterland of the Qinba Mountains region, such as Ankang and Longnan, and promoting and developing them into important international hubs. Sixth, we should develop a terminal and trading market for agricultural products with local characteristics in important nodes connecting metropolitan areas. Finally, we should sell these products in combination with the advantages of the Internet and e-commerce, establishing and perfecting products' certification and traceability system.

## 5 Key mission

### 5.1 Crop farming

#### 5.1.1 Returning steep-sloping land to woodland

To ensure the long-term ecology safety in the Qinba Mountains, the problem of returning cropland to a forest range, from 15° to 20°, must be addressed. The task of steep-sloping land conversion cannot be isolated from other projects. It requires close cooperation with farmland's red line management, ecological immigrant projects, and employment. In short, it is necessary to make a scientific plan, cooperate with different departments, and promote the plan.

#### 5.1.2 Water saving and high-efficiency cultivation in flatlands and alluvial flatlands

After returning sloping land to woodland, the total cultivated area in this region will decrease significantly; therefore, it is necessary to obtain grain compensation from the flatlands and alluvial flatlands. The key is to ensure an increase productive efficiency in farmland. The improvement in efficiency is based on the development of agricultural facilities as well as high-efficiency, water-saving irrigation systems. Except for paddy fields in the flatlands, other farmland management should be combined with

the national projects of land consolidation and channel improvement, in order to develop efficient water-saving agriculture. However, there are two preconditions. First, we must comply with the plans of the channel improvement and forbid disorderly felling on either bank of the channel. Second, we must introduce new water-saving irrigation techniques and, if possible, not use flood irrigation. This is to prevent non-point source pollution and maintain water quality. Facility agriculture should mainly develop vegetables, garden crops, edible mushrooms, and other agricultural products, using precision irrigation. Further, we must guarantee the improvement of economic benefits and prevent water pollution.

### 5.1.3 Mountain ecological agriculture

The Qinba Mountains region has a unique advantage in developing mountain ecological agriculture because of its rich ecological resources and green environment, as well as its bright and highly diverse regional characteristics. The first task is to focus on improving the development of ecological agriculture models, for example, the ecological tea garden, under-forest feeding chicken, and livestock-biogas-orchard models. The second task is to use publicity to popularize the ecological agriculture models in the flatlands- and suburban-intensive farming areas. Further, we should use organic fertilizers to develop the organic plantation and ecological breeding industry, thereby to improve product quality and add value.

## 5.2 Forestry

The forest coverage rate of the Qinba Mountains is approximately 43.3%, and forestland is the safety shield for ecological security in this region. Strict observation of the forestland's red line is the baseline for the strategy pattern in developing ecological security, and the basic guarantee for sustainable development. Delimiting the forestland's ecological red line could push local governments into increasing responsibility awareness of ecology protection, making decision scientifically, exercising their power according to law, and guiding the rational distribution of population and economy, thereby keeping the development of the Qinba Mountains in line with resources and environment carrying capacity. In addition, the focus should be on developing advantageous and distinctive economic forests, such as those containing walnuts and chestnuts. Further, the key task in the low mountains and hill areas is to develop under-forest medicinal materials, edible mushrooms, rare poultry, and other under-forest economy products.

## 5.3 Breeding

### 5.3.1 Intensive breeding

Choosing pigs, laying hens, and dairy cows as the primary animals for large-scale breeding can meet the demand of pop-

ulation centers for meat, milk, and eggs. Large-scale rearing of goats is possible in the grass-hill and sloping-land areas, while water-rich regions can develop waterfowl breeding. This will increase the variety of animal products. No matter what the type or scale of breeding, we must analyze markets to define regional demand as well as the pollution capacity of the area.

### 5.3.2 Production of organic fertilizers

At present, the production of organic fertilizers is on a small scale, and enterprises are small and scattered. Overall, these products never have any influence or popularity. Thus, it is necessary to integrate and support a few organic-fertilizer production enterprises in every county (district or city), and manufacture special organic fertilizers that are suitable for local soils and crops. Furthermore, planning is required to solve the environmental problems caused by large-scale breeding. The plans should utilize compensation and incentives policies, comply with agricultural straw-waste abatement measures, and satisfy the demands of ecological agriculture development.

### 5.3.3 under-forest animal breeding

The Qinba Mountains region have abundant forestry resources, which provide unique environmental conditions for under-forest breeding. Breeding under forest is a new way to increase biodiversity, improve the rural economy, and increase farmers' income. At present, Chongqing, Sichuan, and Shaanxi provinces already have some under-forest breeding enterprises and breeding-specialized households. The most common mode of under-forest breeding is raising chickens, which is an important aspect of under-forest economy. Some examples of successful under-forest breeding chickens are Chongqing Chengkoun mountain chicken, Wuxi Daning river chicken, Sichuan Bashan local chicken, Shaanxi Lueyang black-bone chicken, and Hanjiang chicken. Our investigation uncovered two major problems in raising chickens in forests. First, owing to the lack of standard specifications, under-forest breeding is random and difficult to regulate. Second, animals do serious damage to young trees and destroy soil. This results in uneven ground and lack of growth in forest breeding areas. Therefore, relevant ecology protection rules and regulations must guarantee that under-forest breeding is eco-friendly. Moreover, the breeding density and fixed period for grazing should be limited.

### 5.3.4 Aquatic products with local characteristics

Further, the Qinba Mountains region has rich water resources and various fish, such as the brachymystax lenok, which is native to the region. The local population should take comprehensive measures in promoting characteristic and ecological aquaculture, for example, natural fishing, artificial breeding, reproduction, and raising fish in paddy fields. Except in the minority regions and for minimizing the impact on water quality, we do not advocate large-scale and high-density intensive fishing.

## 5.4 Traditional Chinese medicinal materials

### 5.4.1 Strengthen the wild germplasm conservation to sustainably develop the traditional Chinese medicinal materials

The biggest problem in the utilization of traditional Chinese medicinal materials in the Qinba Mountains is that the wild medicinal materials have been decimated. These resources are decreasing and some species, such as *fritillaria taipaiensis*, *conic gymnadenia tuber*, *ginseng leaf*, *aconitum pendulum busch*, *hyperforin perforatum*, and *wild rhizoma coptidis*, are near extinction. Therefore, improving, screening, and breeding germplasm resource bases of the main medicinal materials species in this region is an urgent need. The germplasm resource bases must protect and reproduce primary, endangered, and scarce medicinal materials to guarantee the safety and sustainability of the “natural gene pool” of the Qinba Mountains’ precious medicinal materials.

### 5.4.2 Building the brands of traditional Chinese medicinal materials in Qinba Mountains

The focus must be on the production and brand building of Chinese medicines. We suggest that medicinal material brands concentrate on the region’s characteristic species, such as *eucomia ulmoides*, *rhizoma coptidis*, *fructus aurantii*, *cortex phellodendri*, *cornus officinalis*, *salvia miltiorrhiza*, *radix bupleuri*, *dioscorea opposita*, *radix platycodi*, *radix isatidis*, *radix astragali*, *fritillaria*, *codonopsis pilosula*, *Chinese angelica*, *turmeric*, *gallnut*, *gastrodia elata*, *gallnut*, and *Chinese yew*. This can be done in combination with the construction of a medicinal-material genetic-resource center and reproductive base, or in synchronization with the extension of the planting technology standard.

### 5.4.3 Developing good agricultural practices for traditional Chinese medicinal materials’ planting and processing

In the areas of the Qinba Mountains that are advantageous for herbs, such as south of Shaanxi and Gansu Province, northwest of Hubei Province, and north of Sichuan Province, we should build bases to improve, screen, and breed germplasm resources. In addition, it is necessary to maintain the fine qualities of traditional Chinese medicinal materials, solve the problem of low reproduction rates, and provide safeguards for the standardized production of Chinese medicinal materials in future. Further, it is important to create an optimized layout for herb classification and form technology systems for planting, harvesting, and processing native herbs. Finally, we must establish multiple ecological medicine-industry bases to solve the problems of plant scattering and “small and comprehensive” production.

### 5.4.4 Deep processing medicinal materials

Moreover, the low capacity of herbal deep processing is a

bottleneck for the medicinal materials industry in the region. Currently, the serious problems of the medicinal-materials-processing enterprises are those of low industry concentration, the small scale, and repetitive construction. For example, more than 10 enterprises process diosgenin products in Shaanxi Province; however, there is not a single listed company. Therefore, enterprise combination and project integration are good ways to improve sustainable development in the traditional Chinese medicine industry, making it more high-tech, high-value-added, and high-benefit. This will convert resource advantages into product superiority.

## 6 Conclusion

The Qinba Mountains’ CFMS green and circular development is not only an important choice for the development of agriculture ecology and modernization, but also for the ecological safety of headwater areas and water quality. These development strategies should be based on coordinated development between national and regional factors, and by upgrading the core elements of the agricultural industry, optimizing the production structure, and transforming agricultural management. Only then can we accelerate the green and circular development of the agriculture industry.

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