

# Research on the Current Situation and Countermeasures of Regional Ecological Agriculture Development in Shaanxi Province

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## ABSTRACT

The vigorous development of regional ecological agriculture in Shaanxi Province can effectively solve the problems of resource utilization and environmental protection, promote the adjustment of rural industrial structure and rural revitalization. In order to further promote the development of ecological agriculture in Shaanxi Province, this article focuses on the current situation of regional ecological agriculture development in Shaanxi Province, analyzes the problems existing in the development of regional ecological agriculture in Shaanxi Province, and conducts in-depth analysis from three levels: resource allocation, government supervision, and technological development. It explores the path of sustainable development of ecological agriculture and proposes effective measures to promote the healthy, harmonious, and sustainable development of ecological economy in Shaanxi Province. It also provides ideas and references for the development of ecological agriculture in other regions of China.

## KEYWORDS

Shaanxi Province; Regional ecological agriculture; Development status; Development strategies.

## 1. INTRODUCTION

Under the guidance of the national development strategy, promoting green agricultural development, promoting harmonious coexistence between humans and nature, industrial revitalization, and ecological revitalization are the main contents of rural revitalization. The construction of agricultural ecological civilization has become an important goal for the high-quality development of agriculture. The China Agricultural Sustainable Development Plan (2015-2030) also proposes that developing ecological circular agriculture is a long-term way to enhance agricultural economy, indicating the inseparable relationship between agriculture and ecological environment [1]. With the continuous promotion of ecological civilization construction, the development model of ecological agriculture, as an ecological form of agriculture, is a typical model and important measure to implement the concept of sustainable agricultural development. While improving agricultural production capacity and promoting farmers' income growth, it breaks down the green development barriers of ecological environment pollution [2]. At present, the country attaches great importance to the development of the northwest region. However, the economic development of the northwest region is mainly based on resource-based industry and traditional agriculture. Ecological problems such as water scarcity, land desertification, and ecosystem degradation are prominent, which leads to the mismatch between ecological development and economic development in the northwest region. Therefore, based on the development strategy of "green mountains and clear waters are as valuable as gold and silver", the development of ecological agriculture in the northwest region is imperative [3]. As a major agricultural province and a pioneer in economic development in the northwest region, Shaanxi

Province is facing the dilemma of environmental protection and economic improvement. Embedding agricultural production activities into green ecosystems and forming a virtuous cycle pattern of regional ecological agriculture is a key entry point that meets the dual needs of Shaanxi Province for economic development and ecological protection [4]. Based on this, this article deeply explores the current situation of regional ecological agriculture development in Shaanxi Province, analyzes the necessity of developing regional ecological agriculture in Shaanxi Province from three perspectives: resource allocation, government regulation, and technological development, and proposes countermeasures and suggestions for the problems faced in development.

## **2. CONCEPT DEFINITION**

Ecological agriculture refers to modern agriculture that, based on the principles of ecology and economics, combines modern management experience with modern science and technology on the basis of traditional agricultural experience, while taking into account the triple benefits of social, economic, and ecological benefits of agriculture, ultimately achieving balanced growth in agriculture, economy, and environment. Ecological agriculture emphasizes the maintenance of ecosystem balance, adopts natural ecological cycle processes, and minimizes the pollution and negative impact of agricultural activities on the ecological environment as much as possible [5], further optimization of functionality and structure has also been achieved.

The ecological agriculture model refers to the agricultural management model that links various links into a chain in the agricultural ecosystem and recycles internal materials, achieving the unity of economic and ecological benefits [6]. As a new type of agricultural system and agricultural management model, in the operation process of ecological agriculture model, agricultural management entities organize agricultural production and management according to the laws of ecological economics [7]. At the same time, in the agricultural production process, this model uses ecosystem engineering methods and multi-level material utilization technologies to balance the overall layout of people's lives, ecological functions, and agricultural production within the agricultural region.

## **3. THE NECESSITY OF DEVELOPING ECOLOGICAL AGRICULTURE**

### **3.1. From the perspective of economic sustainability**

Ecological agriculture focuses on the long-term interests of agriculture, ecology, and farmers in terms of sustainable economic development. From the perspective of producers, ecological agriculture emphasizes the production of green, organic, and safe agricultural products, which improves the quality and brand competitiveness of agricultural products, helps to increase the market value and selling price of agricultural products, and increases the income of farmers. According to statistics, the income of farmers in Shaanxi Province increased from 6285 yuan in 2012 to 14745 yuan in 2021, with a growth rate of 134.6%. From a regional perspective, under an environmentally friendly development model, regional ecological agriculture empowers the economic vitality of rural areas through diversified management and ecotourism.

### **3.2. From the perspective of ecological sustainability**

The traditional agricultural model relies on the use of chemical pesticides and fertilizers, which seriously damages water sources, soil, and ecological environment. The development of regional ecological agriculture adopts methods such as natural agriculture and ecological construction, using specific planting schemes such as organic fertilizers and crop rotation to improve the living environment and protect the agricultural ecosystem in rural areas, maintain balance and biodiversity within the ecosystem, and promote sustainable development of the ecological environment [8].

According to statistics, the amount of chemical fertilizers and pesticides used in Shaanxi Province has been decreasing for four consecutive years, with the comprehensive utilization rates of livestock and poultry manure and crop straw reaching 90.6% and 94% respectively, reducing agricultural production costs and promoting a virtuous cycle of soil quality.

### **3.3. From the perspective of social sustainability**

Firstly, the development of ecological agriculture can provide safer and healthier food, meeting people's basic survival needs while also meeting their demand for green food, which is beneficial for improving people's health status and enhancing their quality of life. Secondly, ecological agriculture emphasizes the participation and cooperation of rural communities, promotes communication and mutual assistance among farmers, and enhances the cohesion and stability of rural society. Finally, integrating regional culture into the ecological agriculture model can to some extent enhance people's high-level and spiritual needs, thereby promoting rural revitalization and high-quality development of rural and agricultural areas.

## **4. CURRENT STATUS OF REGIONAL ECOLOGICAL AGRICULTURE DEVELOPMENT IN SHAANXI PROVINCE**

### **4.1. Investment in ecological agriculture construction**

From 2018 to 2022, the total output of agriculture, forestry, animal husbandry, and fishery in Shaanxi Province increased from 323.999 billion yuan to 460.193 billion yuan, an increase of 42.04%. In 2022, the total sowing area of crops in Shaanxi Province was 4.2122 million hectares, an increase of 22900 hectares compared to 2021. From this, it can be seen that in recent years, the planting area of crops and the yield of agriculture, forestry, animal husbandry, and fishery in Shaanxi Province have steadily improved. The development of agriculture in Shaanxi Province has shown a positive trend, laying a solid foundation for the development of regional ecological agriculture in Shaanxi Province. The development of regional ecological agriculture requires a large amount of capital investment, including the construction of ecological agriculture demonstration zones, improvement of farmland environment, and promotion of green agricultural technologies. According to existing data, as of now, the Shaanxi Provincial Development and Reform Commission has secured and arranged about 8.003 billion yuan in various funds related to agriculture, of which 1.485 billion yuan has been allocated for the construction of high standard farmland, the utilization of livestock and poultry manure resources, the treatment of agricultural non-point source pollution, and the demonstration park for integrated development of rural industries. The funds in the field of forestry ecology reached 1.845 billion yuan, mainly used for ecological protection and restoration in key areas, and the funds in the field of water conservancy reached 4.618 billion yuan. From this, it can be seen that Shaanxi Province has sufficient investment in ecological agriculture, providing financial support for the development of regional ecological agriculture.

### **4.2. Current status of regional ecological resources**

Firstly, the current situation of water resources. Shaanxi Province has implemented a five-year action plan for water-saving agriculture, focusing on four major regions, promoting eight models, and building 1.11 million mu of dryland water-saving agriculture. In 2022, the overall water quality of rivers in Shaanxi Province was excellent. Among the 230 national and provincial control sections, the proportion of Class I-III water quality sections was 96.1%, an increase of 4.4 percentage points from the previous year; The proportion of Class IV to Class V water quality sections is 3.9%, a decrease of 3.1 percentage points from the previous year, and the phased elimination of inferior Class V sections is better than the assessment target of 2.7%. Secondly, the current situation of soil governance. In 2022, the effective management of soil erosion in Shaanxi Province covers an area of

90800 square kilometers. The average annual input of sediment from the Yellow River in the Loess Plateau region has been reduced from 800 million tons to 400 million tons. The number of sandstorm days per year in the northern sandy area has been reduced from 66 days to 24 days. In addition, the ecological quality of the Shaanxi section of the Qinling Mountains has been evaluated as "excellent", with an area of 99.3%. The overall soil environment quality in the province remains stable. Thirdly, the current situation of returning farmland to forests. Shaanxi vigorously implements the key forestry ecological project of returning farmland to forests, and the forest coverage rate has increased from 30.92% before returning farmland to 43.06%, which is the period with the largest and fastest growth.

### **4.3. Current status of regional ecological environment scale**

Firstly, the establishment and expansion of ecological agriculture demonstration zones. As of now, Shaanxi Province has established ecological agriculture demonstration zones such as Yangling Demonstration Zone, Yanchuan County Ecological Agriculture Demonstration Zone, and Sanyuan County Potato Industry Demonstration Zone, promoting the development of ecological agriculture in surrounding areas and increasing the number of Shaanxi Province's three products and one standard certified products. Secondly, Shaanxi Province actively and steadily promotes carbon peak and carbon neutrality work. Relying on the Qin Chuang original new driving platform, 63 power generation enterprises in Shaanxi Province have been included in the first batch of performance, participating in the construction of the national carbon emission trading market, with an annual coverage of approximately 172 million tons of carbon dioxide emissions. Thirdly, the emissions of major pollutants in Shaanxi Province continue to decline. From 2021 to 2022, a total of 28900 tons of nitrogen oxides, 15400 tons of volatile organic compounds, 59500 tons of chemical oxygen demand, and 8000 tons of nitrogen have been reduced, fully exceeding the national target for 2022. The advancement of these works not only meets the national demand for ecological development, but also improves the regional ecological agricultural environment in Shaanxi Province.

## **5. PROBLEMS IN THE DEVELOPMENT OF REGIONAL ECOLOGICAL AGRICULTURE IN SHAANXI PROVINCE**

### **5.1. Improper allocation of regional ecological resources**

One is the issue of regional development imbalance. There are significant differences in the development level among different cities in Shaanxi Province. Cities such as Xi'an and Baoji have relatively fast economic development, while cities like Shangluo and Ankang have relatively low development levels. This leads to uneven distribution and development of resources, resulting in regional ecological resource coordination problems. The second is the uneven distribution of water resources caused by location factors. Tongchuan, Yan'an, Yulin and other regions are facing water resource shortages, and many areas also face problems such as excessive high water consumption industries and improper water resource management, leading to waste and unreasonable utilization of water resources. Thirdly, the regional ecological agriculture in Shaanxi Province has not effectively coordinated and coordinated the advantageous resources of various regions, resulting in improper resource allocation, low utilization rate of regional ecological resources, and weak ecological recycling. Among them, due to the accelerated urbanization process, farmland in Xi'an has been converted to urban construction, resulting in insufficient farmland area and inability to efficiently use land resources; Some farmland in Baoji City is facing the risk of desertification, and problems such as land degradation and soil erosion have reduced agricultural productivity and low resource utilization rate; In some areas of Xianyang City, the pursuit of high-yield and efficient agricultural methods has led to excessive use of chemical substances, resulting in safety issues for agricultural products and damage to the agricultural ecological environment. The amplification advantage of resources has not been reflected, resulting in resource waste to a certain extent.

## **5.2. Inadequate regulatory performance by government departments**

In some areas of Shaanxi Province, there is a phenomenon of arranging a large number of farmland occupation and compensation balance projects in violation of natural laws. For example, in 2018, Yulin City destroyed forests and cultivated 133000 acres, exacerbating forest degradation and land desertification. In 2020, the cultivation of arable land in Jingbian County led to a sharp increase in agricultural irrigation water usage, resulting in over extraction of 35.78 million cubic meters of groundwater. One of the main reasons for the repeated occurrence of environmental pollution problems is the inadequate performance of various government departments in protecting the ecological agriculture environment. In addition, the water conservancy department in Shaanxi Province has been slow in promoting watershed planning and has not strictly supervised illegal water intake. More than 30000 water intakes in the province have not been included in supervision. The housing and urban-rural development department has failed to supervise the upgrading and renovation of urban sewage treatment plants, and 27 sewage treatment plants are unable to stably meet the discharge standards. If the regulatory issues of government departments accumulate for a long time, they will directly affect and threaten the ecological agriculture construction work in various regions.

## **5.3. Backward development of green innovation technology**

Energy consumption in Shaanxi Province is in a stage of significant growth. In the process of energy consumption, Shaanxi Province has encountered problems such as low unit energy consumption output value, serious energy waste, and ecological environment pollution that affect sustainable development. The first reason for these problems is that the overall industrial structure of the high-tech industry in Shaanxi Province is relatively single, lacking diversified development, resulting in a weak driving role of the high-tech industry. Secondly, the independent innovation capability of green innovation technology is relatively insufficient, and the phenomenon of core technology and low-carbon equipment relying on imports is more serious, resulting in a lack of motivation for ecological agriculture transformation. Thirdly, there is a serious phenomenon of regional division of scientific and technological forces in Shaanxi Province, making it difficult for scientific and technological forces to form a joint force and integrating technological advantages to effectively play a role.

# **6. DISCUSSION AND CONCLUSION**

## **6.1. Development Strategies for Regional Ecological Agriculture in Shaanxi Province**

Firstly, rational allocation of regional ecological resources. The essence of the development of regional ecological agriculture is to effectively utilize more resources according to existing conditions and local conditions, in order to comprehensively play a role in promoting the development of regional ecological agriculture. One is to pay attention to the coordination of agricultural ecological development in various regions of Shaanxi Province, strengthen regional exchanges and cooperation, narrow the differences in development levels between regions, actively resolve imbalances, narrow regional development differences, and promote high-quality coordinated development of agriculture. The second is to play a leading role as a model for high-level regions. For example, Xi'an should actively utilize exchange platforms and cooperation mechanisms to share development experiences, effectively promote the flow of advanced agricultural production concepts, technologies, and factors among various ecological regions, and achieve high-quality coordinated development of agriculture with strong driving weak. The third is to identify the shortcomings of low-level regional development, develop regional ecological agriculture development models that are in line with their own characteristics, and continuously improve the high-quality development of ecological agriculture.

Secondly, increase the supervision of government departments. On the one hand, in policy formulation, new concepts and methods should be used to promote the development of regional ecological agriculture. Through propaganda and education activities such as farmer training and demonstration project construction, the ecological awareness and technical level of farmers should be improved, and the transformation of the concept of ecological sustainable development should be fundamentally promoted, playing a supervisory role at the basic level. On the other hand, strengthen government guidance and support. Actively promote organic agriculture and green planting models, pay attention to the restoration and protection of farmland ecology, and improve the efficiency of ecological resource utilization and the ability to prevent soil erosion through agricultural water conservancy engineering construction, soil and water conservation measures, and scientific and reasonable supervision by departments at all levels.

Thirdly, promote the development of green innovative technologies. One is to attach importance to agricultural technological innovation, strengthen the construction of agricultural research institutes and agricultural technology promotion systems, and improve the efficiency and level of agricultural production by introducing advanced agricultural technology and equipment. The second is to promote green technology innovation in ecological agriculture construction. Increase the formation of leading talents and research teams in regional ecological agriculture construction, strengthen research and promotion of ecological agriculture technology, variety improvement, and promote the application of new technologies in ecological agriculture [9]. The third is to introduce incentive mechanisms. Priority government funding support will be given to independently developed innovative agricultural technology projects, and recognition and financial rewards will be given to enterprises and individuals who have made significant contributions.

## 6.2. Conclusion

Ecological environment protection benefits the country and the people. Shaanxi Province is a key area for national ecological construction. Under the framework of high-quality development of regional ecological agriculture, in order to achieve sustainable development of regional ecological agriculture in Shaanxi Province, this article elaborates on the current development status of regional ecological agriculture in Shaanxi Province. After analyzing the problems in the development of regional ecological agriculture in Shaanxi Province, suggestions are proposed to improve the development of regional ecological agriculture in Shaanxi Province from three levels: resource allocation, government regulation, and technological development. The aim is to establish a sustainable development model for regional ecological agriculture in Shaanxi Province, adhere to the coordinated progress of environmental protection and economy, and ensure the healthy development of regional ecological agriculture in Shaanxi Province.

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