

# Reflection on the Construction of High Standard Farmland under the Background of Rural Revitalization

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## Abstract

Under the background of the rural revitalization strategy, the construction of high standard farmland, as a core link in the development of modern agriculture, is gradually receiving widespread attention from all sectors of society. High standard farmland can not only improve agricultural production efficiency and land output rate, but also play an important role in food security, environmental protection, and rural economic development. However, the current construction of high standard farmland still faces challenges in various aspects such as technology, funding, and management. Through the analysis of the current situation of high standard farmland construction, it is found that existing technological means and management models have improved the quality of farmland to a certain extent. However, in order to achieve the goal of rural revitalization, further policy support and the application of innovative technologies need to be strengthened. In the future, the construction of high standard farmland should focus on improving irrigation facilities, promoting precision agriculture technology, and exploring efficient resource utilization. At the same time, it should promote farmer participation and technical training to ensure the sustainable development of farmland construction. This article aims to provide scientific basis and policy recommendations for promoting rural revitalization by comprehensively analyzing the current situation, challenges, and future development directions of high standard farmland construction.

## Keywords

Rural revitalization High standard farmland; Construction conditions.

## 1. Introduction

The rural revitalization strategy is an important measure for China to address the issue of imbalanced urban-rural development, aiming to achieve comprehensive revitalization of rural economy, society, and culture by promoting modernization of agriculture and rural areas. In this context, the construction of high standard farmland, as a fundamental project for the development of modern agriculture, has become increasingly important. High standard farmland can not only improve agricultural production efficiency and increase grain yield, but also improve the agricultural ecological environment and promote sustainable development of rural economy. High standard farmland construction is not just a simple land improvement project, but also covers multiple aspects such as soil improvement, irrigation and drainage, field road construction, and farmland ecological environment protection. By applying advanced agricultural technology and management models, the construction of high standard farmland can achieve intensive, standardized, and efficient management of farmland, providing a solid foundation for agricultural modernization. However, the construction of high standard farmland still faces many challenges in practice, such as insufficient technology promotion, insufficient funding investment, and imperfect management mechanisms. Therefore, in-depth exploration of the current situation and problems of high standard farmland construction, and proposing practical and feasible solutions, have important practical significance and theoretical value for promoting rural revitalization.

## 2. Current situation analysis

The quality of farmland and the current status of agricultural production in China have undergone significant changes in the past few decades. However, due to the combined effects of natural and human factors, there are still overall imbalances and limitations in the quality of farmland. Traditional agricultural production methods rely on a large amount of fertilizer and pesticide inputs, which, while increasing yield in the short term, also bring about problems such as soil degradation, water resource waste, and environmental pollution. Severe salinization, acidification, and compaction of farmland in some areas have led to a decrease in soil fertility, directly affecting the sustainability of agricultural production. The lagging construction of agricultural infrastructure and incomplete irrigation and drainage systems further limit the production potential and risk resistance of farmland. In this context, improving the quality of farmland and improving agricultural production conditions has become an urgent need to achieve agricultural modernization and rural revitalization.

The existing high standard farmland construction achievements indicate that through scientific planning and management, the production efficiency and ecological benefits of farmland can be significantly improved. In recent years, various regions have actively promoted high standard farmland construction projects, adopted advanced farming techniques and modern farmland infrastructure, and achieved significant results. For example, in some areas, measures such as land leveling, soil improvement, and efficient irrigation have significantly improved the output capacity of farmland. Some demonstration areas have achieved a significant increase in grain production per unit area, while reducing the use of fertilizers and pesticides, improving the quality and safety of agricultural products. In the process of constructing high standard farmland, the application of modern agricultural technologies, such as precision agriculture, intelligent irrigation, and drone plant protection, not only improves production efficiency but also reduces negative impacts on the environment.

Specific case studies show that the construction of high standard farmland also faces some challenges and problems in practical operation. For example, in some areas, due to the lack of scientific planning and reasonable management, there have been phenomena such as redundant construction, resource waste, and ecological damage during the construction process. In some high standard farmland construction projects, although the quality of farmland has been improved in the short term, the effect has not been maintained in the long term due to inadequate management and maintenance in the later stage. In addition, there are still shortcomings in technology promotion and farmer participation, and some farmers have a low acceptance of new technologies, which affects the promotion and application of high standard farmland construction. Insufficient funding and inadequate policy support are also important factors restricting the construction of high standard farmland. Nevertheless, these cases also provide valuable experience and lessons for the future construction of high standard farmland, clarifying the directions that need to be improved and strengthened.

## 3. Challenges and Issues

### 3.1. Technical aspects

Although modern agricultural technologies such as precision agriculture, intelligent irrigation, and drone plant protection have achieved significant results in some areas, there are still many difficulties in promoting and popularizing these technologies. Some farmers have a low acceptance of new technologies and insufficient understanding and application ability of modern agricultural technologies, which affects the effectiveness of technology promotion. In addition, the inadequacy of the technical service system is also an important issue, as some regions lack professional technical service teams, resulting in the inability of technology to be effectively applied to actual production. For example, although soil improvement techniques and efficient irrigation systems in some regions can theoretically significantly improve agricultural production capacity, their practical application

effects are not ideal due to the lack of professional technical guidance, which not only wastes resources but also undermines the enthusiasm of farmers.

### **3.2. Lack of financial resources**

The construction of high standard farmland requires a large amount of capital investment, which is used for land improvement, infrastructure construction, technology introduction, and other aspects. However, in many rural areas, the economic foundation is relatively weak, the income of farmers is limited, and the financial capacity of local governments is also limited, leading to funding issues becoming a bottleneck that restricts the construction of high standard farmland. Although the national and local governments have provided certain policy support, there is a lag and insufficient phenomenon in fund allocation in actual operation, which cannot meet the needs of comprehensively promoting the construction of high standard farmland. In addition, the low participation of social capital has also exacerbated the problem of funding shortages. Some potential social investors hold a wait-and-see attitude towards agricultural projects due to their long investment return cycle and high risks, further limiting the expansion of funding channels. This financial pressure not only affects the construction progress of high standard farmland, but also poses significant challenges for later maintenance and management.

### **3.3. Farmland environmental protection and sustainable development**

The impact of traditional agricultural production methods on the environment still exists. The high-intensity use of fertilizers and pesticides not only pollutes soil and water sources, but also causes damage to agricultural ecosystems. The construction of high standard farmland not only requires improving agricultural production efficiency, but also emphasizes the protection of agricultural ecological environment to ensure the sustainable development of agriculture. Environmental protection in farmland requires comprehensive consideration of soil quality, water resource utilization, and ecosystem health. For example, in the process of soil improvement, it is necessary to choose improvement methods that are suitable for the local soil and climate conditions, and avoid blindly using chemical improvement measures. At the same time, in terms of water resource management, it is necessary to promote efficient water-saving irrigation technologies, reduce excessive groundwater exploitation and water resource waste. In addition, the development of ecological agriculture and circular agriculture is also an important way to achieve sustainable development of farmland. By promoting measures such as organic agriculture, straw returning, and comprehensive utilization of agricultural waste, the negative impact of agricultural production on the environment can be effectively reduced, and the virtuous cycle of farmland ecosystem can be promoted.

## **4. Key Technologies and Innovation**

### **4.1. Agricultural water conservancy facility technology**

Efficient water-saving irrigation technologies, such as drip irrigation, sprinkler irrigation, and micro sprinkler irrigation, can not only significantly reduce water resource waste, but also improve water utilization efficiency, ensuring that crops receive sufficient water supply during their optimal growth period. These technologies have shown significant advantages in practice, for example, through drip irrigation technology, water can be directly transported to the roots of crops, reducing evaporation and leakage losses, and significantly improving the utilization rate of irrigation water. In the arid and semi-arid areas of the north, advanced water conservancy facilities and technologies can effectively address the problem of water resource shortage and ensure stable production of farmland. In addition, the promotion of smart water conservancy systems combines IoT technology with traditional water conservancy projects, achieving precise irrigation regulation through real-time monitoring of soil moisture, rainfall, and groundwater level, further enhancing the scientific and effective management of agricultural water resources. Through the comprehensive application of these technologies, not only can the problem of agricultural water use be effectively solved, but also to some extent, the

dependence of agricultural production on water resources can be alleviated, and the sustainable development of agriculture can be promoted.

#### **4.2. Precision Agriculture and Intelligent Planting Technology**

Precision agriculture utilizes satellite positioning systems, remote sensing technology, and geographic information systems to accurately monitor and manage soil, water, nutrients, and other aspects of farmland, ensuring the accuracy and effectiveness of agricultural inputs. For example, precision fertilization technology can tailor fertilization plans based on soil fertility and crop growth needs, which can improve fertilizer utilization efficiency and reduce environmental pollution caused by excessive use of fertilizers. Intelligent planting technology achieves intelligent management of the entire agricultural production process through means such as the Internet of Things, big data, and artificial intelligence. From sowing, irrigation, fertilization to pest control, every step can be monitored and regulated through intelligent devices and systems. For example, unmanned aerial vehicle (UAV) plant protection technology has been widely applied in field management. By efficiently spraying pesticides, it can not only improve the prevention and control effect, but also reduce the use of pesticides and reduce the risk of environmental pollution. The application of these technologies not only improves agricultural production efficiency and product quality, but also provides a new path for the transformation and upgrading of agricultural production methods, promoting the transition from traditional agriculture to modern agriculture.

#### **4.3. Efficient utilization of resources and agricultural ecological construction technology**

The sustainable development of farmland cannot be separated from the efficient utilization of resources and the protection of the ecological environment. Circular agriculture is an effective resource utilization model that achieves the resource utilization of agricultural waste through technologies such as straw returning, livestock manure treatment, and biogas power generation. It not only improves soil fertility but also reduces environmental pollution. For example, straw returning technology involves crushing crop straw and directly returning it to the field, increasing soil organic matter content, improving soil structure, and enhancing soil water and fertilizer retention capacity. The technology of agricultural ecological construction focuses on maintaining and restoring the health of agricultural ecosystems. By planting green manure crops, constructing ecological isolation zones, and implementing biodiversity protection measures, a good agricultural ecological environment is created. For example, planting green manure crops can not only increase soil organic matter, but also improve soil microbial communities and enhance soil fertility. In addition, building ecological isolation zones such as farmland protective forests and wetlands can help prevent wind and sand, regulate microclimate, and protect biodiversity. The application of these technologies has promoted the coordinated development of agricultural production and ecological environment protection, and achieved the ecological and social benefits of high standard farmland construction.

### **5. Future development direction**

In the future, the construction of high standard farmland needs to focus more on technological innovation and optimization of management models while continuing to improve the level of infrastructure. The government needs to strengthen top-level design, formulate scientific long-term plans, and clarify the goals and tasks of high standard farmland construction. Through policy guidance and financial support, encourage agricultural enterprises and social capital to participate in the construction of high standard farmland, and promote the modernization and upgrading of farmland infrastructure. For example, introducing smart agricultural technology to achieve precise management of agricultural production processes, improving agricultural production efficiency and resource utilization efficiency. In addition, it is necessary to strengthen the protection of the ecological environment of farmland, promote ecological restoration and environmental governance

of farmland through the implementation of green development policies, and ensure the coordinated development of agricultural production and ecological environment.

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