

# **Agricultural Facilities Construction for Accelerating Agricultural Modernization and Development**

**Wei Sun**

Yantai Research Institute of China Agricultural University, 2006 Binhai Zhong Lu, High-tech Zone, Yantai, Shandong

784171286@qq.com

**Keywords:** Agriculture, Facility construction, Modernization, Development strategy.

**Abstract:** Agricultural facilities construction is the basic requirement of agricultural modernization construction and the basic guarantee of sustainable agricultural development. With the study of modern agriculture, the limitations of original agricultural infrastructure are gradually exposed, with the practical problems of agricultural infrastructure construction reform in agricultural development. This work mainly discussed the problems of agricultural infrastructure construction, and proposed how to bring about the rapid and high-quality development of modern agriculture through the deepening and optimization of agricultural facilities construction. In the work, the current deficiencies of agricultural facilities construction was observed, and then the possible facility construction paths in the facility construction were proposed, striving to provide corresponding guidance and reference for the modernization and development of agriculture. This work would be of contribution to creating a new situation of modern agricultural development through the perfect construction of agricultural facilities.

## **1. Introduction**

China is a typical agricultural country, and the development of agriculture largely determines the degree of social development and the people's life satisfaction. For agricultural development, the construction of infrastructure is the main influencing factor. Also, the delay of agricultural production development caused by insufficient facilities construction also always reminds us that at any time, we should focus on infrastructure construction, and the optimization of infrastructure brings a solid foundation of agricultural development with the construction of infrastructure [1]. In China's agricultural development, there is the imbalance of regional development and the lag of information construction, which leads to the lack of support and motivation of agricultural modernization and heavy resistance in the development. Therefore, the thinking and exploration of agricultural facilities construction is of positive significance to guide the modernization and development of agriculture.

## **2. Main Problems in the Construction of Agricultural Facilities**

### **2.1 Agricultural water conservancy and transportation lacks a long-term management and protection mechanism**

From 2009 to 2020, China's effective irrigation area and water-saving irrigation area gradually expanded, and the length of highways and railways continued to grow. The proportion of effective irrigation area in water-saving irrigation area increased from 43.5% in 2009 to about 54% in 2020. The proportion of high-speed grade roads in total highway mileage and the proportion of national railway electrification mileage in total railway mileage increased from 1.7% and 42.1% in 2009 to 2.9% and 69.9% in 2020 respectively. The maintenance and management of agricultural infrastructure plays an extremely significant role in its efficiency. Some studies have shown that about 60% of the world's infrastructure needs to be maintained in order to ensure its normal

operation. However, irrigation and water conservancy facilities and transportation facilities in rural areas of China are "heavy on construction and light on management", and even "built by people but not managed by others" [2]. On the one hand, local officials tend to pay more attention to the "visible" rural infrastructure construction in order to highlight their political achievements, while the "invisible" follow-up management is neglected. On the other hand, there is no clear management department and professional maintenance team to maintain rural infrastructure. This gradually causes serious damage and aging of water conservancy facilities, and shortens their service life. Many road sections can not be repaired due to long-term damage, resulting in road collapse and affecting the normal use of the road.

## **2.2 The development of agricultural mechanization is unbalanced and inadequate**

The development of modern agriculture is inseparable from agricultural mechanization, and China's agricultural mechanization is developing from extensive to intensive. In recent years, the total power of agricultural machinery in China has decreased slightly. The comprehensive mechanization rate of the main crops' cultivation income increased from 49.1% in 2009 to 70% in 2020, with a significant increase in agricultural mechanization rate. Taking China's agricultural mechanization rate in 2020 as an example, the comprehensive mechanization rate of wheat, corn and rice is 69%. The mechanization rate of livestock and poultry breeding industry is 35%. Among them, the mechanization rate of chicken breeding is 40%, and that of pig breeding is 30%, and that of beef cattle and waterfowl is generally lower than 30%. The mechanization rate of facility agriculture is only 31% - 33%. It can be seen that although the level of agricultural mechanization in China continues to improve, the overall development of agricultural mechanization is unbalanced.

## **2.3 Rural information network infrastructure construction is weak**

In recent years, China has made initial progress in building digital villages. 4G coverage in administrative villages has exceeded 98%, and Internet penetration in rural areas has increased significantly. Compared with 2010, the number of rural broadband users in 2020 will increase by 4.4 times, and the proportion of rural broadband users in China will increase from 19.6% to 30%. Rural information network infrastructure construction is not only the essential element of rural revitalization strategy, but also the channel of rural culture construction, and the new vitality of rural residents' life [3]. Among them, the e-commerce platform can not only supply agricultural products to the domestic market, increase farmers' income and improve agricultural efficiency, but also meet the diversified consumption of farmers. "Research on network promoting rural consumption" points out that rural logistics infrastructure is still imperfect. Expressway construction in towns and villages needs to be strengthened, and the last mile of express delivery is still a challenge. On the other hand, the rural market order is not standardized enough, and fake and shoddy products and false propaganda appear frequently.

# **3. The Optimization Strategy of Agricultural Facility Construction**

## **3.1 Gradually increasing the popularization and application of new technology and equipment**

Most plastic greenhouses and solar greenhouses have low application level of new technology and equipment, high labor intensity, and low level of mechanization and intelligence. It is suggested that colleges and universities and relevant innovative enterprises should be encouraged and supported to carry out technological innovation research and comprehensive supporting technology demonstration and application research and development from facilities structure, materials, energy, biotechnology, information technology, breeding, new machinery, cultivation, etc. The machinery and equipment needed for facility agriculture will be fully included in the agricultural machinery subsidies. The main body of facility agriculture should be trained in the use of technology to inject development momentum. Support should be given to upgrading old and aging agricultural facilities. Currently, many materials and technologies used in plastic greenhouses and solar greenhouses in Beijing suburbs can not meet the needs of energy saving and intelligence. It is generally reflected that the

greenhouses are short, and the wall insulation is poor, and the proportion of wall collapse and roof damage is high every year. The transformation and renewal of small and medium-sized greenhouses has become the main demand of agricultural enterprises and cooperatives. However, the transformation cost of new standard steel frame greenhouses is high, which is difficult for most small and medium-sized producers and operators to bear. It is suggested that a special fund for new construction and reconstruction should be set up, and support and guidance for renovation and new construction should be strengthened appropriately. Also, it is necessary to improve the hardware facilities and conditions needed for basic production, thus laying the necessary material foundation for transformation, upgrading and development [4].

### **3.2 Revitalizing existing idle facilities and increasing the supply base of vegetable baskets**

Some agricultural facilities have been idle for a long time, causing serious waste. It is suggested that comprehensive measures should be taken to stabilize the area of existing agricultural facilities and ensure the necessary supply of "vegetable basket". Policies have been used to guide the revitalization of idle facilities, restore production, and increase the supply base of vegetable baskets. It is necessary to improve the social service system and improve the quality of agricultural professional services.

The main body of facility agriculture with large-scale operation has strong demand in plant protection, nutrient solution detection, formula adjustment, soil improvement, etc. However, it is difficult to find a relatively mature and reliable service organization in the market. The existing training is not helpful to the technical improvement and standardized production of operators. In addition, the difficulty of financing is also a concern. It is suggested to strengthen the support for the construction of social service system, improve the comprehensive service ability of service institutions, and carry out "ordering service" and "order service" [5]. Also, it should explore and promote facility agriculture to form interest community with village collectives and farmers, broaden investment and financing channels, and build a good and stable operating environment.

### **3.3 Publicizing the facilities policy and playing a guiding role in decision-making**

Currently, the index setting of facility agricultural land is not in line with the reality of agricultural production. It can not meet the needs of construction processing, sorting, packaging workshops and supporting equipment. Simultaneously, governments at all levels have strongly supported the tourism and leisure agriculture based on facility agriculture for many years. There is no difference between the land use standard and the "pure production" facility agriculture. It is suggested to strengthen the land management and guarantee of facility agriculture, and explore the development mode in line with the reality. The production needs of different operators should be met, and the operators who are willing to engage in facility agricultural production should have "peace of mind".

### **3.4 Establishing a long-term mechanism for the management and protection of rural facilities to serve agriculture**

Agricultural infrastructure is characterized by public goods. Based on the difference between externality and exclusivity of agricultural infrastructure, it should clarify the responsibility subject, distinguish the form of management and protection, and improve the effect of management and protection. First of all, pure public goods, such as rural roads, reservoirs, etc., are non competitive and non exclusive in the process of consumption. The government or village collectives are responsible for providing follow-up management and protection funds and directly undertaking or outsourcing management and protection tasks. In accordance with the principle of "county road county management, township road township management", the system of rural highway head can be implemented. The head of the county government is the general road chief, and the township and village road chief are subordinate. Secondly, club items such as irrigation canals are non-competitive and exclusivity. The beneficiaries are relatively fixed, which can mobilize the enthusiasm of the village collective or farmers under the condition of government subsidies. The ownership of public resources such as reservoirs, ponds and pumping stations is shared by all villagers, and they need to

have management and protection technology. One part of them can be maintained by farmers who have received formal training, and the other part can be maintained and managed by professional institutions on a regular basis with funds provided by the local government due to higher requirements of management and protection technology.

### **3.5 Absorbing funds for social assistance and enriching the forms of financial input**

First, the government should play its role as a financial lever. China has achieved a comprehensive victory in poverty alleviation, and the situation of rural infrastructure is far better than that in the early days of the new village movement in Korea. At this stage, the pressure of local government debt is large, and thus it is more necessary to play the guiding role of financial funds in the rural revitalization. Second, diversified funds should be invested. Agricultural infrastructure construction is characterized by large investment and long cycle, and the enthusiasm of social capital investment is limited [6]. China can set up agricultural infrastructure construction investment fund, and introduce market-oriented professional fund mode. On the premise of risk control, a "white list" of enterprises should be set up to encourage private capital to invest in rural infrastructure projects.

## **4. Conclusions**

The construction of agricultural facilities has a fundamental impact on the development of modern agriculture, and is also closely related to agricultural development, social and economic development, cultural construction, etc. Accordingly, it must attach great importance to the construction of agricultural facilities, and do a good job in scientific deployment and hierarchical arrangement. Also, the construction of agricultural facilities should be ensured to promote the modernization of China's agriculture.

## **References**

- [1] Shin, H. W., Kim, T. H., Kim, G. H., & Cho, H. K. (2008). A Study on the Construction Process of agricultural Facilities. In Proceedings of the Korean Institute of Building Construction Conference (pp. 151-154). The Korean Institute of Building Construction.
- [2] Choi, O. Y., Shin, H. W., Kim, T. H., & Kim, G. H. (2008). A study on current status and the problem of agricultural facilities. *Journal of the Korea Institute of Building Construction*, 8 (6), 147-154.
- [3] Jing, Z., & Xiang, Z. (2012). Thought on the Agricultural Water Conservancy Facilities Construction in Anhui Province [J]. *Journal of Beijing City University*, 1.
- [4] Uvarova, S., Gumba, K., Kiseleva, E., & Sonin, Y. (2020). Digitalization of design and construction of agricultural facilities as a basis for ensuring their energy efficiency. In *E3S Web of Conferences* (Vol. 175, p. 11004). EDP Sciences.
- [5] Liu, Z., Ying, S., Wu, W., Li, X., Tan, Y., & Liu, Q. (2009). Study on the tourism facilities construction in agricultural demonstration zone-a case study of southern Jiangsu area. *Journal of Landscape Research*, 1 (3), 71-75.
- [6] Choi, O. Y., Kim, J. H., Kim, T. H., & Kim, G. H. (2008). A Study on current Status of Agricultural Facilities. In Proceedings of the Korean Institute of Building Construction Conference (pp. 147-150). The Korean Institute of Building Construction.