

Promoting Agricultural Modernization and Enhancing Rural Vitality

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Abstract: In promoting agricultural modernization, the Ningxia Hui Autonomous Region Agricultural Exploration and Design Institute should focus on technological innovation, optimizing industrial layout, strengthening resource management, and building an effective governance system. Through technological progress, the development of smart agriculture, as well as talent cultivation and interest linkage, Ningxia can achieve the goal of agricultural modernization, improve the efficiency of agricultural product supply, and enhance rural vitality.

Keywords: Smart agriculture, Technological innovation, Resource integration

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1 Introduction

The Ningxia Hui Autonomous Region Agricultural Exploration and Design Institute can adopt various strategies and measures to promote agricultural modernization and enhance rural vitality.^[1] Firstly, based on existing research and analysis, the modernization of agriculture in Ningxia requires not only attention to the quality and quantity of agricultural products, but also comprehensive consideration of the transformation and upgrading of industrial, production, and management systems.^[2] This means that the Ningxia Hui Autonomous Region Agricultural Exploration and Design Institute needs to start from these aspects to promote the high-quality development of the agricultural industry.

2 Technology Assists the Development of Smart Agriculture

Accelerating the pace of agricultural modernization is an important task facing Ningxia. In order to achieve this

goal, the Ningxia Hui Autonomous Region Agricultural Exploration and Design Institute can rely on technological progress to promote the transformation from traditional agriculture to modern agriculture. This includes utilizing information technologies such as the Internet of Things, 3S technology, cloud computing, big data, and artificial intelligence to develop smart agriculture, as well as improving agricultural production efficiency and agricultural product supply efficiency through technological innovation.^[3]

1. The application of Internet of Things technology: The Ningxia Agricultural Internet of Things Big Data Sharing and Comprehensive Application Platform is an important example. The platform supports the entire process of data collection, storage, processing, publishing, analysis, and visual display, providing services for scientific researchers, characteristic industry demonstration bases, and agricultural management departments. In addition, agricultural informatization systems based on the Internet of Things have

also been developed to improve the level of agricultural automation and informatization, and achieve intelligent and automated operation of agriculture.

2. The application of 3S technology: The Ningxia Agricultural Comprehensive Development Management Information System utilizes 3S integration technology to solve the needs of agricultural comprehensive development work, achieving real-time information and visual dynamic management of various links and processes of the project. In addition, the application prospects of remote sensing (RS), geographic information systems (GIS), and global positioning systems (GPS) as 3S technologies in agricultural development in the northwest region have been widely discussed, especially in remote sensing inversion of soil moisture and dynamic monitoring of drought and desertification.^[4]

3. Potential applications of cloud computing and artificial intelligence: Cloud computing can store and process large amounts of agricultural data, such as meteorological data, soil quality, and crop growth. This helps predict outbreaks of pests and diseases, optimize agricultural supply chains, and improve the quality of agricultural products. Agricultural practitioners can share resources, such as agricultural knowledge, planting techniques, and market information, through cloud platforms. This helps to improve the decision-making ability and production efficiency of farmers. Artificial intelligence applications can monitor and analyze data such as soil moisture, temperature, and light levels to optimize crop production and reduce waste. Expanding standardized data sources and optimizing the environment crop model are the core and main barriers to precision agriculture. Intelligent decision-making can effectively improve the resource utilization efficiency of agricultural chemicals and feed, scientifically improve product quality, and help farmers achieve cost reduction and efficiency increase. Intelligent agricultural machinery and equipment, such as autonomous navigation agricultural machinery and unmanned plant protection machines, can basically achieve precise execution of production decisions. The automation

equipment of facility agriculture indicates the trend of industrialization and unmanned agriculture.

4. Integration and development of Internet plus agricultural characteristic advantageous industries: Internet plus has also explored the integration and development path of agricultural characteristic advantageous industries, which involves the informatization construction of production, sales, management and service links, and helps to accelerate the integration of technology and agricultural characteristic advantageous industries.

3 Agricultural talent cultivation and modernization

The Ningxia Hui Autonomous Region Agricultural Exploration and Design Institute should also pay attention to the cultivation and introduction of agricultural talents, as well as the issue of the connection between farmers and modern agricultural interests.^[5] By establishing a sound talent policy and interest integration system, it is possible to effectively enhance rural vitality and promote agricultural and rural modernization.

3.1 In terms of talent cultivation

A summary and analysis were conducted on the construction of the talent team, and countermeasures were proposed to strengthen the construction of the talent team. In the context of new rural construction, the University of Agriculture and Forestry has innovated its talent training model to meet the needs of new rural construction, indicating that Ningxia may also have taken similar innovative measures in talent training. Ningxia also pays special attention to the cultivation of practical talents in rural areas, and through improving and perfecting policy concepts, systems, and technologies at multiple levels, cultivates a large number of high-quality and skilled talents for socialist modern construction.^[6]

3.2 In terms of talent introduction

Ningxia has introduced a series of policies for the introduction of scientific and technological talents, aiming to scientifically and effectively introduce scientific and technological talents to promote regional economic

development and technological leadership. Although there are some problems, such as a single source of high-level talents and insufficient flexible introduction, Ningxia undergraduate colleges have made rapid development in the construction of high-level talent teams.

3.3 Effect evaluation

We have achieved certain results in the construction of technological infrastructure, but also pointed out the need to further strengthen the construction of talent teams and other issues. In terms of cultivating high skilled talents, although good results have been achieved, there are still problems such as structural imbalance and insufficient number of training institutions. In terms of talent cultivation and introduction, measures have been taken, including innovative talent cultivation models, the introduction of science and technology talent introduction policies, and attention to the cultivation of practical talents in rural areas. These measures have to some extent promoted regional economic development and technological innovation, but at the same time, they also face challenges such as imbalanced talent structure and insufficient training institutions.

4 Specific cases

When implementing specific strategies, the Ningxia Hui Autonomous Region Agricultural Exploration and Design Institute can refer to existing successful cases and experiences, such as the efforts made by Ningxia Academy of Agriculture and Forestry in comprehensively promoting rural revitalization, as well as the achievements made by other regions in implementing rural revitalization strategies and promoting agricultural and rural modernization. At the same time, it should be noted that there is a gap between the modernization level of agriculture in Ningxia and the national average level, and more targeted and effective measures should be formulated to address this situation. Specific cases of Ningxia Hui Autonomous Region Agricultural Exploration and Design Institute improving agricultural production efficiency and agricultural product supply efficiency through technological innovation:

1. Practice of Collaborative Innovation: The work practice of Ningxia Academy of Agriculture and Forestry in the field of agricultural science and technology collaborative innovation has demonstrated how to improve the ability, quality, and efficiency of agricultural science and technology innovation by strengthening agricultural science and technology collaborative innovation. This includes establishing effective collaborative innovation mechanisms, increasing support for agricultural technology collaborative innovation, and further strengthening innovation team building measures.

2. Technological progress and innovation: Relying on technological progress and innovation is the basic path to improve the comprehensive production capacity of agriculture. By analyzing the changes in agricultural production factor efficiency, agricultural technology and equipment level, and the scientific and technological quality of agricultural workers, it can be seen that technological progress has a supportive effect on the comprehensive agricultural production capacity of Ningxia.

3. Collaboration model between institutions and enterprises: Ningxia Academy of Agricultural and Forestry Sciences has effectively promoted the implementation of the rural revitalization strategy by implementing the public welfare service model of institutional local cooperation and the non public welfare service model of institutional enterprise cooperation, such as the "socialized service model of internal department enterprise linkage" and the "technology enterprise+" model. These models not only promote the transformation of scientific and technological achievements, but also improve the supply efficiency of agricultural products.

4. Technological innovation in agricultural product processing industry: By strengthening the main body of technological innovation and supporting the construction of the guarantee system, constructing a technological innovation system for agricultural product processing industry in Ningxia, promoting the progress of agricultural processing technology, and thereby improving the core

competitiveness and supply efficiency of agricultural products.

5. "Top 10 Science and Technology Innovation Projects": Ningxia Academy of Agriculture and Forestry closely focuses on key technical issues in the development of Ningxia's agricultural characteristic advantage industries, vigorously implements the "Top 10 Science and Technology Innovation Projects", and has launched significant and effective scientific research achievements and advanced applicable technologies, providing strong support for accelerating the development of agriculture in Ningxia.

6. Research and application of water-saving agricultural technology models: Based on the actual situation, this study integrates water-saving agricultural technology models suitable for different regions and crop characteristics in arid areas of Ningxia, and applies them in practice, deeply tapping into the potential of agricultural production in arid areas and contributing to the stability of summer grain production in Ningxia.

5 Experience of Agricultural Exploration and Design Institute in Rural Revitalization

The successful experience and practices of Ningxia Hui Autonomous Region Agricultural Exploration and Design Institute in rural revitalization strategy can be learned from the following aspects:

1. Technological innovation and application: Ningxia Academy of Agricultural and Forestry Sciences has established a management and operation mechanism, docking mechanism, and innovative model for institute local scientific and technological cooperation, creating a platform for institute local cooperation. This model emphasizes the effective integration of technology and local needs, improving the effectiveness of technology promotion. For agricultural exploration and design institutes, they can learn from their technological innovation and application methods, and improve agricultural production efficiency and quality through technological means.

2. Design driven innovation: Based on the theory of design driven innovation, it provides new strategic methods

for rural revitalization planning and design. This method can not only drive the construction and development of rural economy through the design and development of cultural and tourism products, but also strengthen the construction of ecological civilization and promote the popularization of rural culture. This indicates that agricultural exploration and design institutes can promote the implementation of rural revitalization strategies through design driven innovation.

3. Integrating Resources and Collaborative Development: The rural revitalization strategy emphasizes the development of rural industrial economy, promoting agricultural scientific and technological innovation and the transformation of scientific research achievements, and integrating and developing rural resources. This requires the Agricultural Exploration and Design Institute to not only focus on the development of a single field, but also integrate various resources to achieve diversified development when implementing the rural revitalization strategy.

4. Human centered design services: The involvement of design services in rural construction needs to adhere to the principles of putting farmers first and ecology as the foundation. This means that when participating in rural revitalization projects, agricultural exploration and design institutes should pay attention to the needs of farmers and the protection of the ecological environment to ensure the sustainability of the projects.

5. Comprehensive evaluation and participatory evaluation: Developing a comprehensive evaluation method is crucial for improving and enriching the lives of rural people. This method considers the conceptualization of community policy structure, localization of policy structure in rural communities, and promotion of participatory evaluation of rural community people. Agricultural exploration and design institutes can adopt this evaluation method to ensure that rural revitalization projects are more closely aligned with practical needs, while enhancing project transparency and public participation.

The successful experiences and practices that Ningxia Hui Autonomous Region Agricultural Exploration and

Design Institute can learn from in the rural revitalization strategy include technological innovation and application, design driven innovation, resource integration and collaborative development, people-oriented design services, and comprehensive evaluation and participatory evaluation.

6 Improvement measures

In response to the problem of the gap between the modernization development level of agriculture in Ningxia and the national average level, the Ningxia Hui Autonomous Region Agricultural Exploration and Design Institute can take the following specific improvement measures or plans: optimize the layout of modern agricultural industry: optimize the layout of agricultural industry, especially the construction and utilization of high standard farmland, based on the geographical and climatic conditions of Ningxia. By analyzing the natural resources and economic conditions of different regions, formulate agricultural development strategies that are in line with the characteristics of each region, in order to improve agricultural production efficiency and product quality. Innovation investment mechanism: Increase investment in agricultural science and technology research and development, introduce and cultivate agricultural science and technology talents, and promote the transformation and application of agricultural science and technology achievements. This includes improving agricultural production facilities, adopting advanced agricultural machinery and technology, and developing new crop varieties that are adapted to the local environment. Strengthen operation and maintenance: Establish a sound maintenance and management system for agricultural infrastructure, ensuring that agricultural water conservancy facilities, irrigation systems, etc. are in good condition. In addition, strengthen the supervision of environmental protection and ecological balance in agricultural production processes to ensure the sustainability of agricultural activities. Promote the development of modern agricultural industry: Through policy support and financial investment, encourage and guide the development of agriculture towards modernization and efficiency. This

includes developing new agricultural models such as facility agriculture and ecological agriculture, as well as promoting the integration and development of agriculture with other industries such as tourism and culture. Building a new "Five Unifications" management system: unified planning, unified construction, unified management, unified services, and unified supervision, forming a comprehensive, efficient, and transparent agricultural management system. This will help improve the overall management level and service quality of agriculture in Ningxia, and better meet the needs of farmers and consumers. Scientific division of agricultural zones: Based on multidimensional indicators such as farmland, climate, and water resources in Ningxia, scientifically divide agricultural development zones, protective development zones, and restricted development zones. This helps to allocate resources reasonably and achieve the dual goals of agricultural production and ecological environment protection.

7 Conclusion

The Ningxia Hui Autonomous Region Agricultural Exploration and Design Institute is actively exploring paths such as technological innovation, optimizing industrial layout, and strengthening resource management in promoting agricultural modernization. Through the development of smart agriculture, talent cultivation, and the construction of an effective governance system, Ningxia will move towards a more prosperous and sustainable path of rural development. Let's look forward to a bright future for agriculture in Ningxia together.

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