Study on Optimizing Modern Agricultural Production System in Xingwen County

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Abstract—This paper aims at Optimizing Modern Agricultural Production System in Xingwen County. To achieve it, field surveys were applied and the results find that the local government should start from the following to optimize the agricultural production system in Xingwen county:(1) to improve and upgrading infrastructure conditions for agricultural production;(2) to promote standardized agricultural production;(3) to enhance the effectiveness of science and technology supply; (4) to implement the transformation of agricultural production mode to realize green production.

Keywords—agricultural production system; modern agriculture; xingwen county

I. INTRODUCTION

Xingwen County is located in the southeast of Yibin City, between 104 52 28 - 105 21 23, 28 04 28 - 28 27. It is 47 kilometers long from east to west and 43 kilometers wide from north to south. It is adjacent to Xuyong County in the southeast, Weixin County in Yunnan Province in the south, Gongxian County in the west, Changning in the northwest, and Naxi District in Jiangan and Luzhou City in the north. The County covers an area of 1379.89.17 square kilometres, of which 438.63 square kilometres are cultivated land. The forest area of the county reaches 10.634 million mu, and the forest coverage rate reaches 51.39%. The county has 15 towns under its jurisdiction. By the end of 2018, the total population was about 500,000. In recent years, Xingwen County has made remarkable progress in the development of modern agricultural industry, focusing on the integration of agriculture and tourism, based on its natural resources and industrial advantages. In 2018, the disposable income of rural residents was 14186 yuan, an increase of 9.8% over 2017. Nevertheless, Xingwen County is located in the Wumeng Mountains, and its social and economic development is still relatively backward. The construction of the agricultural industry system is also facing challenges such as insufficient investment in the development of agricultural industry, insufficient technical reserve of agricultural modernization industry, and weak driving force of new types of agribusinesses.

Modern agricultural production system is the key and foundation of modern agricultural production system. At present, China's total factor productivity of agriculture is still not high. The agricultural labor force accounts for about 27% of the total one while the total agricultural output value accounts for only 9% of the total national product value. 27% of the population creates 9% of the output value, which is far from that of developed countries. Production system focuses on products and production capacity, mainly involving agricultural production conditions, is the material basis for industrial prosperity. Constructing modern agricultural production system means arming agriculture with modern equipment, serving agriculture with modern science and technology, reforming agriculture with modern production mode, and changing the situation that agricultural production depends on nature. Constructing and optimizing modern agricultural production system has always been one of the hot topics and key topics of scholars in the field of agricultural economic management. But different scholars have different views and understandings. Some scholars believe that the construction of modern agricultural industry system should be related to the development and strategic positioning of local agricultural superior and characteristic industries, and consider the optimization and integration of agricultural production system from the natural resources endowment [1]; others believe that the construction of modern agricultural industry system is a systematic project, and modern agricultural production should be taken into account [2]. The construction of the system should be considered in a broader space, and the construction of the modern agricultural production system should be considered from the perspective of the modern agricultural industry system [3]. At the same time, some scholars believe that agriculture is an organic part of the regional industrial system. We should consider the reconstruction of the agricultural production system from the industrial structure and industrial status of a region. Others believe that the construction of agricultural production system should consider the stage of agricultural modernization, and different production systems should be adapted to different stages of agricultural modernization [4]. Considering the foundation of modern agricultural development and the orientation of modern agricultural industry in the development of national economy in Xingwen County, we believe that modern agricultural production in Xingwen County should be...
constructed by promoting standardized agricultural production, improving agricultural production infrastructure, strengthening the effective supply of agricultural science and technology, and vigorously developing ecological circular agriculture. It provides solid guarantee for the development of agricultural modernization in Xingwen County from the aspects of material basis, production standards and technology supply.

II. ANALYSIS OF OPTIMIZING THE PATH OF MODERN AGRICULTURAL PRODUCTION SYSTEM IN XINGWEN COUNTY

A. To Improve and Upgrading Infrastructure Conditions for Agricultural Production

One is to improve and upgrade the conditions of rural roads and farming roads. On one hand, we should improve the capacity of rural roads. Because Xingwen County is located in Wumeng Mountain Area, the traffic conditions of rural roads are poor and the traffic capacity of rural roads is restricted by bad natural conditions. Poor rural road conditions and traffic capacity restrict the development of modern agriculture. Therefore, the construction of modern agricultural production system should start with improving the capacity of rural roads. On the other hand, under the household contract responsibility system, farmland is over-subdivided and farmland cultivation roads are missing. This is not conducive to the appropriate scale of agricultural management. Therefore, we should make full use of the project of improving farmland quality and build farmland cultivation roads so as to gradually realize the mechanization of farming. Finally, modern irrigation and drainage facilities should be added. Xingwen County belongs to karst landform. Drought, water shortage and waterlogging are important factors restricting the development of modern agriculture. Therefore, on the basis of improving rural road conditions, modern agricultural irrigation and drainage facilities should be added to provide material conditions for stable and high yield of agriculture.

Improve the quality of cultivated land. Cultivated land is not only an important means of agricultural production, but also an important condition for the production of high-quality agricultural products. Because Xingwen County belongs to karst landform, the overall quality of cultivated land is not high. Therefore, the construction of modern agricultural production system should be carried out simultaneously through a variety of measures to vigorously improve the quality of cultivated land. The first is to improve the quality of cultivated land soil. Through the promotion of soil testing and formula fertilization, the missing elements of soil can be precisely promoted, and the phenomena of soil acidification and compaction caused by the abuse of chemical fertilizers can be reduced. Through the implementation of non-point source pollution control project on cultivated land, efforts were made to curb excessive heavy metals in soil. Second, a large number of high-standard basic farmland should be built. Through the implementation of high-standard basic farmland construction projects, the obstacles restricting agricultural production have been removed. High standard basic farmland can also create conditions for agricultural mechanization production. Third, we should vigorously promote the use of organic fertilizers. The soil organic matter content in cultivated land was increased by returning crop straw to the field and reusing animal manure.

Improve the level of agricultural mechanization. On one hand, we should adopt various means and measures, such as subsidies, replacing the old with the new, and establishing agricultural machinery professional cooperatives, to mobilize the enthusiasm of small-scale farmers and new agricultural operators to purchase and use agricultural machinery. On the other hand, in combination with the construction projects of farmland and water conservancy facilities, high-standard basic farmland and rural road construction in Xingwen County, we should vigorously enhance the capacity of rural roads and field roads in order to create external conditions for the use of agricultural machinery in large quantities. On this basis, we should improve the production process of large-scale crops such as rice, rape, and promote the integration of production process and agricultural mechanization. In addition, we should fully mobilize the enthusiasm of agricultural machinery researchers in scientific research institutes and rural skillful workers, and vigorously explore agricultural machinery suitable for the conditions of agricultural production in Xingwen. Finally, we should change the current situation of more small-scale agricultural machinery, less large-scale agricultural machinery, more power agricultural machinery and less supporting machinery, and promote the full utilization of agricultural machinery. Moreover, we should fully mobilize the enthusiasm of machinery maintenance enterprises through tax reduction and exemption measures, so as to create conditions for large-scale use of agricultural machinery.

B. Promoting Standardized Agricultural Production

Firstly, we should promote the construction of standardized production demonstration bases. Demonstration bases for standardized production of bulk crops such as rice, rape and maize and cash crops such as vegetables and tobacco leaves; and standardized breeding bases for livestock and poultry such as black chicken, beef cattle and pigs should be established. These bases should not only realize the modernization and standardization of facilities and equipment, but also realize the standardization of process flow. Through standardized production of agricultural products, the green development and high-quality development of agricultural production in Xingwen County will be gradually realized to meet the needs of the market. We should speed up the standardization of Se-rich agriculture in accordance with the characteristics of Se-rich soil in Xingwen County. Around selenium-rich agriculture, the standards of selenium-rich agricultural products in Xingwen County were formulated. Local governments should vigorously encourage new agricultural business entities, such as agricultural enterprises, farmers’ professional cooperatives, planting or aquaculture major households, to establish selenium-rich standardized agricultural production bases independently, focusing on the development of production standards for selenium-rich agricultural products such as rice, melons and vegetables, beef and mutton.

Secondly, we should steadily promote the certification of geographical indications for Non-polluted Agricultural products, green food, organic agricultural products and...
agricultural products. The certification of pollution-free agricultural products, green food, organic agricultural products and geographical indications of agricultural products are strategic choices in the new stage of agricultural development, and are important signs of the transformation from traditional agriculture to modern agriculture. The construction of agricultural modernization production system should vigorously encourage the new rural business entities such as agricultural industrialized enterprises, farmers' professional cooperatives and other certification, and constantly expand the scale of agricultural product origin certification and the number of product certification. On the other hand, we should strengthen supervision and management of the use of signs after certification of certified agricultural products, give full play to the demonstration and driving role of certification of geographical indications of pollution-free agricultural products, green food, organic agricultural products and agricultural products in the areas of origin management and process control, and create agricultural product lines with local characteristics, high efficiency and strong driving capacity.

Thirdly, we should promote the formulation and revision of county-level local standards for agricultural products. Standards have been formulated or revised around the characteristics of selenium-rich rice, selenium-rich tea, selenium-rich kiwifruit, live pigs and black-bone chickens in Xingwen County. As far as the existing agricultural product standards are concerned, if significant changes have taken place in comparison with the actual situation, they should be updated in time; for agricultural products that have not yet formulated standards, we should formulate important standards, key technical specifications and important management standards for development in time, based on the goal of upgrading the characteristic and advantageous industries in Xingwen County. Integrate the standards of service before, during and after the production process and industrial upgrading, development and management to form a standard system to promote the development of industries with distinctive advantages.

Fourthly, we should strengthen the publicity of relevant laws, regulations and systems concerning agriculture. Strengthen standardization propaganda and training. On one hand, we should strengthen the publicity of the standardization law, the law on the quality and safety of agricultural products, and the compulsory standards for the quality and safety of agricultural products. New propaganda means such as internet and exhibition and sale of agricultural products in production, processing and transportation are used to popularize the knowledge of agricultural standardization and raise the consciousness of standardization in the whole society. On the other hand, we should make comprehensive use of financial and tax means to strengthen the education, training and incentives of agricultural production and operation subjects such as farmers, agricultural enterprises and professional cooperatives.

C. To Enhance the Effectiveness of Science and Technology Supply

Firstly, we should combine the agricultural industry characteristics of Xingwen County and strengthen the scientific and technological innovation of superior industries such as rice and tea. On the one hand, through economic means such as reward and achievement sharing, domestic and foreign scientific research institutions and universities are encouraged to establish scientific research bases in Xingwen. Through the promotion of agricultural production, agricultural scientific research and teaching cooperation, break the boundaries of departments, units, regions and disciplines, and build a cooperative system and mechanism of agricultural-related institutions. Scientific and technological personnel are encouraged to carry out demonstrations of the transformation and application of scientific and technological achievements with high and new technologies of characteristic agricultural industries such as rice and tea in Xingwen County. On the other hand, the main body of agricultural science and technology innovation and effective supply is agricultural enterprises. To this end, the local government should establish a mechanism for the transformation and utilization of achievements with enterprises as the main body, carry out the action of establishing demonstration enterprises for the transformation of achievements, and support enterprises in the transformation and application of new achievements and new technologies.

Secondly, we should build a comprehensive information service system for agriculture and rural areas. On one hand, the county should strengthen the construction of large agricultural-related economic data, improve the relevant infrastructure, and establish the processing and application of relevant data. On the other hand, we will consolidate the infrastructure of rural Internet projects, constantly improve the rural science and technology information household connections, and expand the coverage of comprehensive information services in rural areas. Around rice, tea, animal husbandry and other leading, characteristic agricultural industry actively docking with Internet enterprises, especially listed enterprises, to increase the network sales of agricultural products. Finally, we need to re-establish the electronic sales model of agricultural products, and build a platform for agricultural products production and marketing that integrates "order docking, cold chain distribution, e-commerce, community transactions".

Finally, we should enhance the ability of transformation and application of scientific and technological achievements. The core and focus of the competition of agricultural products lies in the consciousness of agricultural science and technology. By means of economy and planning, agricultural producers are encouraged to enhance their ability to transform and apply scientific and technological achievements. Therefore, on one hand, we should strengthen the construction of related hardware facilities for the transformation and application of scientific and technological achievements, and create an external environment for agricultural operators such as farmers, enterprises and farmers' professional cooperatives to actively transform and operate scientific and technological achievements. On the other hand, we should deepen the reform of grass-roots agricultural technology extension system, improve the performance appraisal and incentive mechanism of science and technology extension personnel, and build a new agricultural technology extension system with Grass-roots
Agricultural Technology Extension institutions as the leading, scientific research institutions as the support, and extensive participation of agricultural social service organizations. Finally, we should strengthen the protection and application of agricultural intellectual property rights. We will build a service center for the transfer of agricultural scientific and technological achievements in Xingwen County, implement the system of science and technology commissioners, and promote the construction of agricultural science and technology parks.

D. To Implement the Transformation of Agricultural Production Mode to Realize Green Production

Firstly, the use of chemical fertilizers and pesticides should be reduced to achieve zero growth of chemical fertilizers and pesticides. On the one hand, by vigorously promoting the technology of increasing the efficiency of chemical fertilizer reduction, we will expand the scope of use of formula fertilizer, and encourage farmers to increase the application of organic fertilizer and green manure. On the other hand, we should speed up the promotion of integrated technology model of pesticide reduction and efficiency enhancement, and accelerate the popularization and application of green prevention and control technology. We will strive to achieve zero growth in chemical fertilizers and pesticides by 2022. In order to restore the productive capacity of cultivated land, improve the agricultural ecological environment, and strive to achieve the system of farmland rotation and fallow.

Secondly, we should vigorously promote the recycling of agricultural wastes. On one hand, we should promote the technical model of comprehensive utilization of livestock and poultry manure, actively develop third-party treatment and socialization services of livestock and poultry manure, and improve the mechanism of harmless treatment of dead and sick livestock and poultry. On the other hand, we should speed up the comprehensive utilization of straw, develop large and medium-sized biogas projects according to local conditions, and vigorously promote the circulation production mode of "fruit marsh animal" and "vegetable marsh animal". By 2022, the utilization rate of excreta from large-scale livestock and poultry farming will reach 98%, and the comprehensive utilization rate of crop straw will reach 95%.

Finally, we should vigorously develop efficient and water-saving agriculture. On the one hand, the local government should focus on promoting high-efficiency water-saving technologies such as drip irrigation under mulch, ridge and furrow irrigation. By 2022, the area of high-efficiency water-saving technology promotion will be stable at about 25,300,000 mu. On the other hand, we should actively establish pilot demonstration zones for sustainable agricultural development; vigorously develop eco-circular agriculture with the combination of agriculture and animal husbandry, production and supplement, food and foodstuff, cultivation and cultivation cycle, and economic development. In addition, we should do a good job in monitoring and controlling the ecological environment of cultivated land and grassland, effectively strengthen the supervision and prevention of soil pollution, resolutely stop the flow of polluted agricultural products to the market, resolutely combat illegal grassland occupation, illegal grazing, excessive reclamation and mining and other violations of grassland destruction.

III. CONCLUSION

Modern agricultural production system is the premise and foundation of modern agricultural system construction. The selection and construction of modern agricultural production system should be combined with the characteristics of local agricultural industry, superior agricultural industry and the orientation of agriculture in the development of national economy. As far as Xingwen County is concerned, the construction of modern agricultural production system should start from the following four aspects. (1) to improve and upgrading infrastructure conditions for agricultural production; (2) to promote standardized agricultural production; (3) to enhance the effectiveness of science and technology supply; (4) to implement the transformation of agricultural production mode to realize green production.

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