Research on the Mechanism of Scientific and Technological Innovation in the Agricultural Supply Side Structural Reform

——Taking Sichuan Province as an Example

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Abstract: To promote the structural reform of the supply side of agriculture, it is required to deepen the reform of the agricultural science and technology system, aim at the focus and direction of agricultural science and technology research and development, strengthen the integration of production, education and research, actively promote the integration of agricultural science and technology achievements, optimize the allocation of resources for scientific and technological personnel, and promote the development of agriculture. The input of factors depends on the transformation of technology. Based on the analysis of the status quo of agricultural science and technology innovation ability in Sichuan Province, this paper puts forward a specific promotion path.

1. Introduction

The supply-side reform is to be carried out around several major factors on the supply side. It includes the reform of the land system, the improvement of the quality of laborers, the reduction of production costs and the improvement of capital efficiency. Technological innovation plays an important role in supply-side reform. Insufficient agricultural science and technology innovation ability and weak promotion will restrict the research and development and adoption of new varieties and new technologies, further restrict the structural reform of agricultural supply side, and then affect agriculture from “resource-dependent” and “labor-intensive” to “technically dependent”. Sichuan's agricultural science and technology innovation capabilities are insufficient, especially in the fields of seed industry, agricultural machinery, food processing, Internet + and big data platforms.

2. Current Status of Agricultural Science and Technology Innovation Capability in Sichuan Province

The status quo of agricultural science and technology innovation capability in Sichuan Province can be reflected in the aspects of basic resource allocation and effective supply of scientific and technological achievements.

From the perspective of human resource allocation, the total amount of agricultural technology innovation human resources in Sichuan Province is insufficient and the structure is irrational. The proportion of agricultural scientific research and scientific and technological personnel in the total number is too small, and the key areas lack composite and high-precision talents. The weak field lacks a technical team. Emerging industries related to agriculture lack talents leading in the international arena. The lack of talents and the contradiction of talent structure have become the main bottleneck restricting the development of Sichuan agricultural science and technology.

From the perspective of financial resources allocation, although the investment in agricultural science and technology in Sichuan has continued to increase, the proportion of investment in agricultural GDP is still small, and there is still a large gap with foreign agricultural developed countries; and the financial investment channel is too single. In addition to government investment,

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the proportion of capital investment by enterprises and financial institutions is too low, which is far from the actual demand for agricultural science and technology development. Secondly, Sichuan agricultural science and technology investment is not reasonable in structure. From the perspective of agricultural industrial chain, it shows that it has large investment in pre-production and post-production, and insufficient investment in post-production processing. From the perspective of industry category, agricultural science and technology investment is too scattered and characteristic. The vast majority of agricultural R&D expenditures have been invested in the field of experimental development. Insufficient investment is in basic research, excessive attention to the application of scientific and technological achievements in production, and lack of forward-looking, resulting in insufficient stamina for agricultural technology.

From the perspective of effective supply of scientific and technological achievements, there have been many achievements in the selection and breeding of new varieties of crops, but there are not many breakthrough new varieties, and the combination with new materials and new technologies is not high. Existing agriculture The correlation between scientific and technological achievements and actual needs is low, and often cannot meet the real needs of farmers or enterprises. At the same time, the transformation of many agricultural scientific and technological achievements requires agricultural machinery and engineering as a carrier, which is also bound to the extent that the effective supply of agricultural scientific and technological achievements will be restricted by the level of agricultural mechanization. Moreover, the singleness in the promotion of agricultural scientific and technological achievements directly caused the current situation of the difficulty in transforming agricultural scientific and technological achievements.

At present, Sichuan Province has formed a four-level agricultural technology extension system with “provincial, municipal, county, township or regional”. Although the Sichuan public welfare agricultural technology extension system has been initially established, the following problems still exist: First, Sichuan is building a national-level science and technology park, a provincial-level science and technology park, an agricultural science and technology expert compound, an agricultural industrial technology innovation alliance, and an agricultural technology service center. The number of research institutes is still small, and it is not enough to meet the growing demand for science and technology services. In particular, the personnel engaged in science and technology services lag behind the level of developed agricultural areas. Secondly, the number of professional technicians in grassroots agricultural technology extension service teams is relatively small. The overall professional level and service ability of the service team is slightly insufficient. Finally, many agricultural technology promotion organizations only play the role of conveying the spirit of the superior, and the ability to integrate service resources is not strong. This has led to the failure of agricultural technology-related service organizations in Sichuan Province as the primary service target, and did not proceed from the actual needs of agricultural producers and operators, and finally formed a situation in which the agricultural science and technology in the actual promotion process was difficult.

3. The Promotion Path of Agricultural Science and Technology Innovation in Sichuan Province

3.1 Optimize the Structure and Focus of Financial Technology Investment

To play a good role in guiding and stimulating the investment in science and technology by financial technology investment, we must start with optimizing the input structure. Obviously, Sichuan agriculture is facing the problem of delays in technology research and development in the frontier areas, low technology conversion rate, and unreasonable R&D investment structure. Therefore, it is necessary to target leading industries and key links, support scientific and technological R&D innovation and transformation of achievements, and optimize agricultural science and technology innovation and R&D. Resource allocation, actively promote the integration of supporting technologies for agricultural scientific and technological achievements, and promote the transformation of agricultural development in the province from relying on factor input to

relying on science and technology.

First, aim at key frontier areas, speed up the development of efficient and practical, cost-saving technology. From germplasm innovation, gene mining, breeding technology, breeding of new varieties, breeding of good breeds, etc., we will carry out special breakthrough new breed breeding and collaborative research; focus on supporting research and development of agricultural technology and intelligent agricultural equipment, and accelerate the production of pigs, poultry and rice. Innovation and optimization of standardized breeding techniques such as fruits and vegetables; research on comprehensive prevention and control technologies for farmland non-point source pollution and soil pollution, research on animal and plant pest control and ecologically efficient breeding techniques, research on pesticide reduction and green prevention and control technologies; support for bulk agricultural products Research and utilization technology, high-efficiency conversion technology of agricultural biological resources, agricultural waste resource processing technology, etc.; carry out technical research on information collection, storage, transmission and processing analysis, build a provincial agricultural database, and further promote the e-commerce of agricultural products and traceability of agricultural products System construction, guiding and encouraging agricultural enterprises and farmers' cooperatives to apply modern information technology to transform the Internet of Things in field cultivation and livestock and poultry breeding. Through research and development and transformation of the above technologies, we will break through the major common technical bottlenecks that restrict the development of leading industries in Sichuan Province, greatly improve the basic production level of agriculture in Sichuan Province, and gradually develop agricultural high-tech industries such as biological seed industry and wisdom breeding. The industry is on the road.

The second is to lay out the technology chain based on the perspective of the whole industry chain, and accelerate the application and transformation of mature technologies in the fields of modern industrial technology, cultural services and industrial design in the agricultural field. Focus on strengthening the research on the in-depth development of special resources, and speed up the research and development of post-harvest drying, deep processing, cold chain circulation, leisure sightseeing, forest health and science education in Sichuan, Sichuan, Sichuan, Sichuan, Sichuan and Sichuan. New technologies and equipment urgently needed in new industries and new industries will be built to build a full industrial chain technology system, providing strong technical support for the integration of the first, second and third industries and the transformation and upgrading of Sichuan's agriculture.

The third is to innovate financial input and overall planning to further optimize the investment structure of agricultural science and technology. On the basis of taking into account basic research and applied research, we will set up special funds for the transformation of results, appropriately improve the experimental development, increase the proportion of experimental development and achievements, and increase the proportion of investment in agricultural research to the level of developed countries. At the same time, give full play to the guiding role and leverage of financial funds. Comprehensive use of government procurement, loan interest subsidies, technology guarantees, insurance subsidies, tax relief, etc., inciting financial capital and social capital to support agricultural science and technology research and development and transformation, focusing on strengthening the industrialization of major achievements of universities and research institutes, and promoting Major projects landed in Sichuan.

3.2 Support the Establishment of a Joint Venture of Industry, Academia and Research Institutes with Agricultural Private Enterprises as the Mainstay of Innovation

Industry-university-research cooperation is an effective way to realize agricultural science and technology innovation, and also a breakthrough in building a technological innovation system. However, the status of innovation subject is vague, and the cooperation between industry, universities and research institutes is not short-lived. Therefore, it is necessary to focus on building a technological innovation and R&D system based on the company's technology center, market-oriented demand, and coordinating all kinds of scientific and technological resources, and

complementing the shortcomings of the Sichuan agricultural production, research and research system.

First, relying on the “Chuanzihao” billion-dollar industry, we selected a group of powerful agricultural private enterprises to support the acceleration of the construction of enterprise technology research and development centers. Through incubator incubation, a batch of high-tech enterprises, a group of science and technology personnel to start a group, a number of traditional industrial transformation and upgrading, a batch of introduction and cultivation, and vigorously cultivate agricultural technology enterprises. Focusing on the agricultural leading industries and characteristic emerging industries, the agricultural science and technology enterprises with the tie-making action in the industry should be selected. The provincial science and technology department and the local science and technology bureaus should give project support to promote the upgrading and innovation of enterprise products and enhance the intrinsic innovation capability of enterprises to promote agriculture. Enterprises deploy new equipment and apply new technologies to stimulate the innovative vitality of agricultural enterprises in science and technology. For agricultural enterprises that have established enterprise R&D centers, they should speed up the upgrading of R&D institutions and further tap the potential of technological innovation. We will focus on the development of high-end, high-efficiency and ecologically-oriented agricultural emerging technology enterprises, accelerate the cultivation and agglomeration of agricultural technology small and micro enterprises that complement the short-term industrial chain, and support the transformation of Sichuan's agricultural industry. Each year, the provincial government should evaluate and summarize the R&D centers, and select a number of enterprise R&D centers with performance evaluation results at the forefront to guide their development into provincial key R&D centers.

The second is to explore the establishment of a joint venture of industry, academia and research institutes with agricultural private enterprises as the core, and the establishment of a joint research and development institute for provincial agricultural production, research and research shares, and jointly promote the innovation of agricultural science and technology industry from the application level. In accordance with the idea of industrial chain layout construction, through the construction of provincial-level agricultural production, research and research joint research and development institutes in the upper, middle and lower reaches, complete the integration and connectivity of the core links of the industrial chain, and realize the "double chain" of organic synergy between the innovation chain and the industrial chain. That is to say, the agricultural enterprises supporting the leading industries in Sichuan Province will take the lead, establish close cooperative relations with agricultural research institutes, colleges and universities, and other scientific research units, and calculate the capital, technology, land, equipment and other R&D investment. The joint research and development institute of Xueyan Co., Ltd. implements shareholding management. Under the preconditions of the principle of “revenue sharing and risk sharing”, through the joint construction of key laboratories, engineering technology centers, engineering laboratories, enterprise technology centers and other carriers, through the establishment of scientific and technological innovation teams, joint training of talents, Jointly declare projects and other forms to form a consortium, consolidate the basic conditions of agricultural innovation, improve the incentive policies for scientific and technological personnel, achieve the transformation of results from research and development to transformation, and finally to the benign operation of products, in order to promote more common technological achievements in the development of enterprises and industries. Diffusion and transformation applications, establish and improve the agricultural science and technology innovation platform in Sichuan Province. Further form a good situation for innovation and entrepreneurship in which science and technology resources are concentrated at the grassroots level and in the industry.

3.3 Create A Highland and Platform for the Development, Transformation and Promotion of Agricultural Science and Technology in Sichuan

The carrier construction of science and technology research and development, transformation

and promotion is of fundamental and critical significance for scientific and technological innovation. However, the lack of influential carrier “brand”, service transaction supply and demand has not been effectively docked, and agricultural science and technology achievements transformation docking platform is not sound. Other factors are restricting the innovation and development of Sichuan agricultural science and technology. Therefore, it is necessary to build a new highland for Sichuan agricultural science and technology research and development, transformation and promotion, and promote regional agricultural science and technology innovation and upgrading. It is necessary to use various new business entities and socialized technical service organizations as a platform, and further strengthen the platform construction and play it in the market.

The first is to build a new highland for Sichuan agricultural science and technology research and development, transformation and promotion. With Sichuan Agricultural University, Chengdu Agriculture and Forestry College, and Chengdu Agricultural Vocational and Technical College as the main carriers, we will create a “Chongchuan Agricultural University Knowledge Economy Circle”, relying on the resource advantages of universities and research institutes to enlarge and strengthen a number of SMEs. The “One Belt, One Road” major development strategy will guide the region with agriculture as the leading industry to accelerate the gathering of innovative factors, improve innovation capabilities, guide superior agricultural products and superior technologies to go out, and strive to build a provincial-level high-tech park with agriculture as the leading industry. The park has become a well-known and influential agricultural high-tech highland in the southwest, a model area for the development of modern agriculture, and a strong commanding height.

Second, it is a new type of agricultural management entity such as large grain farmers, family farms, professional cooperatives, and socialized technical service organizations such as agricultural machinery cooperatives and new agricultural capital companies. It introduces different supply entities to realize the supply and demand of large-scale scientific and technological services and results transactions. Optimize regional layout, guide the provinces to combine local agricultural industry development needs, build a group of specialized, refined and characteristic agricultural science and technology intermediary service organizations, and cultivate a group of agricultural technology innovation, intellectual property rights, technology assessment, agricultural monitoring, Scientific and technological intermediaries in R&D and design, professional training, and evaluation of new varieties, and thus form a complete innovative service chain for agricultural technology transfer and industrialization of scientific and technological achievements. On this basis, relying on the entire Sichuan science and technology market, we will actively cultivate the professional market for agricultural technology achievement transactions and provide a professional service platform for agricultural science and technology achievements transactions.

The third is to further strengthen the construction of various forms of carriers and platforms such as agricultural science and technology commissioners, agricultural expert compoundes, agricultural service supermarkets, and agriculture-related information service institutions, and to play their role in the market by means of government procurement services, project/base construction, etc. Integrate agricultural science, education, production, research and technical personnel, and establish an industrial innovation and service team consisting of agricultural chief experts, academic leaders, and local experts, and encourage the agriculture-related colleges and universities to rely on their own scientific research strength. The production base will establish an agricultural expert compound, accelerate the scientific and technological achievements of the institute to the grassroots level; encourage the science and technology commissioners to become an important force in the transformation of the university's achievements, and return the team to the results of the transformation of income; all localities should be guided by the government. The main idea of the company's main body, integrating resources, market operation, technical support, and one-stop service is to establish an agricultural service supermarket and build an agricultural technology service trading platform, thereby reducing service outsourcing costs and improving the efficiency of service transactions; purchasing services and projects through the government. The way of co-construction and joint construction of the base will guide the transfer of scientific and technological achievements to the demand transfer of Sichuan's characteristic industries, and

establish and improve the docking platform for the transformation of agricultural scientific and technological achievements.

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