

Problems and Countermeasures of Modern Agriculture Development in Shanxi Province from the Perspective of the "Sixth Industry"

Liyu Zhu¹, Yudi Chen², Weihan Jin³

¹School of International Trade and Finance, Shanxi University of Finance and Economics, Taiyuan, China

²School of International Trade and Finance, Shanxi University of Finance and Economics, Taiyuan, China

³School of Electrical and Electronic Engineering, Huazhong University of Science and Technology, Wuhan, China

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Abstract: The “sixth industry” refers to an agriculture-led industry to which secondary and tertiary industries are attached. From the perspective of the “sixth industry”, the primary industry, or agriculture, integrated with secondary and tertiary industries through extension of the agricultural industrial chain and increase of agricultural added value, turns into a comprehensive industry that connects the other two. Finally, the unfavorable status of agriculture is changed. Modern agriculture usually involves industrialization and modern management methods to organize production and operation. This paper, based on requirements of the “sixth industry” development, first analyzes the problems of modern agricultural development in Shanxi Province mainly in industrial agglomeration, industrial chain extension, agricultural function expansion and scientific and technological application. The paper then draws on the advanced experience of modern agriculture development abroad with reference to the development modes under the perspective of the "sixth industry" in the US, Japan, South Korea and the Netherlands. Finally, the paper provides countermeasures aiming at the existing problems in Shanxi Province to develop modern agriculture under the perspective of "sixth industry". The paper will be of guiding meaning for Shanxi to further develop modern agriculture and promote deep integration between industries.

The China “No. 1 central document” for 2015 points out that China shall promote the local resources and market oriented integration of primary, secondary and tertiary industries in rural areas on the basis of agriculture. Industry integration is needed not only for modern agriculture development, but also for villagers to enhance their level of happiness and sense of gain. The 2019 “No. 1 central document” once again emphasizes the need to expand rural industries, to broaden channels for farmers to increase income, to improve the mechanism for promoting common interests from integration and development of rural primary, secondary and tertiary industries, and to extend the industrial chain so that farmers gain more benefits from industrial growth.

The concept of the "sixth industry" was first proposed in the 1990s by Naraomi Imamura, an emeritus professor and agricultural expert from Tokyo University. The concept refers to an agriculture-led industry with secondary and tertiary industries attached to it. The primary industry will gradually transit to a comprehensive industry. Through extending the agricultural industrial chain, increasing added value of agriculture as well as broadening agricultural function and business scope, primary, secondary and tertiary industries are integrated. This reduces separate development of these three types of industries and increases cross-boundary growth. Compared with traditional agricultural development, the “sixth industry” values the industry integration multiplication effect from extension of the industrial chain and the expansion of the industrial scope. In modern agriculture, industrialization is often practiced and modern management methods are adopted to organize production and operation. It is similar under the perspective of the “sixth industry” where modern agricultural gradually expands its scope from traditional agriculture production to processing industry, commerce, science and technology, forming an integral industrial chain consisting of production, processing, science and technology, service as well as sales. Therefore, it is of guiding meaning to study the means of modern agriculture development in Shanxi from the

perspective of the "sixth industry". This paper, based on requirements of the "sixth industry" development, first analyzes the problems of modern agricultural development in Shanxi Province mainly in industrial agglomeration, industrial chain extension, agricultural function expansion and scientific and technological application. The paper then draws on the advanced experience of modern agriculture development abroad with reference to the development modes under the perspective of the "sixth industry" in the US, Japan, South Korea and the Netherlands. Finally, the paper provides countermeasures aiming at the existing problems in Shanxi Province to develop modern agriculture under the perspective of "sixth industry".

1. Problems of agricultural development in Shanxi Province

1.1 Limited radiation effect in industrial park

Agricultural industrialization level in Shanxi province remains relatively low and agglomeration capacity small. Its modern agricultural demonstration parks are also in the initial stage where there is a large capital gap that only has limited radiation effect. For example, the leisure and sightseeing ecological agriculture demonstration park in Lingquan Mountain Village, Qinxian County, despite its project aimed at introducing and promoting new technologies, fails to exert radiation effect on other areas nor strong demonstration effect on the rural areas in Shanxi due to its limited scale and a relatively small proportion of scientific and technological talents.

1.2 Inadequate extension of the industrial chain

The short agricultural industrial chain in Shanxi plus a lack of overall planning between the primary, secondary and tertiary industries incapacitates inter-industry flow of production factors. This results in the inadequate extension of the industrial chain and isolated operation among entities. Therefore, their economic benefits fail to reach the maximum level and the added value is consequently low. For instance, Shanxi, as one of the six major jujube production areas in China, has extensive planting areas, yet it fails to effectively integrate jujube production, enterprise processing, market sales and other activities, which causes uneven distribution of profits among participants in the jujube industrial chain and this leads to the weak competitiveness of the industry.

1.3 Single agricultural functionality

Agricultural cultural inheritance and leisure function expansion in Shanxi is insufficient: serious homogenization of leisure agricultural development among cities and counties, inadequate infrastructure and reception facilities, and most agricultural tourism service personnel being farmers who lack the specialties to provide high-quality tourism services. Apple tourism in Wangrong County, for example, is single in function and similar to that of Jixian County. Although there is an apple theme park in Wangrong, tourism activities are usually limited to displays and performances. Because of this, tourists only take a short stay and their revisit rate is low. Agricultural tourism in Shanxi fails to attract large numbers of visitors

1.4 Limited application of science and technology

In rural areas of Shanxi Province, application of cold-chain logistics and information technology to planting, processing and sales is inadequate. Moreover, problems such as limited Internet coverage, lack of education among professional farmers, as well as unreasonable logistics and transportation network including scattered distribution points, hinder agricultural products e-commerce development in this province, which could have been a good way to advertise locally well-known agricultural products to the whole nation. Products like Shanxi millet, Jun jujube, and Taigu Cake, have strict requirements on transport packaging and conditions. Due to limited technology and brand-building, these products are less known nationwide.

2. Advanced experience in modern agricultural development abroad

2.1 United States: Constructing agricultural industrial belt according to local conditions

According to local conditions and laws of nature, the US has established agricultural industrial belt clusters in the suitable and most suitable areas. America has formed agricultural industry belts with local characteristics, including livestock industry belt, grain cultivation industry belt, and cash crop industry belt. Guided by the principle of professional production, each belt generally engages in only one or several agricultural products, and some even engage in one certain step of one agricultural production. The agricultural industrial belts have not only reduced the cost of agricultural production in the US, making agriculture profitable from economies of scale, but also achieved agricultural sustainable development.

2.2 Japan: Agricultural, Industrial and Commercial Coordination and Cooperation

Japan integrates agriculture, industry and commerce based on the small-scale agricultural economy. While combining agricultural products processing and sales enterprises, Japan has formed economic and geographical organization that binds together producing, processing and sales. Entities of secondary and tertiary industries are encouraged to enter agriculture. Through joint development of the three industries, industrial chains are extended, not only meeting the demand of agriculture for talents and professions, but also achieving agricultural industrialization. Meanwhile, Japan has established a sound food circulation system to promote direct selling of agricultural products—the "producer-direct sales- consumer" mode. This mode has reduced the circulation cost and, through cold-chain logistics applications, ensured the freshness of agricultural products and circulation efficiency. Japan has also built a scientific management system that involves agricultural producers as well as food processing enterprises and covers all processes of the industrial chain to further enhance the added value of agricultural products.

2.3 Netherlands: Developing Creative Agriculture

Located in north-west Europe, the Netherlands increases the added value of agricultural products by creative agriculture, that is, while developing agriculture, exploring the ecological, cultural and tourism functions in agriculture and promoting the integration of agriculture with other industries. Every year, flower shows and theme park exhibitions hosted in the Netherland attract domestic and foreign visitors. These exhibitions popularize flower brands and boost local tourism and leisure tourism growth. At the same time, the Netherlands promotes agriculture experience tour with flowers being the main attraction. These measures combine agricultural production, handcraft, sightseeing, tourism experience, catering and lodging industry. Dutch flower agriculture, which combines the characteristics of agriculture itself and tourism, boosts development of tourism and leisure agriculture, enhance rural economic vitality, improves rural production and living conditions. The flower industry in the Netherland thus raises farmers' income and accelerate modern agriculture development.

2.4 South Korea: Technological Innovation supports industrial integration

The Korean Government has declared its support for research, development, promotion and industrialization of innovative technologies, as well as for protection and utilization of intellectual properties, and has proposed its plan to develop new industries with bioenergy as one pillar industry that produces and utilizes renewable energy in rural areas. Meantime, a variety of mobile phone software has been developed for agricultural production, and online agricultural and animal products direct selling has been widely used during circulation and sales. Customized advisory services are also provided to farmers in need of advanced technology and training. Their problems will be solved by expert groups so as to ensure the transformation and application of technology.

3. Countermeasures to Develop Modern Agriculture in Shanxi Province from the Perspective of "Sixth Industry"

3.1 Optimizing industrial layout and focusing on building agricultural industry clusters

Covering seven degrees in latitude, Shanxi exhibits climate differences from south to north. Thus, optimizing planting and breeding structure in its six agricultural developing areas—Yanmen Pass, Lvliang Mountain, Fenhe Basin, Taihang Mountain, Shangdang Basin and suburban agriculture area—should be built on topography, ecological resource characteristics as well as features of main agricultural production areas in Shanxi's six major river valleys. Shanxi should also take example by the US agricultural development and then construct agricultural industrial parks based on current industrial parks and local conditions. These parks should reasonably analyze their resource endowments, set examples for other areas, and establish regional agricultural industry clusters so as to strengthen industrial concentration effect and, from point to area, accelerate the development of Shanxi agricultural modernization.

3.2 Extending the industrial chain and improving circulation efficiency

It is difficult for farmers to become rich simply by relying on the primary industry, so it is necessary to apply industrial chain, value chain and interest chain to the whole process of agricultural production, processing, marketing and sales. Shanxi should learn from Japanese mode of vertical cooperation among producers, processors, service providers and consumers. For instance, introducing branches or manure processing companies into fruit planting will increase the output value of fruit and related industries. The government should also, by drawing on Japan's experience in reducing circulation costs, improve the integration of agricultural products industries with supply chain nodes. Emphasis should be given to supporting communication between agricultural production bases and large supermarket chains, schools and other large enterprises to reduce circulation process and cost. This will help adjust and coordinate existing industrial chain and establish competitive advantage in the entire industrial chain. One example is to promote millet, one of featured agricultural products in Shanxi. In order to increase income and wealth of farmers, Shanxi needs to integrate producing, deep processing, fine packaging and sales, creating the "organic and green" brand of Shanxi millet.

3.3 Multi-functional expansion and improve the added value of agricultural industry

Shanxi industry integration, with the aim of pushing modern agriculture development, should continue to expand channels of income for farmers and improve their wealth. Shanxi should learn from the experience of the Netherlands and explore a way to deeply integrate its featured industries with tourism, education, culture, health and other industries. For example, the apple industry could seek extra added value by building apple theme parks and hosting apple expositions. Shanxi should, in the meanwhile, develop on its individualized tourism resources and exploit featured industries of each county to set up a cluster of distinctive leisure agriculture tourist attractions. In Taigu County and Jixian County where fruit resources are superior, further tourism routes can be built throughout the whole region. Different routes and activities cater to visitors with diverse needs. These will promote integration of the primary, secondary and tertiary industries in rural areas and modern agriculture development.

3.4 Developing smart agriculture and increasing the investment on scientific and technological talents

Shanxi provincial government and enterprises should further accelerate digital countryside construction. Via the Internet of Things and big data, high-techs are able to integrate across border to help build a sound system of smart agriculture. The government should, by drawing on the development mode of South Korea, improve qualities of agricultural products and build a modern agriculture with standard production through the following methods: establishing a system of modern logistics equipment, speeding up the application, transformation and promotion of science

and technology, enhancing the level of mechanization in the industrial chain like using the IoT to manage soil, meteorology, microorganisms, chemicals, product safety as well as automation machinery, developing an agricultural products quality tracing system that implements strict surveillance on products quality, bringing more science and technology to agriculture by increasing investment on agricultural science and technology, by strengthening new professional education for farmers as well as by scouting for professional talents.

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