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Current Situation and Countermeasures of Agricultural Industry Development in Linyi under the Background of Poverty Alleviation

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Abstract By summarizing current situation of modern agriculture in Linyi City, problems faced by the development of modern agriculture in Linyi City under the background of helping poverty alleviation are analyzed. They are mainly the low degree of farmers' organization and the low level of agricultural industrialization; the low overall quality of farmers and the weak ability to absorb science, technology and culture; weak agricultural infrastructure and deterioration of agricultural ecological environment; inadequate agricultural scientific and technological innovation and slow popularization and application of achievements. A series of solutions and countermeasures are put forward to improve the degree of farmers' organization, enhance farmers' quality, increase investment in agricultural infrastructure, and accelerate the transformation of scientific and technological achievements.

Key words Poverty alleviation, Agriculture, Problem, Countermeasure, Linyi City

1 Introduction

In recent years, poverty alleviation has played an important role in the process of social development. With the continuous introduction of various policies, the development of poverty reduction has been further promoted[1]. Agricultural industry support is not only an important condition to improve the level of rural economy, but also the primary way to achieve poverty alleviation. At present, the rudiments of modern agriculture in Linyi City have basically taken shape, but new problems have also been encountered in the development, such as the loss of migrant workers, weak and small rural left behind groups, land idle, difficult creation of local characteristic industrial brand[2-3], difficult survival of small and medium-sized enterprises, low efficiency of agricultural science and technology transformation, lack of enterprise capital chain, and low degree of community organization. These problems make farmers reluctantly make the choice of neither planting nor letting go, and thus agriculture is in an awkward position of not increasing the total amount and efficiency[4]. The healthy development of agricultural modernization in Linyi is crucial to the regional economic development of the whole Linyi City, and it is also the consolidation of the sustainable development of the achievements of poverty alleviation. In order to better promote the development of agricultural economy in Linyi City, the analysis is conducted according to the local regional characteristics. The existing problems are found out, and corresponding countermeasures are put forward, which could provide scientific basis for promoting modern agriculture in Linyi City to better help alleviate poverty.

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2 Agricultural situation in Linyi City

2.1 Overview of modern agriculture Linyi is a famous trade and logistics city in China, as well as an agricultural city, and the area of cultivated land reaches 66 700 ha[5]. Agricultural population of the city is 8.6 million, accounting for 83% of total population. Total agricultural output value of the city is 45.55 billion yuan. Among them, output value of planting industry reaches 27.83 billion yuan, accounting for 61% of total agricultural output value. Linyi is also the main grain producing area of Shandong Province. In 2010, the sown area of grain in the city was 730 000 ha, and total grain output was 4.56 million t. It was dominant by wheat, corn, sweet potato, and rice, and their total yield accounted for 98% of total grain output, and their proportions were 44%, 34%, 11%, and 9%. In 2009, added value of primary industry reached 25.046 billion yuan, which increased by 8.706 billion yuan than 2005, with the increase rate of 53.3%. Per capita net income of farmers reached 5 883 yuan, which increased by 2 282 yuan over 2005, with the increase rate of 63.4%[6-7].

At present, Linyi has nine planting bases for grain, oil, vegetable, fruit, tea, tobacco, mulberry, medicine and flowers, and ratio of food crops to cash crops is 55:45. There are 3 940 villages specializing in production, accounting for 55%. There are 85 specialized townships, accounting for 47%. The area of high-efficient characteristic agricultural product base is 466 700 ha[8]. Sown area of cash crops in Linyi City is 366 700 ha, and it is dominant by peanuts, melons and vegetables, yellow tobacco, and cotton[9]. Among them, planting area of peanut is 173 300 ha, accounting for 47% of economic crop area, and total yield reaches 800 000 t, and output value is 3.8 billion yuan. Planting area of melons and vegetables is 153 300 ha, accounting for 42% of economic crop area, and total yield exceeds 6.6 million t, and output value is 17 billion yuan. Planting area of flue-cured tobacco is 16 700 ha, and total yield reaches 46 000 t. Planting area of cotton is 10 000 ha, and total yield is 13 000 t[10].

2.2 Basic formation of agricultural pattern planning system At present, Linyi has formed the planting production pattern of southern grain and vegetable, eastern oil-tea camellia, and northwest fruit, and cultivated two dominant industries of vegetable and fruit, as well as the regional economic sector of characteristic agriculture. Nine counties have become one of the top 100 counties in grain, oil and fruit industry in China. A 400 000 ha commercial grain base, a 66 700 ha high-quality peanut base, a 66 700 ha efficient vegetable base and a 66 700 ha high-quality fruit base have been initially established. "One village has one product, and one township has one industry", each with its own characteristics[11-12]. Linyi has many traditional characteristic industries, and it has cultivated many characteristic agricultural industrial belts mainly composed of peanuts, vegetables, fruits, yellow tobacco, silkworm, osier, ginkgo, honeysuckle, Chinese chestnut and tea. A large number of "characteristic villages" and "famous villages" have emerged[13]. Orchard area of Linyi City is 73 300 ha, and total yield is 1.79 million t; area of mulberry garden is 5 300 ha, and total yield is 85 000 t; area of osier is 20 000 ha, and total yield is 0.168 million t; area of ginkgo is 20 000 ha, and total yield of gingko fruit is 3 000 t; area of honeysuckle is 66 700 ha, and output value is more than 0.7 billion yuan; area of chestnut is 46 700 ha, and total yield is 80 000 t. Linyi has 26 characteristic villages of Chinese agricultural products recognized by relevant national departments, and 14 agricultural products have won the national geographical indication trademark and national geographical indication product certification respectively[14-15].

3 Problems faced by modern agriculture in Linyi City

3.1 Low degree of farmer organization and low level of agricultural industrialization On the whole, the industrialization level of agriculture in Linyi City is not high enough, and the agricultural industry chain is not long, and the value-added conversion rate of agricultural products processing is low. Meanwhile, in the process of agricultural industrialization, the interest linkage mechanism and interest relationship between agricultural leading enterprises and farmers are not close enough[16]. At present, there are 1 398 farmers' professional cooperative economic organizations in Linyi, accounting for 10% of the whole country and 50% of Shandong Province, with 1.5 million cooperative employees and 6.64 million t of agricultural products sold annually. It can be seen from the development status of farmers' professional cooperative economic organizations that the cooperative economy of Linyi City has shown a good development trend. However, it must be clearly recognized that there is still a certain gap between the development of Linyi farmers' professional cooperative economic organizations and the requirements of the cooperative economy of developed countries and the new socialist countryside[17]. For example, there are still problems such as farmers' weak sense of cooperation, imperfect internal governance mechanism, inadequate support policies, and serious resource shortage in the development of farmers' professional cooperative economic organizations[18-19].

3.2 Low overall quality of farmers and not strong ability to absorb science, technology and culture According to the statistics, the scientific and cultural quality of rural farmers in Linyi City is generally low. In Linmu County, there are 560 000 agricultural population, and rural labor force accounts for 72.4% of the agricultural population, and agricultural labor force accounts for 66.1% of the labor force. The education level of the labor force is 37.9% for primary school and below, 45.1% for junior high school, 14.6% for senior high school or technical secondary school, and 2.4% for college and above. 35% of labor force aged 26-35; 10% of labor force aged 36-45; 50% of labor force aged 46-55; 5% of labor force aged more than 56, which seriously affects and restricts farmers' income increase. Less than 2% of the total population in the city are skilled farmers and rural leaders. This not only limits the opportunities and ways for farmers to get rich, but also restricts the improvement of agricultural labor productivity and the development of modern agriculture[20]. Moreover, the young and middle-aged labor force has been drained from the agricultural field, and the elderly, women and children have become the main force in agricultural production. Their comprehensive quality is relatively low, and they lack the necessary ability to accept and operate new technologies and varieties. The production technology mainly depends on words and deeds, and the selection of varieties is basically based on experience. As a result, the agricultural structure is relatively simple, and the production technology is backward. The agricultural efficiency is not improved, and the labor efficiency is low[21]. The age structure and knowledge structure will inevitably lead to a shortage of practical talents and leaders in agricultural development, and there will be no follow-up to improve the level of agricultural production[22].

3.3 Weak agricultural infrastructure and deterioration of agricultural ecological environment On the whole, Linyi's agricultural infrastructure is very weak. There is a big gap between the requirements of agricultural machinery equipment and its facilities for the development of modern agriculture. The overall ability of agriculture to resist natural disasters has not been significantly improved[23]. At the same time, the agricultural labor productivity of Linyi City is low, which is only 1/7 of that of the secondary industry. The land managed by farmers is scattered, and it is difficult to realize mechanized production because of the small scale of cultivated land, irregular fields, poor road conditions, *etc.* From the perspective of the current farming situation, each farmer has different stubble arrangements, and the varieties are disordered. The production is time-consuming and labor-intensive, and the production cost remains high. For a long time, the "hygienic agriculture" of valuing chemical fertilizer and despising farm manure and the business model of predatory production have seriously reduced the soil fertility level[24]. According to the soil sampling survey, the proportion of the first, second and third grade soil in Linyi City decreased from 80% in the 1990s to 54% in 2008, of which the high-quality soil accounted for only 16% of the cultivated land. Rural roads, water conservancy and other facilities are aging, seriously damaged, difficult to repair, and water canals become dry. Infrastructure is weak, and industrial "three wastes" have worsened the overall agricultural environment, and agricultural non-point source pollution has become the main source of pollution affecting the agricultural ecological environment[25]. Modern agriculture in Linyi City is facing severe challenges of agricultural production resources and ecological environment.

3.4 Inadequate agricultural scientific and technological innovation and slow popularization and application of achievements (i) Compared with developed provinces, the contribution

rate of science and technology to agricultural growth in Linyi City is relatively low, far from meeting the new requirements of modern agricultural technology. (ii) The utilization rate of modern agricultural technology is not high, with low coverage rate, and the technological gap between regions, industries and properties is obvious. (iii) There is a serious shortage of agricultural science and technology reserves, and it is difficult to make major breakthroughs in scientific and technological innovation.

At present, the scientific and technological content of leading enterprises in Linyi City is generally low. 80% of the technical equipment level of agricultural enterprises is at the world average level in the 1970s and 1980s, and only about 8% can reach the international advanced level. There is a lack of strong technical support in the fine processing, packaging, marketing, brand management and other aspects of agricultural products[26]. The weakness of leading enterprises directly affects the processing and conversion rate of agricultural products. The conversion rate of agricultural products processing in Linyi City is only 40% -50%, of which only 20% are processed more than twice. The ratio of agricultural products processing output value to agricultural output value is 0.8∶1.

4 Countermeasures and suggestions

4.1 Improving the degree of farmers' organization and the level of agricultural industrialization At present, the main form of production and operation in rural areas is the individual and decentralized labor of farmers, and the symbol of modernization should be large-scale operation[27]. The development of agricultural cooperatives has the following advantages: (i) agricultural cooperatives can change decentralized operation into large-scale land operations, so that they can carry out industrialized operations. (ii) Agricultural cooperatives can completely transform agricultural industrialization, decentralized, sporadic and non economical agriculture into industrialized operation, so as to improve the level of industrialization. (iii) Agricultural cooperatives can implement advanced production management, which is the biggest advantage of agricultural cooperatives. (iv) Cooperatives push their products to the market, integrate their business forms into the market, sell their products, improve the commodity rate and their market competitiveness. In addition, the most important thing to run agricultural cooperatives is to break the previous single, blind and even lagging forms of cooperation, and to incorporate cooperatives into planned and accurate information operations, so that cooperatives become the basic elements of modern agriculture and improve the level of agricultural industrialization[28-29]. At present, there are 11 299 farmers' professional cooperatives (associations) in the city, and 4 974 farmers' professional cooperatives registered in industry and commerce, accounting for 13.8% of the total number of farmers, and the scale of agricultural professional cooperatives is very small. Therefore, joint expansion is needed, and agricultural cooperatives have become the measures of modern agricultural development[30].

4.2 Improving the quality of farmers and enhancing their ability to absorb science, technology and culture (i) It should make rational use of education and training resources such as municipal, county and district schools and employment training centers to conduct classroom education, teach agricultural science and technology and cultural courses, and enable farmers and migrant workers to master 1-2 practical technologies, so that farmers can obtain learning opportunities. (ii) It should strengthen publicity and enhance the initiative of farmers to learn agricultural science and technology. At present, radio and television have become an important channel for farmers to accept new knowledge and new ideas. It should give full play to the role of district radio stations, district television stations and town television relay stations, vigorously publicize the good model of getting rich through science and technology, increase the broadcast time of agricultural knowledge programs, and make agricultural knowledge programs close to farmers, practical, vivid and interesting, so as to attract farmers to watch, learn and exchange[31]. At the same time, it should deeply investigate farmers' demand for production technology, educate them according to their needs, and stimulate their initiative in learning. (iii) It is necessary to innovate the rural human resource development system, enhance the awareness of talents, establish a new concept of talents, cultivate a group of rural scientific and cultural leaders, solve the problem of lack of rural talents, create a good environment for rural farmers to learn, enable farmers to enjoy the right to be educated, re-educated, retrained, cultivate large scientific and technological families, and play an exemplary role for farmers.

4.3 Increasing investment in agricultural infrastructure and improving modern agricultural production (i) It should vigorously develop facility agriculture and raise the level of agricultural production. According to the advantages of planting resources in Linyi, it should adhere to acting according to local conditions, strengthen structural adjustment, focus on facility agriculture and characteristic agriculture, strengthen policy guidance and technical services, and vigorously promote the planting mode of melon, fruit and vegetable in greenhouses and large, medium and small arch greenhouses[32]. At present, Linyi has formed a vegetable planting and production area in the south, a flower seedling planting and production area in the suburbs, a high-quality flue-cured tobacco planting and production area, and a characteristic fruit planting and production area. The city's facility agriculture area reaches 6 200 ha. (ii) It should launch new agricultural projects and improve modern agricultural production conditions. On the one hand, it could improve the utilization rate of water and fertilizer resources and enhance the ability of crop production to resist disasters by establishing perfect farmland infrastructure. On the other hand, it can improve the industrialization level of modern agriculture and break the bottleneck that affects the crop production by strengthening the construction of farmland infrastructure, promoting the application of advanced practical agricultural technology, industrialized management and other measures[33]. (iii) It could promote investment in greenhouse technology, and increase ways for farmers to increase income and become rich.

4.4 Accelerating the transformation of scientific and technological achievements

4.4.1 Strengthening the agricultural science force in villages and towns, and providing village level scientific and technological service personnel. For example, the method of "sending out and inviting in" could be taken to actively create opportunities for front-line agricultural personnel to learn and improve, and cultivate a group of rural agricultural talents who understand technolo-

gy, are good at management, and have market ideas.

4.4.2 Increasing investment in science and technology by the government. Government investment should be focused on modern agricultural projects that can promote the rapid economic development of the region[34-35]. At the same time, the government should take the lead in encouraging the society to set up various companies to promote the transformation of scientific and technological achievements and raise funds from the society. Rural credit cooperatives should strongly favor loans for the development of scientific and technological projects in modern agriculture.

4.4.3 Adopting multi-level and multi-channel scientific and technological investment. It should carry out rural technical training, go deep into the fields and corners, and teach science and technology, so that farmers can truly master modern agricultural technology. The strong vitality of the transformation of rural scientific and technological achievements: increasing farmers' income is the starting point and ending point of the transformation of rural scientific and technological achievements[36]. The cutting-edge modern agricultural product industry and high-quality modern agricultural industry should first be established on a good industrial basis. By employing various agricultural experts, it could promote the transformation of modern agricultural scientific and technological achievements and accelerate the development of modern agriculture[37]. For example, Hedong District carried out various forms of technical training for more than 300 000 farmers, strictly standardized planting standards, promoted more than 100 new technologies such as factory seedling breeding, and increased income by 6 000 yuan. At present, Dalin, Wanquan, Hongfeng and other enterprises have established 8 000 ha farm type bases, which are the production workshops of enterprises. In early 2018, the technicians of Lan'guan Group in Hedong District successfully broke the monopoly of the Netherlands Flower Association and solved the problem of self breeding of lily, tulip and other flowers, reducing the price of seed balls from 4.0 – 5.0 yuan/piece at the time of import to about 0.5 yuan/piece today. Since then, this flower enterprise, which used to focus on planting fresh cut flowers, has turned to breeding seed balls, and vigorously implemented order agriculture. The enterprise provides farmers with seed balls free of charge and recycles flowers at the price of 0.5 yuan/piece, driving more than 3 600 farmers around to engage in fresh cut flower related production. The flower production base of the enterprise has also been rated as a provincial science popularization demonstration base by the provincial science association.

According to the statistics of the agricultural department, Linyi has built 324 agricultural standardized production bases at all levels and of all types, with a total area of 212 000 ha. Among them, there are 53 municipal agricultural standardized production bases named by the municipal government. It can be said that the application of science and technology in agriculture is huge, and the wealth is unlimited, and science and technology is the first productive force[38].

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should make it clear that farmers' cooperatives should absorb more people who are easy to return to poverty, to ensure their income stability, and consolidate the achievements of poverty alleviation.

4.3.2 Focusing on promoting trials and demonstrations of cooperatives. First, it is necessary to adhere to the idea of "opening the way through the pilot and leading the way through the demonstration", and select the experimental demonstration sites at the provincial level. We should select village-level cooperatives with different locations, different environments and different types to carry out pilot or comparative experiments and sum up development experience. It is necessary to focus on supporting and helping cooperatives engaged in advantageous agricultural characteristic industries and related industries in dam areas of more than 33.3 ha, and create models. The second is to improve the evaluation index system of demonstration cooperatives. Villages or communities with a good foundation and much experience should be encouraged to declare demonstration sites. It is necessary to promote the establishment of demonstration cooperatives at provincial, municipal and county levels, and encourage the establishment and declaration of national demonstration cooperatives. The cooperatives with successful declarations will be rewarded respectively. Third, it is necessary to increase the publicity and commendation of advanced demonstration cooperatives, sum up experience in a timely manner, organize study and observation, and constantly play a typical leading role.

4.3.3 Focusing on building provincial cooperative data center. First, relying on the advantages of big data industry, we should build a provincial cooperative data platform, establish a cooperative information entry system and information sharing mechanism, grasp the development status of cooperatives in the province in time, and provide decision-making reference for guiding industrial adjustment and issuing support policies. Second, it is necessary to establish and improve the credit file system of provincial farmers' cooperatives, improve the credit management mechanism of cooperatives, give preference to farmers' cooperatives with good credit in the evaluation of model cooperatives and policy support, and supervise and rectify cooperatives with abnormal credit in a timely manner. The third is to establish an exchange platform for directors of farmers' cooperatives, and encourage members of cooperative councils to exchange experience and share information in cooperative data centers.

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