The obstacles and Countermeasures of the Trend of "Elderly Agriculture" to the Development of Intelligent Agriculture — Jiangxi Province as an Example

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Abstract: Through the analysis of the obstacles in the development of intelligent agriculture in the elderly agriculture, the corresponding countermeasures are put forward. In promoting wisdom agriculture in the development process of the elderly agriculture, need the joint efforts of all walks of life, including government policy support, scientific research institutions and agricultural enterprises, only through multilateral cooperation, can finally realize the organic combination of elderly agriculture and wisdom agriculture, promote the process of agricultural modernization.

Keywords: elderly agriculture, intelligent agriculture, obstacles, countermeasures

1 Introduction

In order to realize rural revitalization, the country has put forward a major strategy to developing smart agriculture. The development of smart agriculture can be said to be an effective way to promote the integrated development of urban and rural areas after China becomes a world manufacturing power, and is an important direction for the development of modern agriculture. At present our country 5G communication technology, artificial intelligence, cloud computing technology development has been in the world, can make full use of these advanced technology, transform the traditional agriculture, promoting "Internet+" and agricultural production, management, management, service integration development, vigorously promote intelligent agricultural production and agricultural marketing network, promote agricultural production and management efficiency and service facilitation new promotion, in order to speed up the agricultural modernization and the rural 123 industrial integration provides momentum, realize the smooth transformation of traditional agriculture to wisdom agriculture in China. However, there are many adverse factors and obstacles in the transformation of China's traditional agriculture to smart agriculture, and the trend of "elderly agriculture" is one of the obstacles.

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2 The current situation of "elderly agriculture" in China

The so-called agriculture for the elderly is the agricultural production and operation activities mainly for the elderly labor force[1]. The most prominent feature of the elderly agriculture is the aging of the labor force engaged in agricultural production and operation activities[2-3].

The causes of the elderly in China are the aging of the social population caused by "fewer children" and the transfer of rural young and middle-aged labor force to the towns caused by urbanization. According to the UN standards, if the population aged 60 or above accounts for 10% of the total population, then the country or region will unexpectedly enter an aging society. In 2020, the seventh national census data shows that the proportion of the rural elderly aged 60 and above is 23.81% of the total rural population, and the proportion of the elderly aged 65 and above is 17.72% of the total rural population. With the further development of China's urbanization and industrialization, the rural young and middle-aged labor force continues to transfer to cities and towns, and the agricultural phenomenon of the elderly in China will be further intensified[4].

The age range of the rural labor force defined in China is 15-65 years old, and all the rural population aged over 15 years old and under 65 years old belong to the category of the labor force. However, this definition of labor force mainly applies to the age limit of rural population working outside, while the rural population engaged in agricultural production and operation activities in rural areas is actually not subject to this age limit, and the rural population over 65 years old is still the main labor force of a peasant household family. Taking Jiangxi Province in the central part of China as an example, Jiangxi Province is a province with a large proportion of agricultural population. According to the comprehensive data of Jiangxi Province[5], the rural population of Jiangxi Province was 33.47 million, among which the working-age labor force aged 15-64 is 24.44 million, accounting for 73.0% of the total rural population aged 50-64 was 6.23 million, accounting for 25.5% of the total rural labor force. However, with the acceleration of urbanization in recent years, Jiangxi has become one of the important areas of the national agricultural labor force transfer to the outside. After a large number of rural young and middle-aged rural labor force transferred to cities and towns, resulting in the aging of the labor force left-behind rural areas engaged in agricultural production and operation. According to the sample survey of farmers in D Village, Z Town, Duchang County, Jiangxi Province in July 2021, among the 104 sample farmers surveyed (see Table 1), the labor force aged between 50 and 64 accounts for 40.38% of the total sample force; if the population aged 65 are still engaged in agricultural production and operation activities at home, the proportion of aging labor force in the sample area is as high as 64.42%.

Table 1 Age distribution of the main labor force of the sample farmers.

age group	number of people	ratio (%)	accumulative total
15-49 Years	37	35.8	35.58
50~64 Years	42	40.8	75.96
65 and over	25	24.4	100.00
amount to	104	100.00	

3 Barriers to the development of smart agriculture under the trend of elderly agriculture

Wisdom agriculture is a set of many modern technology and knowledge of integrated application system[6], its content including geographic information, global satellite positioning, remote sensing technology, automation technology, computer technology, communication and network technology and other digital technology, at the same time and agricultural production, agricultural ecological environment, agriculture and rural areas and other basic professional knowledge, the production and management, circulation and service and so on each link need digital knowledge to management and control[7-8]. Therefore, the development of smart agriculture urgently needs the agricultural labor force to have modern knowledge and skills. The current aging trend of agricultural labor force in China has brought the following obstacles to the development of smart agriculture in China.

3.1 Technical level lags behind

Elderly farmers have been engaged in traditional agricultural production for a long time, and their technical level is relatively lagging behind, and they have some difficulties in understanding and application of intelligent agricultural technology. According to the comprehensive data of the third National Agricultural Census in jiangxi province,the cultural education level of agricultural production and operation personnel in Jian gxi Province was obtained (see Table 2). Jiangxi province had a total of 331802 people in agricultural production and operation personnel in 2016. among them, not go to school accounted for 4.5%, with primary school culture education 40.4%, with junior high school culture education 47.7%, with high school culture education level accounted for 6.6%, with college and above cultural education level accounted for only 0.8%. The general knowledge and culture of Jiangxi rural production and operation personnel are relatively backward, which affects their cognitive ability of new knowledge and new technology.

Table 2 Cultural education level of agricultural production and operation personnel in Jiangxi Province.

Education level	Number of people (people)	scale (%)
illiteracy	14931	4.5
Primary school culture	134048	40.4
Junior high school culture	158270	47.7
High school culture	21899	6.6
College education or above	2654	0.8
amount to	331802	100.0

The technical training status of agricultural production and operation personnel in Jiangxi Pro vince in 2016 can also be obtained from the Reference [5] (see Table 3).In terms of technical training of agricultural production and operation personnel (see Table 3), among 331802 agricultural production and operation personnel in Jiangxi Province, 255995 received no agricultural professional technical training, accounting for 77.2%; 75807 people received agricultural professional technical training, accounting for 22.8%. Those over 50 without technical training in agriculture, at 95.3 percent. These elderly agricultural laborers who have not received agricultural professional technical training find it difficult to understand and use

knowledge of smart agriculture technology, and cannot adapt to the development requirements of smart agriculture.

Table 3 The technical training status of agricultural production and operation personnel in Jiangxi Province in 2016

Agricultural professional and technical training status	Number of people (people)	scale (%)
No training	255995	77.2
Training	75807	22.8
amount to	331802	100.0

Source: Comprehensive data of the Third National Agricultural Census of Jiangxi Province (2016)

3.2 Conservative concept and insufficient willingness to participate

The understanding formed by elderly farmers in traditional agriculture for many years guides their experience in agricultural production and operation, which is not easy to give up, and due to their age, health level and energy decline, elderly farmers generally resist new technology, skeptical of new technology, afraid of taking risks and unwilling to try [9,10]; at the same time, the lack of understanding of the benefits of smart agriculture leads to their low enthusiasm to participate in smart agriculture in agricultural production. Among the 104 sample farmers investigated by this research group, 67 main labor force aged 50 and above, only 7 are willing to participate in the training if they have an opportunity, 60 are not willing to participate in the training and the voluntary participation rate is only 10.5%; If they pay for the training, only 5 are willing to participate in the training, and the voluntary participation rate is only 7.5%. The low quality of labor force brought by "elderly agriculture" makes it difficult to promote new technologies in agricultural production, thus affecting the progress of agricultural science and technology.

3.3 Information access is not smooth, information is backward

The main channels for elderly farmers to obtain information are still mainly in the traditional ways, and it is difficult go access the internet, use digital supplies and distinguish network information, resulting in the degree of understanding and utilization of the Internet and digital information is not high[11], leading to their insufficient understanding of the information related to smart agriculture. At the same time, the relative backwardness of rural network construction also affects the elderly farmers to obtain information. Among the 104 sample households surveyed (see Table 4), 22 households had agricultural production technical information through books, accounting for 21.2%; 48 households had agricultural production technical information through TV, accounting for 46.2%; 1 household had agricultural production technical information through radio, accounting for 0.96%, and 33 households had agricultural production technical information through the Internet, accounting for 31.7%. However, if the main labor force of households under 50 years old is excluded, only 19 samples of peasant families know the main labor force of agricultural production technology through the Internet, accounting for 18.3%. It can be seen that the elderly farmers still obtain agricultural production technology information in the traditional way, which does not meet the needs of the development of intelligent agriculture.

Table 4 Methods of access to agricultural technical information for the main labor force of the sample peasant households.

The way to obtain the information	Number of people (people)	scale (%)
books	22	21.15
television	48	46.16
broadcasting	1	0.96
internet	33	31.73
amount to	104	100.00

Among the 104 sample farmers surveyed by our research group, 67 are aged 50 and above; Among the 67 main labor samples (see Table 5), from the agricultural production information, 22.39% want to know the excellent variety information, 8.96% want to know the breeding technology information, 7.46% want to know the field management technology information, and 47.76 people want to know the agricultural meteorological forecast information. The data show that China's agriculture is still in the traditional agricultural state of "relying on the sky to harvest", and farmers' agricultural production activities are very dependent on the weather.

Table 5 Agricultural technical information obtained by the elderly farmers.

Agricultural and technical knowledge and information content	Number of people (people)	scale (%)
Good variety information	15	22.39
Breeding technology information	6	8.96
Technical information on field management	5	7.46
Store fresh and processing information	1	1.49
Agricultural materials and agricultural products supply and demand price information	1	1.49
Agricultural weather forecast information	32	47.76
Other information	7	10.45
amount to	67	100.0

3.4 The gap between urban and rural social living environment hinders the flow of urban labor force to the countryside.

The development of smart agriculture needs the labor force with high knowledge, culture and technical level to engage in production, operation and management. In the background of the aging of the rural labor force, the urban population with high knowledge and technology level needs to flow to the countryside to meet the needs of the development of smart agriculture. However, at present, there is still a large gap between urban and rural areas in many areas of China. These social environment gaps include not only material conditions, but also cultural environment, such as backward rural customs and habits. The superior social living environment of the city than the countryside is not conducive to the return of the urban population to the countryside, thus hindering the development of smart agriculture.

4 Countermeasures and suggestions

In view of the obstacles existing in the development of smart agriculture under the background of agriculture for the elderly in China, it is necessary to make joint efforts from all walks of

life and take effective countermeasures from the following aspects to overcome the obstacles existing in the development of smart agriculture.

4.1 Strengthen and provide technical training work

We can start from the government and enterprises, organize training courses and carry out technical training activities to improve the elderly farmers' understanding and application ability of smart agricultural technology, so that they can gradually adapt to the needs of the development of smart agriculture.

4.2 Accelerate the construction of informatization in rural areas

Through the construction and improvement of rural informatization network, improve the level of rural informatization, provide elderly farmers with more convenient ways to obtain information, and help them to better understand the relevant information of smart agriculture.

4.3 Publicize and popularize the knowledge of smart agriculture and improve the understanding of rural labor force on smart agriculture

By carrying out various forms of publicity activities, we will popularize the knowledge of smart agriculture to the elderly farmers, introduce their advantages in improving agricultural production efficiency and reducing labor burden, and improve their enthusiasm for participation.

4.4 Establish a two-way labor flow mechanism between urban and rural areas

At the present stage, because the scale benefit and agglomeration benefit of urban economy are higher than the economic benefit of rural traditional agriculture, the young and middle-aged people of rural labor force flow to the city. Smart agriculture itself is a kind of efficient and green ecological agriculture, which can provide a higher income to the highly skilled labor force. Therefore, for the development of smart agriculture, we need to build a two-way flow mechanism of labor force between urban and rural areas, promote the flow of high-tech labor force to rural areas, and promote the development of smart agriculture.

4.5 Improve the social service system and the social security system

Smart agriculture is a comprehensive industrial system of many disciplinary knowledge and technology, which needs to provide various services including finance, technical consultation and guidance, and market planning in production, operation, circulation, storage, sales and other links. At the same time, smart agriculture is also a high-risk industry, which needs to provide insurance and value-added services for maintenance and financial risks. This requires the government to establish and actively support the development of service social organizations, and cultivate and improve the social service system and security system.

4.6 Further strengthen and improve rural infrastructure construction

We will strengthen and improve rural infrastructure construction, promote the integrated development of urban and rural areas, eliminate the gap between rural areas and urban areas in terms of living convenience, and create a living environment conducive to the two-way flow of labor force between urban and rural areas.

4.7 Accelerate the training of agricultural production and operation management personnel

First, we will fully implement the plan to cultivate modern farmers, focusing on farmers engaged in appropriately scaled operations, conduct training for the whole industrial chain at different levels and in different categories, strengthen technical guidance and tracking services after training, and support the establishment of new types of agricultural operators. Make full use of the existing network education resources, and strengthen the online education and training for farmers. We will implement the training plan for rural operation and management personnel, strengthen the construction of training bases, and train a group of rural practical talent leaders who can lead and drive a party. Second, we will focus on cultivating family farm operators and leaders of farmers' cooperatives. The production and operation of smart agriculture needs to have a certain scale to reduce costs and obtain economies of scale and agglomeration benefits. Therefore, it is necessary to further promote the training of family farm operators, improve project support, production guidance, quality management, market docking and other services. We will establish a talent pool for the leaders of farmers' cooperatives and strengthen training for the backbone of their cooperatives. We will encourage rural migrant workers, college graduates, ex-servicemen, scientific and technological personnel, and practical rural personnel to establish and lead family farms and farmers' cooperatives. We will encourage local conditions to support farmers' cooperatives in hiring agricultural managers. Family farm operators and leaders of farmers' cooperatives are encouraged to participate in the evaluation of professional titles and the recognition of skill levels.

5 Conclusion

The current situation and trend of "elderly agriculture" in China hinder the development of smart agriculture, but smart agriculture is the development direction of Chinese agriculture. Therefore, the development of smart agriculture needs the joint efforts of all sectors of society, including the policy support of the government, the technical support of scientific research institutions and the cooperation of agricultural enterprises. At the same time, it is also necessary to improve the social incentive competition mechanism, so that agricultural labor in order to pursue high-paying employment opportunities to improve their cultural and technical capabilities.

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