

Clarification of the Agricultural Labor Shortage Problem and Relief Paths

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Abstract: Due to the acceleration of the aging process and the orderly advancement of urbanization, the current shortage of agricultural labor in China is not only characterized by a sharp decline in absolute quantity, but also by structural imbalance as evidenced by the aging, low-quality, part-time, and widespread nature of the agricultural labor structure. Therefore, countermeasures should be sought from both the supply side and demand side of agricultural labor. On the demand side, the machine substitution effect should be realized under the premise of developing moderate-scale operations and the withdrawal of elderly farmers; on the supply side, channels for college graduates willing to return to their hometowns and migrant farmers to obtain employment and start businesses should be smoothed to achieve two-way flow of urban-rural factors.

Keywords: Farmer Shortage; Problem Clarification; Practical Dilemma; Solution Path.

1. Problem Statement

The Third Plenary Session of the 20th Central Committee of the Communist Party of China has made systematic arrangements for further comprehensively deepening reform and promoting Chinese-style modernization, among which "consolidating and improving the basic rural management system" is an important measure. Developing agriculture relying on the two-tier management system of "household contract management as the foundation, combining unified and separate operations" is an inevitable choice to realize Chinese-style agricultural modernization. Among them, farmers, as the most dynamic production factor in the rural management system, are the most fundamental guarantee for realizing Chinese-style agricultural modernization. In recent years, with the concentration of young labor in the secondary and tertiary industries, there has been a crisis of generational discontinuity in the young labor force actually engaged in agricultural production. At present, the academic circle follows the following analytical paths regarding whether there is a shortage of agricultural labor: First, evidence from sociological surveys. Some scholars have found through surveys that there are almost no laborers under the age of 60 among agricultural producers, and the structure of left-behind labor in rural China is inferior. Second, inferring agricultural labor shortage from the perspective of farmland abandonment. However, overall, the reasons for abandonment are complex, being constrained by the natural endowment of the land, the trade-off between farming input and output, expectations of market conditions, the degree of organization, and the property rights system. Third, from the perspective of the characteristics of the farming population, it is believed that what is actually in short supply is young farmers. The composition of China's agricultural labor force indicates that the shortage is essentially "aging" and "low-quality". The author believes that the above analytical paths are open to question, as none of them answer from the demand side how many agricultural laborers are actually needed to support modern agricultural production. Clarifying this issue can get to the essence of the "no one to farm" problem and even the problem of land abandonment. To answer the above questions scientifically

and rigorously, a proper verification plan is needed. Based on data from the Seventh National Population Census Yearbook and the Third National Agricultural Census, the author calculates the demand side of China's agricultural labor force to demonstrate whether there is a shortage on the supply side of China's agricultural labor force.

2. Clarification of the Shortage of Agricultural Labor in China

2.1 Calculation of the Demand Side of China's Agricultural Labor Force

To argue whether there is a real shortage of agricultural labor in China, the author attempts to select the following two calculation methods: the current simplified model calculation and the sustainable model calculation for the next 20 years.

1) Current simplified model calculation. According to the statistics of the Ministry of Agriculture and Rural Affairs, by 2022, the area of household contracted farmland in China was 157,465.9 million mu. Based on an average of 7.8 mu of farmland per household and 2-3 laborers per household, China's rural areas would require approximately 400-600 million agricultural population. The above estimation is made under the scenario where agricultural land is not transferred and cultivated land is entirely operated by small farmers. In reality, by 2022, the area of transferred farmland in China was 557 million mu, and there were still 1,017.7 million mu of untransferred farmland, so corrections must be made. By 2020, there were approximately 95 million agricultural employees in China's rural areas, with small farmers (with less than 10 mu of land) accounting for 85.1%, that is, the number of small farmer employees was 80.75 million, and the number of employees in large-scale households and business entities engaged in crop farming was 14.25 million. If small farmers are calculated at an average of 7.8 mu per household, 1,017.7 million mu of contracted land would require 130 million households, with 2-3 people per household, needing 260-390 million small farmer agricultural workers, which is a large gap compared with the current 80.75 million small farmers. If the total cultivated land area of large-scale households + business entities is calculated based on the transferred area of 557 million mu, with an average planting area of 134 mu per household, approximately 4.15 million large-scale households would be needed, with 4 people per household, requiring about 16.6 million people. Currently, there are only 14.25 million people, resulting in a shortage of 2.35 million people. In practice, taking Wuhan family farms as an example, the average cultivated land area per laborer is only 20 mu. Based on 557 million mu of cultivated land, approximately 27.85 million people would be needed. Currently, the number of agricultural employees in large-scale operations is 14.25 million, with a shortage of nearly half.

2) Calculation of agricultural labor sustainability for the next 20 years. Take the 2020 Population Census Statistical Yearbook as an example. If we use a static cumulative statistical method for agricultural population of all age groups (where the population of each age group does not change due to factors such as death, urbanization, and withdrawal from land), the following estimation table is obtained.

Analysis from Table 1 shows that assuming no young people under the age of 40 engage in agriculture by 2045, the agricultural labor force will decrease by 46.38% by then. In other words, excluding other factors (including death, urbanization, withdrawal from contracted land, etc.), based on the natural replacement of the agricultural labor population, there will only be $95 \text{ million} \times (1 - 46.38\%) = 50.94 \text{ million}$ people in 20 years. If China's farmland management model successfully transitions from small-scale farming to family farms in the next 20 years, to ensure no shortage of agricultural population in the future, the per capita cultivated land required will be $157,465,900 \text{ mu} / 50.94 \text{ million people} = 30.9 \text{ mu}$. As mentioned earlier, the current average cultivated land per laborer in China's family farms is 20

mu. Therefore, the two assumptions to ensure no shortage of agricultural labor in 2045 are: on the premise that all farmland management models successfully transition to family farms, ensure that the average cultivated land per laborer reaches approximately 30 mu. As calculated above for the demand side of China's rural labor force in recent years, it can be concluded that there is an absolute shortage in quantity. Another shortage manifests as structural imbalance, specifically the aging, low-quality, instability, and universality of agricultural labor.

Table 1: Estimated Table of China's Future Rural Agricultural Employed Population

Age group	16-19	20-24	25-29	30-34	35-39	45-49	50-54	55-59	60-64	65-69	70-74	75 and above
Proportion	%	%	%	%	%	%	%	%	%	%	%	%
2020	0.7	2.17	3.67	6	5.88	11.9	12.4	15.2	11.78	11	5.4	3
2025		0.7	2.17	3.67	6	7.44	11.9	12.4	15.2	11.78	11	5.4
2030			0.7	2.17	3.67	5.88	7.44	11.9	12.4	15.2	11.78	11
2035				0.7	2.17	6	5.88	7.44	11.9	12.4	15.2	11.78
2040					0.7	3.67	6	5.88	7.44	11.9	12.4	15.2
2045						2.17	3.67	6	5.88	7.44	11.9	12.4

Note: Data for 2020 is sourced from the Seventh National Population Census, with subsequent data incorporated using a static progressive method.

2.2 Structural Characteristics of China's Agricultural Labor Force

With the acceleration of the declining birthrate and aging population, and the gradual advancement of industrialization and urbanization, China's agricultural labor force presents the following structural characteristics.

1) Aging. Structurally, the aging of the agricultural labor force shows a *逐年加重趋势*. The National Health Commission clearly points out that negative population growth and aging may become an unprecedented transformation in a century, and the aging process of the rural population is more severe than that of the urban population. Accompanying the aging of the rural population is the aging of agricultural practitioners. Data from the Seventh National Population Census shows that in 2020, young and middle-aged agricultural practitioners aged 20-39 in rural China accounted for 17.72% of the agricultural population, with an absolute number of only 16.834 million. Against the background of generally weak willingness of young farmers to engage in agriculture, the problem of no successors in agriculture will become more prominent.

2) Low quality. The overall quality of China's agricultural labor force is relatively low, mainly with junior high school education. According to the data of the Third National Agricultural Census, by 2016, 48.4% of China's agricultural labor force had received junior high school education, 7.1% had received senior high school or technical secondary school education, and only 1.2% had received college education or above. In recent years, the state has vigorously cultivated high-quality farmers. By 2020, the actual number of high-quality farmers was 17 million. In that year, China had 177.15 million employees in the primary industry, accounting for only 9.6% of the total employees. They have gradually become an important part of family farms, farmer cooperatives, industrial management organizations, and socialized service organizations. However, it must be noted that under the national condition of "a large country with small-scale farmers", they, as new business entities, are still relatively few in terms of quantity and cultivated land area operated.

3) Part-time employment. In terms of total volume, the phenomenon of part-time employment of agricultural labor force is serious, with long-term instability in quantity and a *逐年下降态势*. Data from the Third National Agricultural Census shows that there are 207 million agricultural management

households in China. Monitoring data from the national rural fixed observation points shows that in terms of the composition of China's agricultural management households, pure agricultural households account for only 10.3%, a decrease of 13 percentage points compared with 2000; part-time agricultural households (Type I) account for 11.6%, a decrease of 14.8 percentage points; 素农户 account for 20.6%, a decrease of 5.6 percentage points; non-agricultural households account for 57.5%, an increase of 33.5 percentage points. This instability is the result of the one-way siphoning effect of cities on rural young labor force in the process of urbanization.

4) Universalization. Geographically, the shortage of agricultural population is not a "scattered" phenomenon in rural areas of underdeveloped regions, but has a certain universality. This is not only the case in economically underdeveloped areas; even in economically developed cities like Shanghai and Beijing, there is a high rate of rural hollowing-out. In southern Jiangsu rural areas with a high level of county economic development, the degree of rural hollowing-out also tends to be severe.

In summary, from an epistemological perspective, the shortage of agricultural population in China is beyond doubt, specifically manifested in the aging, low-quality, part-time employment of the existing farmer workforce, and the universalization of the shortage problem. Guided by the above epistemology, the following will propose solutions for policy reference.

3. Paths to Alleviate the Shortage of Young Labor Force

Currently, in China's agricultural production sector, elderly farmers dominate agricultural production and management decisions, and their adverse impacts on agricultural production include: threatening food security; restricting technological progress and reducing production efficiency; and affecting large-scale operations. Faced with the realistic predicament, this paper attempts to propose targeted measures from the following three levels for reference.

3.1 Realizing the Coordinated Development of New Agricultural Entities and Small-scale Farmers Driven by the Joint Force of "Field Consolidation + Mechanization"

Some 观点认为 that the growth of agricultural mechanization can offset the impact of agricultural labor shortage caused by population aging. However, it ignores the prerequisite factor for the development of agricultural mechanization, that is, it requires long-term stable, concentrated and contiguous land of a certain scale as support. If farmland is changeable and fragmented, it will also hinder the development of agricultural mechanization and make it difficult to exert the role of mechanization. Data from the Big Data Development Center of the Ministry of Agriculture and Rural Affairs shows that after land certification, the average contracted land area per household in the country is less than 7.5 mu, while the average number of plots per household is as high as 5.5. Both the reports of the 19th and 20th National Congresses of the Communist Party of China clearly proposed to "consolidate and improve the basic rural management system". Then, how to solve the problem of farmland fragmentation under the premise of the long-term stability of land contractual relations, so as to realize the "machine substitution" effect and cope with the dilemma of agricultural population shortage?

As localities carry out the new form of "small fields merged into large fields" to improve the basic rural management system, the 2023 Central Document No. 1 summarizes local experiences such as "small fields merged into large fields" and explores to gradually solve the fragmentation problem in combination with farmland construction and land consolidation on the premise of farmers' voluntariness. Some localities have made beneficial attempts and summarized the following experiences: First, the reform of "small fields merged into large fields" should give full play to the

advantages of the collective's "unified" management; second, in the reform, full respect should be paid to farmers' wishes and differentiated demands; third, the reform should pay attention to follow-up guarantees.

In addition, "merging small plots into large ones" to carry out large-scale operations is only a means or measure. The purpose is to improve agricultural productivity to address the shortage of agricultural population and ensure food security to cope with the decline in food self-sufficiency rate. The practices of "large households merging small ones" and "building up large households" in practice are not advisable. The basic national condition of a large number of small farmers in China for a long time will not change. Small farmers and new agricultural business entities (family farms, farmer cooperatives, leading enterprises, agricultural socialized service organizations, etc.) are not mutually exclusive. They should give full play to their respective advantages, develop in coordination, and explore new forms of realizing the improvement of the rural basic management system. Specifically, first, "drive well" small farmers through socialized agricultural machinery services; second, build an interest linkage mechanism between new business entities and small farmers.

3.2 Realizing the Transformation to Modern Agriculture Under the Withdrawal of "elderly farmers + part-time farmers"

Currently, in China's agricultural production, elderly farmers dominate the operational decision-making of agricultural production, which seriously restricts the development of China's agriculture. In the future operational system, cultivating modern agricultural entities and developing large-scale modern agriculture is an inevitable trend, and the withdrawal of elderly agricultural population from agricultural business entities is extremely important. Therefore, we should further improve the paid withdrawal mechanism for contracting rights. On the basis of adhering to collective ownership of rural land and fully respecting farmers' wishes, we should steadily carry out pilot projects for paid withdrawal of farmers' contracted land in rural reform pilot zones, and gradually promote them to guide farmers with stable non-agricultural employment income and long-term urban residence to voluntarily withdraw from land contracting rights.

Social survey results show that due to the strong dependence of elderly farmers on agricultural land, compared with young and middle-aged farmers, elderly farmers have a relatively low willingness to withdraw their contracted management rights. Moreover, in terms of compensation demands for withdrawing from agricultural land, compared with young farmers, elderly farmers are more inclined to choose 保障性补偿. Therefore, as long as the survival pressure of farmers after withdrawing from land is solved, elderly farmers will have a certain willingness to withdraw from land. Adopting economic subsidies or security incentives for elderly farmers to withdraw from agricultural land management is the current mainstream approach. In practice, such as Shanghai Songjiang's "retirement support subsidy" system, "retirement pension model with treatment equivalent to urban citizens upon withdrawal", "priority model for leasing agricultural land for operation", etc.

Due to the relatively high returns in manufacturing and service industries, farmers engaging in concurrent businesses has become an important way to increase household income, but it also significantly reduces investment in agricultural production. For Type II farming households where agriculture is no longer the main source of household income and they have strong non-agricultural income capacity, to improve the comprehensive utilization rate of cultivated land, after conducting a comprehensive assessment of ensuring that the expected income of exiting households does not decrease and the potential social risks that may be triggered after exit, guide qualified households to voluntarily and compensatedly exit their contracted land. Currently, academic circles mainly offer

suggestions on the exit paths, exit guarantees, and regaining contracted land after exit for part-time farmers. The author believes that legislation should clarify statutory exit conditions, such as establishing a set of passive exit conditions and procedural standards through the number of years of urban household registration, income standards, housing conditions, social security, intention to return, compensation mechanisms, etc., and implement different policies for different urbanized farmers. Additionally, explore a "redemption" mechanism for land contractual management rights to enable farmers who have settled in cities and towns to regain land contractual rights, changing the existing institutional limitation of one-way flow.

3.3 Relaxing Restrictions on College Students and Urban Residents Entering Family Farms Under Two-way Household Registration Flow

Taking family farms, the large-scale management entities vigorously promoted by the state, as an example, according to the "Notice on Carrying Out Family Farm Survey Work" issued by the former Ministry of Agriculture in 2013, there are restrictions on the household registration status and age range of family farm operators. In this regard, there are currently two plans: one is the practice in some regions (Hebei Province), where family farms no longer set household registration thresholds, and urban residents can also enter for operation. However, this practice is only piloted sporadically in localities and has not been promoted. The other is to break the one-way flow channel of "agricultural to non-agricultural household registration" and allow urban residents who have engaged in agricultural production for a certain number of years and have the willingness to return to rural areas to obtain the qualification for contracted operation of family farms. The latter is further divided into the following two situations:

First, regarding those who were once members of the collective economic organization and converted from agricultural to non-agricultural household registration due to reasons such as attending school, serving in the military, or working. According to Article 26 of the original Land Contract Law (2009), moving into a districted city and converting to non-agricultural household registration was a condition for losing the right to contract rural land. However, according to Article 27 of the Land Contract Law (revised in 2018), during the contract period, the contractor may not *收回土地承包经营权*. The state protects the land contracting rights of rural households that have moved to cities. Farmers shall not be required to withdraw from land contracting rights as a condition for settling in cities. Furthermore, according to Articles 11 and 18 of the Collective Economic Organizations Law, members of rural collective economic organizations shall not lose their membership due to reasons such as attending school, serving in the military, working, doing business, divorce, widowhood, or imprisonment. College students and migrant workers who have moved back had their household registration in the rural collective economic organization before, and if they do not have stable jobs outside, they should be recognized as having the qualification of collective economic organization members and, after the expiration of the contract period, enjoy the qualification to contract collective land again.

Second, for urban residents who have settled in cities but are willing to contribute to modern rural development, allow them to obtain land in rural areas. Currently, youth employment has entered an ice age, and rural agriculture can just become a place for them to use their skills. For young people with specialized agricultural knowledge and technology, policies should be adapted to the situation, appropriate policy *倾斜* should be given, and obstacles such as household registration restrictions (identity), land circulation (land), and financing (money) for young people to enter rural areas to engage in farming should be removed.

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