WHAT ARE THE DETERMINANTS OF WILLINGNESS TO TRANSFER OUT LARGE-SCALE LAND IN REGION X OF CHINA

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🆔 **Hua Lin[1]**
🆔 **Wen Zhang[2+]**
🆔 **Zhiping Huang[3]**

[1,2,3]*School of Economics and Management, University of Chinese Academy of Sciences, Haidian District, Beijing, China.*
[1]*Email: linhua19@mails.ucas.ac.cn Tel: 13899937946*
[2]*Email: zhangwen191@mails.ucas.ac.cn Tel: 18810281761*
[3]*Email: huangzhiping18@mails.ucas.ac.cn Tel: 18097585658*

(+ Corresponding author)

ABSTRACT

In 2020, the cotton output of region X accounted for 87% of the country's total cotton output with its high degree, large-scale production. We analyzed region X's willingness to transfer land out and the main influencing factors. The results show that farmers have sufficient confidence in agricultural production and a strong willingness to expand the production scale. The higher the degree of education and policy mastery, the more willing they are to transfer out land management rights. The higher the number of labor force, the larger the area of cultivated land. When the type of crop planted is cotton, the higher the proportion of agricultural income is. The farmers who think that transferring land out is risky behavior are less willing to transfer out the land. Analyzing the problems of large-scale farming in region X can provide a helpful reference for the development of China's modern agriculture.

Contribution/Originality: The region we investigated has realized large-scale mechanization and popularization of agricultural social services, which is different from the previous scholars' research on small-scale farmers and fragmented land. Also, the problems faced by large-scale land transfer will be the difficulties in the sustainable development of modern agriculture.

1. INTRODUCTION

Region X is a critical, high-quality, cotton production base in China. In 2020, the cotton area was 37.53 million mu, and the cotton output reached 5.16 million tons, accounting for 87.3% of the national output. In early 2020, COVID-19 broke out. In early 2021, in the name of forced labor, the Better Cotton Initiative (BCI) canceled the certification of cotton enterprises in region X. The United States and many European countries announced a ban on importing cotton and other products from region X, which increased the uncertainty of cotton market demand. The cotton industry is advantageous in region X. With such an unfavorable background, investigation of the willingness to transfer land out can give some insights regarding whether the existing cotton policies can continue to stabilize the income of cotton farmers and whether farmers have confidence in continuing to stabilize cotton production in the future.

The report of the 19th National Congress pointed out that we should prioritize the development of agriculture and rural areas and accelerate their modernization. Agricultural modernization is a new driving force for rural development. It requires promoting traditional agricultural transformation and fundamentally changing the mode of

agricultural production. Promoting large-scale farming is a meaningful way to realize agricultural modernization, improve labor productivity and increase farmers' income (Wang et al., 2021; Yamauchi, 2016). But the difficulty of large-scale agricultural management is still one of the problems faced by China's agriculture industry in rural areas (Huang, Guan, & Jin, 2017; Ye, 2018). The premise of efficient land circulation is that the land property rights or rights of use are clearly defined and effectively protected (Bezabih & Holden, 2006; Deininger, Zegarra, & Lavadenz, 2003; Holden, Deininger, & Ghebru, 2011; Macours, De Janvry, & Sadoulet, 2010). The reform of the separation of rural land ownership, contract rights, and management rights meets the requirements of agricultural modernization, which can effectively protect farmers' interests, promote land circulation, and provide a foundation for large-scale farming (Hong & Wang, 2019). Land transfer has long been the focus of scholars' research. The existing research is mainly based on small-scale farmers and fragmented land (Du, Teng, Wang, & Meng, 2020; Han, Wang, & Yang, 2020; Wan & Cheng, 2001; Wu, Liu, & Davis, 2005; Zhang, Huang, & Rozelle, 1997). Xia, Xin, & Ma (2017) used the rural household survey data from 2015 and 2016 to investigate the factors that lead small-scale farmers to become large-scale farmers. The region we investigated has realized large-scale mechanization and popularization of agricultural social services. Therefore, factors such as joining agricultural cooperatives or cooperating with agricultural enterprises (companies) are not relevant to this paper.

Large-scale farming is the mode of modern agricultural development. With the further promotion of rural revitalization, the problems faced by large-scale land transfer will be the difficulties that must be overcome in the sustainable development of new business entities. Researching large-scale land transfer has important practical significance for promoting the development of modern agriculture in region X. It can also reference gradual moderate-scale land transfer in the country and has strong foresight and theoretical value.

2. DATA AND MODEL

2.1. Data Source

The data for this study was collected via a field survey of farmers in region X from July to November 2021. The willingness of farmers to transfer out their land management rights was investigated by visiting farmers, holding seminars, telephone, internet, and other forms. A questionnaire was then designed based on the survey results. Farmers completed the questionnaire on the premise that it was voluntary and random. A total of 2566 questionnaires were returned, of which 2076 were valid, with a sample validity rate of 80.9%. The survey area covers the cotton-producing and grain-producing areas. The questionnaire from cotton-producing areas accounted for 51.4%, and grain-producing areas accounted for 24.13%. Also, the questionnaire includes the forest and fruit-producing areas because these areas coincide with the cotton- and grain-producing areas. The sample distribution is consistent with the proportion of principal crops in the above areas, which is representative. In 2020, farmers' and herders' per capita cultivated land area in the survey area was 21.3 mu, far higher than the national average of 7.5 mu. In 2018, the land rights confirmation and contracting work were fully completed in the above regions, which laid a good foundation for improving the efficiency of land management rights transfer.

The surveyed areas have achieved full social insurance coverage and established a comprehensive social security system. There is little difference between the surveyed farmers. Agriculture focuses on large-scale and intensive production. The complete mechanization of agricultural production and popularization of socialized service organizations have been realized. The total mechanization rate of grain, vegetable oil, and sugar in the regions has reached 100%. The total mechanization rate of cotton has reached 98%, according to the agricultural department's 2020 statistics. Agricultural machinery is no longer the main factor affecting individual large-scale production. Agricultural socialized service organizations are also popularized. The cultivation, planting, harvesting, pest control, and irrigation in crop production are undertaken by corresponding cooperatives or agricultural companies, and socialized services are fully covered. Therefore, we did not consider indicators such as social security, degree of

agricultural mechanization, or popularity of social service organizations, which have been studied by previous scholars (Huang et al., 2017; Olmstead & Rhode, 2001; Yamauchi, 2016).

2.2. Research Hypothesis and Model Design

2.2.1. Research Hypothesis

According to existing research, current policy, and the data obtained from the survey, we intend to make a quantitative analysis on the influencing factors of transferring out agricultural land from the micro subject of farmers. The assumed influencing factors are demographic characteristics, operating characteristics, and concept perception. In terms of the demographic characteristics of farmers, we selected four indicators: age (AGE), personal identity (IDT) i.e., whether they are village cadres, education level (EDU), and the number of labor force owned by households (LAB).

There are two possible directions for the influence of age (AGE). One is that older farmers may be more conservative and tend to maintain the original state, so they are unwilling to transfer out or into the land (Li, Zhao, & Xin, 2009); the other is that older farmers will transfer out the land because large-scale farmers usually require more capital investment, efficient management and farming technology, which are not easy for older farmers to obtain (Qiao, Rozelle, Zhang, Yao, & Zhang, 2015; Xia et al., 2017). Therefore, the impact of age on transferring land out is challenging to determine in advance.

Personal identity (IDT) has two directions of influence. On the one hand, village cadres have a high level of education and a stable non-agricultural income, and they may not participate in land transfer much. On the other hand, village cadres may use their influence or privilege to expand the scale of agriculture, and considering their knowledge and influence, they have easier access to other farmers' land (Xia et al., 2017).

For education level (EDU), due to the low industrialization level, short industrial chain, the low number of non-agricultural jobs, and limited occupations, people with low education levels can only choose land planting in region X. People with high education levels will transfer out land depending on their non-agricultural income.

The greater the number of labor force owned by households (LAB), the more significant the roles of organization, coordination, and management are in a moderate-scale operation. The more capable a farmer is of large-scale farming, the more reluctant they are to transfer out land.

In terms of farmers' operating characteristics, we selected three indicators: land area (LAD), crop planting type (CRP), and agricultural income proportion (AGR). Regarding land area (LAD), with the increase of income from planting cotton, grain, and other crops, farmers' dependence on land has increased in recent years, and the income gap caused by the scale effect is prominent. In this context, considering the expected income of farmers, we expect that the larger the operating area of farmers, the more reluctant they are to transfer out land.

Different planting crops have different effects on land circulation and reflect the difference of average output per mu. According to the data of farmers' fixed-point observations in 2020, the average cost of cotton per mu is about 1550 yuan, and wheat is about 1000 yuan. The average output value of cotton per mu is 3131 yuan, with a net income of about 1200 yuan, while the average yield of wheat per mu is 1074 yuan, with a net income of 294 yuan. The average output value of cotton per mu is high, and the planting area is the largest. Therefore, we constructed the dummy variable whether to plant cotton (CRP). It is estimated that farmers who grow cotton are less willing to transfer out their land.

The lower the proportion of agricultural income (AGR), the lower the farmers' dependence on the land. Engaging in agricultural production will lead to an increase in opportunity costs. Farmers who can earn income through non-agricultural production are more likely to transfer out land and invest in non-agricultural production. Therefore, it is assumed that the higher the proportion of farmers' agricultural income, the lower the willingness to transfer land out.

Regarding farmers' concept perception, we selected two indicators: risk perception degree (RIS) and mastery of land transfer policy (POL). It is estimated that the higher the risk perception (RIS), the lower the willingness to transfer out land. Farmers who believe that transferring out land is risky will not do so, which is in line with the principle of risk aversion.

Given the influencing factor of policy mastery (POL), many scholars believe that the reduction of the efficiency of China's agricultural land leasing market may be the result of an unclear definition of property rights to a large extent (Huy, Lyne, Ratna, & Nuthall, 2016; Liu & Xu, 2016; Qiu, Shi, & Ma, 2015; Wang, Riedinger, & Jin, 2015), which limits the scope of agricultural land transfer and reduces the effectiveness of land resource allocation. The existing land transfer policy requires the primary service organization to record the land management rights transfer agreement of farmers and then restrict the behavior of both parties, which effectively maintains the market order of land transfer and better ensures the rights and interests of farmers. However, there are differences between the degree of actual security and perceived security (Ma, Heerink, Feng, & Shi, 2015). Therefore, we constructed the variable of the mastery of land transfer policy. The more you know about the land transfer policy, the greater the degree of perceived security, and the more willing you are to transfer out land.

Table 1 shows the codes, definitions, and expected symbols of the variables involved in the model.

Table 1. Meaning and expected symbols of variables.

	Variable	Code	Definition	Expected Symbols
Demographic Characteristic	Age	AGE	< 35 = 1, 35–49 = 2, ≥ 5 = 3	?
	Identity	IDT	Village cadres = 1 Fixed farmers = 2 Non-fixed farmers = 3	?
	Years of education	EDU	Junior high school and below = 1 Senior high school and secondary specialized school = 2 Junior college and above = 3	+
	Number of labor force	LAB	Household labor force (person)	-
Operating Characteristic	Land area	LAD	Actual planting land area of the family (mu)	-
	Crop type	CRP	Cotton = 1 Non-cotton = 0	-
	Proportion of agricultural income	AGR	≤ 30% = 1 30%–50% = 2 50%–80% = 3 ≥ 80% = 4	-
Conceptual Perception	Risk perception	RIS	Land transfer out is considered risky = 1 Otherwise = 0	-
	Policy mastery	POL	Familiar = 1 Unfamiliar = 0	+

2.2.2. Model Design

Logistic regression, also known as log probability regression, has the advantage of directly modeling the classification possibility without making prior assumptions about the data distribution, so it can effectively avoid the problems caused by the inaccurate distribution of data assumptions. Second, logistic regression can not only predict categories but also obtain approximate probability prediction (Zhou, 2016). Therefore, this model is an ideal tool for analyzing individual decision-making behavior. The transfer out of land management rights is a typical binary variable problem, so this study adopts a binary logistic regression model. The model parameters are estimated by the maximum likelihood method. Y = 1 indicates a willingness to transfer out the land management rights. The possibility of Y is P. Otherwise, it is 1-P. The model is:

$$\ln \frac{P}{1-P} = \beta_0 + \beta_1 \cdot \text{AGE} + \beta_2 \cdot \text{IDT} + \beta_3 \cdot \text{EDU} + \beta_4 \cdot \text{LAB} + \beta_5 \cdot \text{LAD} + \beta_6 \cdot \text{CRP} + \beta_7 \cdot \text{AGR} + \beta_8 \cdot \text{RIS}$$
$$+ \beta_9 \cdot \text{POL} + \varepsilon$$

3. RESULTS AND ANALYSIS

3.1. Descriptive Statistics

Regarding household demographic characteristics, 2076 valid samples were obtained in this survey: 60.83% from men and 39.17% from women, 34.49% of all respondents were under 35 years old, 47.98% were between 35 and 49 years old, and 17.53% were over 50. The identity of the sampled farmers includes village cadres, fixed farmers, and non-fixed farmers, which account for 17.10%, 73.31%, and 8.14%, respectively. Regarding education level, 40.51% of farmers have been educated for nine years or less, 26.16% have been educated for 10−12 years, and 33.33% have been educated for more than 12 years. The average household labor force is 1.92, with a median of 2. Surveyed farmers generally understand that the United States has imposed sanctions on cotton in region X.

The average area of family-operated land is 79.97 mu, with a median of 52 mu. It can be seen that this is a distinctive characteristic of large-scale farming. With the participation of relatively few laborers, the land area is high, which also reflects the high degree of agricultural mechanization and the popularization of socialized agricultural services. Given crop types, it can be seen from Table 2 that more than half of the farmers in the survey area grow cotton, accounting for 51.45%. This is followed by food crops, accounting for 30.59%; 7.18% of the farmers planted forest fruits, 1.25% of the farmers planted vegetables, and the remaining 9.54% of the farmers planted other cash crops. As for the proportion of agricultural production in household income, the proportion of farmers whose household income is more than 50% from agriculture is 63.64%, and only 17.53% of farmers' agricultural income accounted for less than 30%. This shows that the vast majority of families rely on agriculture as their single source of income.

In terms of risk perception, 67.34% of the sampled farmers believe that transferring land out is not a risk-taking behavior, while 32.66% of the farmers believe that it is a risk-taking behavior. In terms of policy familiarity, 95.13% of the farmers knew the land transfer filing policies, and 93.65% knew the land management rights transfer policies.

The sample's statistical results show that 69.41% of the farmers are unwilling to transfer out land, and 30.59% are willing to transfer out. As many as 70.62% of the farmers have a clear intention to transfer in and have a solid intention to expand the scale of land management. The results show that the vast majority of farmers maintain positive expectations for the benefits of planting and have little response to the comprehensive sanctions of the United States.

Table 2. Household production and operation.

	Type	Observations	Proportion
Planted crop type (CRP)	Food	635	30.59%
	Cotton	1068	51.45%
	Forest fruits	149	7.18%
	Vegetables	26	1.25%
	Other	198	9.54%
Proportion of agricultural income (AGR)	≤ 30%	364	17.53%
	30%−50%	391	18.83%
	50%−80%	396	19.08%
	≥ 80%	925	44.56%

3.2. Regression Analysis Results

We used STATA software to analyze the sample data and obtained the corresponding variable regression coefficient and robust standard error. The results showed that the coefficient of determination Pseudo R^2 was 0.1689,

and the likelihood ratio test chi-square value LRchi² was 432.14. The null hypothesis that the equation fits the data well is not rejected, which shows that the model is robust.

According to the results in Table 3, although the age (AGE) and identity (IDT) of farmers have a negative impact on the willingness to transfer large-scale land, they are not statistically significant. This shows that in the case of large-scale, mechanized, and popularized social services, age does not significantly reduce the willingness to transfer out land. At the same time, although village cadres can more easily obtain land from other farmers, they have a stable non-agricultural income. Therefore, whether the farmer is a village cadre will not affect willingness to transfer out land. Years of education (EDU), number of the labor force (LAB), land management area (LAD), type of crops grown (CRP), agricultural income share (AGR), risk perception level (RIS), and policy grasp (POL) have a significant impact on the willingness to transfer out land. The following sections analyze the factors that have a significant impact in detail.

Table 3. Model regression results.

Variable	Willingness to transfer land out	Expected symbol
AGE	-0.0793 (-0.98)	?
IDT	-0.0510 (-0.32)	?
EDU	0.4584*** (5.94)	+
LAB	-0.1623** (-2.33)	-
LAD	-0.0055*** (-4.93)	-
CRP	-1.0571*** (-9.46)	-
AGR	-0.4462*** (-9.23)	-
RIS	-0.6958*** (-5.72)	-
POL	0.5724** (2.25)	+
Constant	0.4963 (1.31)	
Observations	2,076	

Note: The table presents the estimated results of the model. The numbers in parentheses are the z-statistics based on standard errors; ** and *** indicate significance at the 5% and 1% levels, respectively, in two-tailed tests.

3.2.1. Demographic Characteristics of Farmers

Education level (EDU) has a significant positive impact on the willingness to transfer out land ($\beta = 0.4584$, $z = 5.94$), which is in line with expectation. The years of education of the labor force is an important indicator to measure the comparative advantage of peasant households in non-agricultural production. Farmers with higher education levels have more advantages in working in cities or starting their businesses, so the probability of transferring out land is also higher. Even though labor is mainly responsible for organizing and coordinating large-scale agricultural production, people with higher education are more inclined to engage in non-agricultural activities.

As can be seen from Figure 1, the overall willingness to transfer out land is 30.60%. Willingness, grouped by years of education, is 22.47% for junior high school and below, 28.78% for high school or technical secondary school, and 41.91% for junior college and above. This further explains that the higher the education level, the higher the inclination to transfer out land management rights. Regarding age–education grouping, farmers with junior high school education are the least willing to transfer out land, and farmers with a college education or above are the most willing to transfer out land. The group with a college degree or above and over 50 years old has the strongest

willingness to transfer out (43.33%), and the group of junior high school and below and over 50 years old has the lowest willingness to transfer out (21.43%).
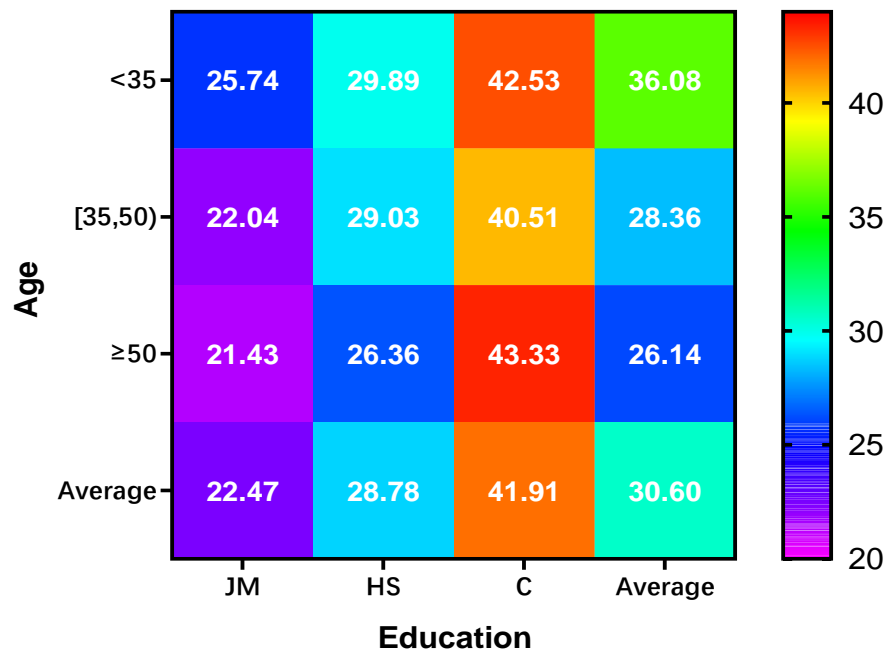

Figure 1. Circulation willingness by age–education grouping (%).
Note: JM = Junior middle school and below; HS = High school or special secondary school; C = College and above.
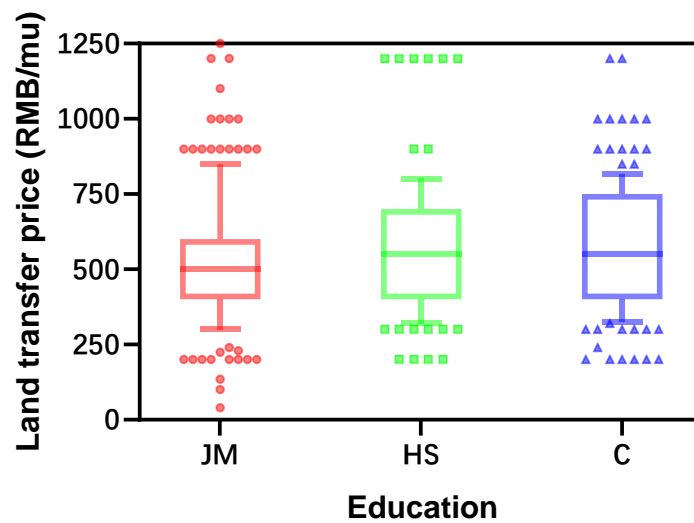

Figure 2. The unit price of land transfer out for farmers with different education levels (yuan/mu).
Note: JM = Junior middle school and below; HS = High school or special secondary school; C = College and above.

Figure 2 illustrates the results of farmers who have transferred out land. It was found that the land transfer price of farmers with junior middle school and below is the lowest of all groups. The land transfer price of less educated people is lower, and their bargaining power is the weakest.

The regression results show that the number of the household labor force (LAB) negatively affects the willingness to transfer out land ($\beta = -0.1623$, $z = -2.33$). Unlike the traditional small-scale peasant economy (He, Jiang, Guo, & Gan, 2016), under the conditions of large-scale production, agricultural production mainly relies on machinery rather than labor, and the whole process of mechanization and mode has been realized. The impact of the number of family laborers on agricultural production is mainly reflected in the organization and collaboration. Therefore, more labor force is more advantageous in coordinating and organizing large-scale production. It is easier to form a scale

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effect, so the willingness to transfer out land decreases with an increase in labor force. Specifically, when the family labor force exceeds two, the willingness to transfer out is lower than average. When the labor force is one, 34.3% of the farmers are willing to transfer out; when the labor force is four, the willingness to transfer out drops to 27.7%; when the labor force is more than five, only 16.7% of the farmers are willing to transfer out land.

3.2.2. Operation Characteristics of Farmers

The family-cultivated land area (LAD) significantly negatively impacts the willingness to transfer out land ($\beta = -0.0055,\ z = -4.93$). The larger the land area, the lower the willingness. In recent years, with the increase in the income from cotton, grain, and other crops, farmers' dependence on land has increased, and the income gap caused by the scale effect has become prominent. In this context, farmers are more reluctant to transfer out their land management rights when the area of operation is larger due to the consideration of expected income.
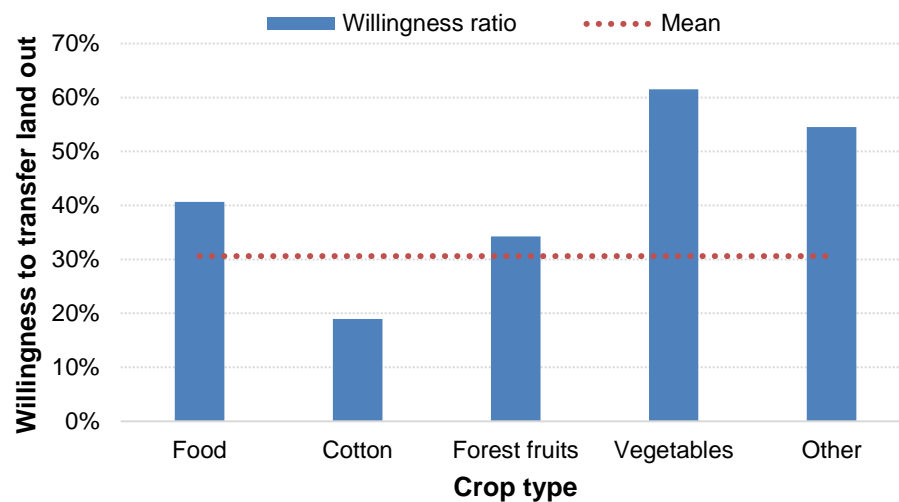

Figure 3. Crop types and willingness to transfer out land.

The type of crops planted (CRP) significantly impacts willingness ($\beta = -1.0571,\ z = -9.46$). Farmers who grow cotton are more reluctant to transfer out. The relationship of crop types and the proportion of willingness to transfer out land is shown in Figure 3. The willingness of the farmers who grow cotton is significantly lower than the average level. In contrast, the willingness of farmers who grow vegetables is higher than 60%, which is significantly higher than the average level. The willingness to transfer out land is closely related to income and subsidies. In recent years, in addition to increasing cotton income year by year, the average output value per mu of crops such as grain and vegetables has little change from year to year. With the rise of agricultural materials, workforce, and other costs, especially the rapid rise of chemical fertilizer prices, the average income per mu of farmers in the vegetable- and grain-producing areas has further decreased. Therefore, farmers who grow non-cotton crops may be more inclined to transfer out land rather than plant by themselves. This is an adverse factor that needs to be considered for food security (Brown, 1994).

The share of household agricultural income (AGR) has a significant negative impact on willingness ($\beta = -0.4462,\ z = -9.23$). Obviously, the higher the proportion of agricultural income, the more critical it is for the family to engage in agricultural production. It also shows that the family has a comparative advantage in farming, so the higher the probability of transferring land out.

As shown in Figure 4, for groups with a high proportion of agricultural income, the upper quartile and 90% upper limit of the land area transferred in are higher than those with a low agricultural income ratio, indicating that the higher the agricultural income ratio, the higher the willingness to transfer land in. It also shows that the higher

the agricultural income ratio, the lower the willingness to transfer land out. The higher the non-agricultural income, the lower the family's dependence on the land. Engaging in agricultural production will lead to an increase in opportunity costs. Farmers who can earn income through non-agricultural production are more likely to transfer land out and invest in non-agricultural production.
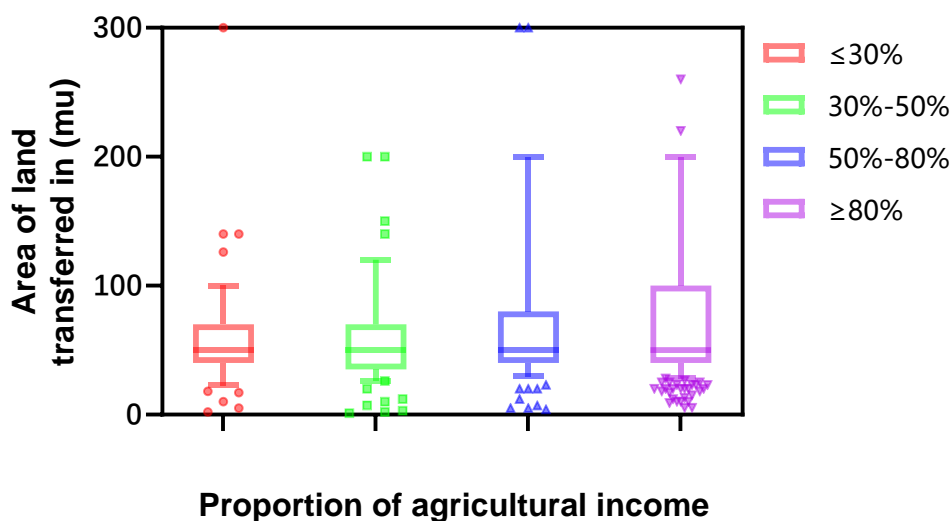

Figure 4. Relationship between the area of land transferred in and the proportion of household agricultural income.

3.2.3. Perception of Farms

Risk perception (RIS) has a significant negative impact on the intention to transfer land out ($\beta = -0.6958$, $z = -5.72$), which is in line with the risk aversion principle. In practical decision-making, farmers often weigh the circulation and planting risks. From the survey, the proportion of farmers who believe that transferring land out and transferring land in is not a risky behavior is 68% and 65%, respectively. Although the United States has imposed sanctions and the uncertainty around agricultural production has increased, the localization and substitution of imported machinery, the application of the BeiDou Navigation Satellite System, 5G networks, and the informatization and intelligence of mechanical cotton-picking have relieved cotton farmers' concerns and enhanced farmers' confidence in continuing production.

The degree of policy mastery (POL) has a significant positive impact on the willingness to transfer land out ($\beta = 0.5724$, $z = 2.25$). Farmers who have mastered the land transfer policy are more willing to transfer land management rights out. The survey found that the main reason for unwillingness to transfer out land is the fear of damage to rights and interests. The existing land transfer policy requires the primary service organization to record the land transfer agreement of farmers and then restricts the behavior of both parties, which effectively maintains the market order of land transfer and better ensures the rights and interests of farmers.

4. DISCUSSION

1. The national policy of stabilizing cotton production has given cotton farmers great confidence. According to the survey, relevant policies have successfully stabilized cotton farmers' confidence against the background of US sanctions. On the other hand, the expected high income of cotton leads to an increase in farmers' willingness to plant cotton. Although the income of grain planting is stable, there is a significant gap compared with cotton, and the difficulty of planting structure adjustments will increase. The existing cotton policy was implemented in 2014. In 2013, the cotton area in region X accounted for 33% of the total sowing area, which had increased to 39.8% by 2020, and the cotton planting area further increased in 2021. In contrast, the proportion of grain decreased from 42.3% in 2013 to 35.5% in 2020. Farmers' willingness to plant cotton has been increasing, but their enthusiasm for planting grain and other crops has been reduced, which is not conducive to stabilizing grain

production. In 2017, China delineated functional grain production areas and important agricultural product protection areas. The goal was to complete the delineation and construction of the "two-region" model within five years, fully build high-standard farmland and implement the strategy of storing grain on the land. In 2020, the general office of the State Council issued guidance on preventing "non-grain" cultivated land and stabilizing grain production, which was proposed to firmly stop the "non-grain" behavior of large-scale transfers of cultivated land without grain in violation of relevant industrial development plans. Regarding the implementation of relevant policies, we should concentrate on farmers in the functional grain production areas and give full play to the critical role of the functional areas in stabilizing grain production and ensuring grain supply. Ensuring the safety of grain production, stabilizing cotton production, preventing the land from being "non-grain," and promoting the balanced development of grain production and cash crops such as cotton is a subject that needs to be discussed in depth.

2. Large-scale farming has played a positive role in solving the problem of "who will farm the land". Xu, Jiang, & Ying (2002) believe that although individual families lack labor and need to transfer out land, the vast majority of families do not lack labor in general but lack labor specifically engaged in agricultural production. We found that in the case of large-scale farming, the larger the family labor force, the lower the willingness to transfer land out, which shows that the labor force is willing to engage in agricultural production in the case of large-scale production. This further confirms the effectiveness of the government's policy of developing agriculture on an appropriate scale, reducing production costs, increasing farmers' income, and effectively solving the problem of "who will farm the land". Large-scale farming and farmers' professionalization not only need practitioners' up-to-date planting technology but also need the corresponding agricultural management experience. However, in the field investigation, it was found that most farmers lack management experience, which makes it difficult for them to cope with market uncertainty.

3. The development of modern agriculture promotes the transfer of land management rights, and the division and construction of cultivated functional land areas need to be accelerated. The water-saving irrigation system in region X has profoundly changed the previous mode of agricultural production. Under the existing drip irrigation system, the head hub controls one or more rotation irrigation communities, and the irrigation time and average irrigation amount per mu in the community are unified. Due to the characteristics of direct drip irrigation to crops, fertilization at the same time as irrigation has also become a fundamental method of fertilization and irrigation. Therefore, the fertilization amount and fertilization time in the same rotation irrigation community are also consistent. The irrigation and fertilization time, irrigation amount, and fertilization amount of different kinds of crops are different, which requires the same crop types in the irrigation rotation community. If the land contracting in the irrigation rotation community is scattered and there are too many planters, it will lead to a series of complex coordination problems, such as inconsistent crops, inconsistent laws of water and fertilizer demand, complex agricultural machinery operation, and field management. This will make it challenging to achieve efficient water and fertilizer integration and will then affect the promotion of modern agricultural production modes. Therefore, the development of large-scale land transfer and the reduction of the number of members in the production link is conducive to improving the efficiency of land production, which is the inevitable requirement of realizing the modernization, scale, intensification, and modularization of agricultural production. Although the transfer of land out is an individual behavior, recentralizing land is an effective way to realize the effective allocation of resources. It can be used to divide the functional areas of the concentrated land, formulate crop planting plans, strengthen the construction of agricultural infrastructure (including irrigation facilities), establish and improve the conditions for modern agricultural development, and improve the land output rate. Realizing the appropriate concentration of land in the same irrigation community or reaching a consensus to plant the same kinds of crops and produce according to the standard is a problem that needs further research.

5. CONCLUSION

According to the reality of agricultural production in region X, we carried out a survey on the willingness of farmers to transfer land out and obtained detailed data. It can be concluded that farmers have a strong willingness to expand production and have sufficient confidence in agricultural production against the background of increasing market uncertainty, which reflects the strength of China's response policies. The longer the time spent in education, the greater the willingness to transfer land out. Household labor force has a significant negative impact on the willingness to transfer out, indicating that under the conditions of large-scale, mechanized, and socialized production, increasing the household labor force has become a favorable factor for the development of large-scale farming. The larger the land, the higher the share of agricultural income; and the greater the degree of risk perception, the lower the inclination to transfer out land. The higher the degree of policy mastery, the higher the willingness to transfer out. Given the above analysis, we suggest that the proportion of the non-agricultural income of the farmer, the social security system, and the circulation of land management rights need to be improved. Policy guidance and planning guidance, as well as the relevant policies of the "two-region" model also need to be improved. It is also vital to promote the adjustment of agricultural structures and prevent "non-grain" land, establish a standardized land transfer market, establish a land transfer price guidance mechanism, prevent excessive land concentration, and realize appropriate-scale farming. Moderate-scale farming is an essential direction of modern agricultural development in China. A timely analysis of the problems can provide valuable references for the ongoing development of moderate-scale farming.

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