The Relationship between Landless Farmers and Land Adjustment, Land Transfer, Land Inheritance

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Abstract Based on the household survey of nine villages in Guangdong Province and Hunan Province, we research the relationship between landless farmers and land adjustment, land transfer in the context of rural land contract rights on a long term basis. We demonstrate that the existence of landless farmers does not pose a serious problem for the current rural community. We also explain the reason why the land is no longer readjusted: the expected return of land adjustment is low and the organizational costs are high.

Key words Landless farmers, Land adjustment, Land transfer, Land inheritance, Long-term land policy, Land system

1 Introduction

Different from the farmers whose land is requisitioned, this paper is only concerned about the landless farmers after the implementation of long-term land policy in rural areas. The estimation of the number of landless farmers is an aspect of previous studies. Sun Yaowu estimated that the number of landless farmers in the whole country was about 145 million in 2004[1]. The survey of Du Yintang in Jiangsu Province and Gansu Province shows that the landless population has reached 19.37% of the total rural population, and the farmers lacking land have reached 46.69% of the total farmers[2]. The survey of Zhang Runqing in Hebei Province shows that landless farmers account for 10.02% of the total population surveyed. Gong Weigang indicated that in the developed southern areas, such as Guangdong and Fujian, the landless population reached 43.6% of rural population[4]. Since women and newborn children are the main body of landless population, many researches are focused on women and new generation farmers[5-6]. Li Guangquan *et al.* worry about the existence of landless farmers and believe that "landless farmers" may become a destabilizing factor and a potential risk affecting rural stability and development[7]. The primary means for the landless farmers to obtain land is to obtain land contract rights through land adjustment. If landless farmers try to obtain land contract rights from land adjustment, it is necessary to promote the village collective to carry out land adjustment. When the village group has implemented a policy unchanged for 30 years, it is difficult for the landless farmers to propel the village land adjustment, and the farmers turn to land transfer to obtain land use rights, so obtaining the land use rights through land transfer is an important way for the landless farmers to obtain land. As for the impact of landless farmers on land adjustment, scholars long believe that the newly increased population is an inducement to land adjustment. Ye Jianping, Qu Futian, Zhao Yang *et al.* believe that since the implementation of land contract system, there has been regular or irregular land adjustment in many villages; demographic change is the main reason for land adjustment[8-10], and the presence of landless farmers leads to readjustment of land. Zhang Zhaoxin examined the impact of landless farmers on land transfer, and pointed out that the way for the landless young couple in the family to solve land shortage, was working outside the home but not leasing land[11]. Liu Kechun *et al.* pointed out married women losing land increase farmers' demand for agricultural land, having a weak impact on farmers' land renting, but no impact on farmers' land leasing[12]. After the late 1990s, the circulation of agricultural land market was accelerated; in the same period, the land adjustment frequency was dwindling, and there seemed to be certain substitution for the market transfer to land adjustment. Theorists have three kinds of different views on the relationship between the two. (i) Most scholars believe that there is mutual inhibition and mutual substitution relationship between the two. Yao Yang pointed out that a well-functioning land rental market could reduce the frequency of a village to carry out land adjustment, and the land rental market could become a substitute for land administrative adjustment[13]. Liu Xiaoyu *et al.* also present a similar concept: land rental markets will in part ease the pressure of rural land adjustment, and in part replace the administrative land adjustment[14]. Qian Zhonghao generalizes the relationship between the two as follows: land administrative adjustment is an alternative for the land market transfer mechanism[15]. (ii) Ye Jianping *et al.* believe that the complete administrative adjustment of land allocation is an alternative for the market allocation pattern, and there is still some complementary relationship[16]. (iii) Liu Kechun *et al.* believe that there is no necessary mutually restricting relationship between administrative adjustment of agricultural land and the market transfer[17].

Conspicuously, there is no final conclusion about the relationship between land adjustment and land transfer in theory. The relationship between land adjustment and land transfer is not the

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issue for discussion in this paper. We mainly discuss the role of existence of landless farmers to land adjustment, land transfer and other land systems, and whether the increasing number of the groups will lead to rural socio-economic problems. Through the survey of landless farmers in 9 villages in Guangdong and Hunan, this paper mainly discusses the impact of landless farmers on rural land system reform.

2 Data sources and sample

The selection of survey samples should cover eastern Guangdong, northern Guangdong, western Guangdong, and the Pearl River Delta. The selection of the village samples is based on the principle of survey convenience, and the selection of farmer samples is random. Overall, the selection of villages and farmers is representative.

During January – April, 2011, we carried out household survey in 9 villages in Guangdong and Hunan. A total of 378 questionnaires were distributed, and 328 questionnaires were returned, with response rate of 85%. The farmland was distributed to the households in 9 villages in 1980, and 8 villages implemented a long-term policy. In the 1980s and 1990s, there were 4 villages carrying out the land adjustment for the last time. Liangtian Village in Guangzhou City has made the most land adjustments, great adjustment once every six years, small adjustment once every three years. The last land adjustment happened in 2006 (Table 1).

Table 1 The basic situation of the village surveyed

Villages	Per capita land area hm^2	The number of rural households surveyed	The total sample population	The number of landless persons in the village	Frequency of land adjustment	Whether there is contract or not	Time of the contract year	Whether the contractual rights warrants are issued or not
Tiantou Village, Boluo County, Huizhou City	0.2668	25	112	58	1	No	No deadline	No
Qingshi Village, Longping Township, Lianzhou City	0.0402	23	110	55	1	Yes	30	Yes
Zhupu Village, Haojiang County, Shantou City	0.0267	19	165	41	1	Yes	15	Yes
Luodong Village, Xingning County, Meizhou City	0.0267	40	240	107	1	Yes	30	Yes
Niujiaoling Village, Yun'an County, Yunfu City	0.0213	17	119	15	2	No	No deadline	No
Xinyijia Village, Ningxiang County, Changsha City	0.0600	101	436	114	1	Yes	30	No
Kengzi Village, Huilai County, Jieyang City	0.0233	27	217	55	2	No	30	No
Tang Village, Fengkai County, Zhaoqing City	0.1467	56	301	81	2	Yes	30	Yes
Liangtian Village, Baiyun District, Guangzhou City	–	20	93	14	6	–	–	–
Total		328	1793	540				

The total sample population surveyed is 1793, and the total landless population is 540, accounting for 30.12% of the total sample population surveyed. The total number of rural households surveyed is 328, and the number of households without landless farmers is 84, accounting for 25.61% of the total number; the remaining 244 households with landless population account for 74.39% of the total number. In the rural households with landless population, the households with two landless persons occupy the largest proportion (28.05%) (Table 2), 2.21 landless persons per household. In the 328 sample rural households surveyed, there are 1.65 landless people per household.

In the 540 landless people, the size of effective sample with complete personal information is 532. In the 540 landless farmers, women account for 54.8% while men account for 44.4%. From the age, 80% of landless farmers are aged less than 30.

The age of landless farmers is concentrated in two (i) less than 10 years, accounting for 37.29%; (ii) 20 – 30, accounting for 33.33%. The two age groups are corresponding to the times of final land adjustment in the 1990s and 1980s, respectively. In the occupational distribution of landless population, the preschool children and students account for 52.82%; the migrant workers account for 36.84%; the people farming at home account for only 7.89% (Table 3).

Table 2 The number and proportion of landless population in the respondents' family

Landless population in the family	Number of households	The share in the number of households surveyed//%
0	84	25.61
1	67	20.43
2	92	28.05
3	53	16.16
4	24	7.32
More than 5	5	1.52
Missing	3	0.91
Total	328	100.00

Table 3 Characteristics of landless farmers

Variable	Frequency	Percentage//%	
Age	Less than 10	198	37.29
	11 – 15	47	8.85
	16 – 20	53	9.98
	21 – 30	177	33.33
	More than 30	56	10.55
	Unanswered	9	–
	Total	540	100.00
Gender	Female	296	55.64
	Male	236	44.36
	Unanswered	8	–
	Total	540	100.00
Occupation	Preschoolers or schoolers	281	52.82
	Working outside the home	196	36.84
	Farming at home	42	7.89
	Others	13	2.44
	Unanswered	8	–
	Total	540	100.00

Overall, the landless population accounts for 30.12% of the total population surveyed, and the rural households with landless population account for 74.39% of total rural households surveyed, 1.65 landless persons per household; the number of landless farmers continues to increase with the continuation of long-term land policy.

Most of the landless farmers are aged below 30 currently, with the newly increased population (women and children) as the main body; landless population has no significant gender differences between children; in the married adult, women are more than men, and the proportion of landless farmers farming at home is very low.

3 Landless farmers and land adjustment

If the land is adjusted too late, there will be more landless farmers. In the 3 villages which adjusted land in the 1980s, the proportion of landless population to total sample population is mostly about 50%; in the 4 villages which adjusted land in the 1990s, the proportion of landless population is mostly about 25%. The final adjustment of land in Liangtian Village, Baiyun District, Guangzhou City is the latest, thus the landless population is the smallest (Table 4).

Table 4 Landless population and land adjustment

Villages	Times of the last land adjustment	The total sample population	The number of landless persons in the village	The proportion of landless population to total sample population//%	Does anyone request land distribution from the village head?
Tiantou Village, Boluo County, Huizhou City	1	112	58	51.79	Yes, but few
Qingshi Village, Longping Township, Lianzhou City	1	110	55	50.00	No
Zhupu Village, Haojiang County, Shantou City	1	165	41	24.85	No
Luodong Village, Xingning County, Meizhou City	1	240	107	44.58	Yes, but few
Niujiaoling Village, Yun'an County, Yunfu City	2	119	15	12.61	3 – 4 people
Xinyijia Village, Ningxiang County, Changsha City	1	436	114	26.15	2 – 3 people
Kengzi Village, Huilai County, Jieyang City	2	217	55	25.35	No
Tang Village, Fengkai County, Zhaoqing City	2	301	81	26.91	2 – 3 people
Liangtian Village, Baiyun District, Guangzhou City	6	93	14	15.05	–
Total		1793	540		

In the valid questionnaires, when being asked "Do you want your own land?", more than 62.77% of farmers say "yes" and "really want"; 37.23% of farmers show indifferent attitudes, or say "do not want" (Table 5). For the farmers who "do not want", they just do not want the land currently, and they want land when they come back.

Table 5 Do you want your own land

Wishes of 328 farmers	Frequency	Percentage//%	Valid percentage//%	Wishes of 244 landless farmers	Frequency	Percentage//%	Valid percentage//%
Does not matter	20	6.10	8.40	Does not matter	19	7.82	8.23
Do not want	67	20.40	28.15	Do not want	67	27.57	29.00
Want	109	33.20	45.80	Want	104	42.80	45.02
Really want	42	12.80	17.65	Really want	41	16.87	17.75
Missing	90	27.40		Missing	14	4.94	
Total	328	100.00		Total	244		

The landless farmers' wishes to own land need to be achieved through land adjustment. When being asked "Is there any villager ask the village committee to redistribute the land?", the village committee directors in 5 villages reply, "Yes, but few, only 2 to 3 people", as is shown in Table 4. The farmers requiring re – distribution of land are those landless farmers who are just married. It is found that farmers' wishes to own land is different from the willingness to adjust land, then whether the landless farmers have the willingness to adjust land?

We will analyze it through the establishment of the model. Farmers' willingness to adjust land is taken as the variable to be explained, which is derived from "Which way do you want to get your own contracted land?" in the questionnaire. This question has four options: (i) (The same policy implemented for 30 years, no way"; (ii) "Want the village to withdraw all the land for readjustment and reallocation" (*i. e.* great land readjustment); (iii) "The households with decreased population transfer the land to the households with increased population" (*i. e.* small land adjust-

ment); (iv) "Inheriting parents' land or the land left by their married sisters". After eliminating the samples without landless population, there are 244 valid samples left. Independent variables include the personal characteristics of farmers surveyed, the features of villages and characteristics of rural households. The specific variables are described in Table 6. Land adjustment is a categorical variable, so it is appropriate to adopt multinomial Logistic regression model for analysis.

Table 6 Description of the variables

Land adjustment	0:The same policy implemented for 30 years, no way (benchmark); 1:Want the village to withdraw all the land for readjustment and reallocation(great land readjustment); 2:The households with decreased population transfer the land to the households with increased population (small land adjustment); Others (Inheriting parents' land or the land left by their married sisters);
Gender (x_1)	0:female 1:male
Age ($x2$)	2011 – Year of birth
Educational level(x3)	$C_1=1$, primary school; $C_1=0$, others; $C_2=1$, junior high school, $C_2=0$, others; the rest may be deduced by analogy, $C_3=1$, senior high school, $C_1=C_2=C_3=C4=0$, illiterate(benchmark);
Satisfaction with the policy	$D_1=1$, dissatisfied; $D_1=0$, others; $D_2=1$, satisfied, $D_2=0$, others; $D_3=1$, very satisfied, $D_3=0$, others; $D_1=D_2=D_3=0$, do not matter(benchmark);
Sources of household income	$E_1=1$, dominated by agriculture income, , $E_1=0$, others; $E_2=1$, based on wage income; $E_2=0$, others; $E_3=1$, total family income is non-farm income, $E_3=0$, others; $E_1=E_2=E_3=0$, net farming income(benchmark);
Per capita land area of household	Household population/ family land area
The length of time from the year of the last land adjustment	The length from the survey time to the year of the last land adjustment
The proportion of landless population	The population without their own land in the family/ household population
The proportion of migrant workers	Number of migrant workers/household population

Land adjustment is carried out at a certain point in time, while the changes in the population are continuous. The longer the time from the year of the last land adjustment, the larger the landless population. The chi-square test is used to carry out independence test on the the length of time from the year of the last land adjustment and landless population. The test result $Pr=0.003<0.05$, indicating that the length of time from the year of the last land adjustment is significantly correlated with landless population, and if two variables enter into the model at the same time, then collinearity exists, therefore, two variables need to enter the model separately for analysis. This article uses Stata10.0 to process data, and the results are shown in Table 7. $Prob>chi2=0.000$, indicating that the model is fitted well.

Model 1 results indicate that gender, age, per capita land area of household, the share of population working outside the home in the household population and the satisfaction with the policy unchanged for 30 years, have a significant impact on land adjustment. In the case of making other variables remain unchanged, the occurrence ratio of men to opt for "Want the village to withdraw all the land for readjustment and reallocation", "The households with decreased population transfer the land to the households with increased population", and "Inheriting parents' land or the land left by their married sisters", is 0.357, 0.501, 0.306, respectively, namely decreasing by 64.3%, 49.9%, 69.4%[18], suggesting that men do not want to solve the landless problem through land adjustment and inheritance; for the older farmers with larger per capita land area, they are more unwilling to obtain land through inheritance; for the rural households with more people working outside the home, they do not want to obtain land through inheritance or land adjustment. It is also found that the increasing landless population in the family does not increase farmers' willingness to adjust the land, but reduces farmers' willingness to adjust the land, which is inconsistent with the research findings of Ye Jianping, Qu Futian and Zhao Yang[8-10].

Table 7 Land adjustment model 1 (The proportion of landless population to household population)

Variables	Land adjustment method 1		Land adjustment method 2		Land adjustment method 3	
	Relative risk ratio	*P* value	Relative risk ratio	*P* value	Relative risk ratio	*P* value
Gender	0.357	0.045**	0.501	0.146	0.306	0.004***
Age	1.019	0.326	1.004	0.790	0.970	0.042**
Dissatisfied with the policy unchanged for 30 years	3.247	0.086*	4.233	0.012**	0.674	0.515
Satisfied with the policy unchanged for 30 years	3.352	0.065*	1.828	0.305	2.139	0.096*
Very satisfied with the policy unchanged for 30 years	3.180	0.405	0.000	0.999	4.657	0.114
Per capita land area of household	0.397	0.120	0.685	0.133	0.355	0.048**
The share of population working outside the home in the household population	0.096	0.048**	0.092	0.035**	0.384	0.313
The share of landless population in household population	0.024	0.009***	0.048	0.016**	0.066	0.014**
Family income is mainly agricultural income	0.380	0.315	0.498	0.451	1.005	0.995
Family income is mainly wage income	0.320	0.205	0.646	0.610	0.745	0.733
Family income is totally non-farm income	1.246	0.832	1.014	0.989	1.327	0.775

Note: *, **, *** mean significant at level 0.1, 0.05, 0.01, respectively.

Table 8 Land adjustment model 2 (The length of time from the year of the last land adjustment)

Variables	Land adjustment method 1		Land adjustment method 2		Land adjustment method 3	
	Relative risk ratio	*P* value	Relative risk ratio	*P* value	Relative risk ratio	*P* value
Gender	0.352	0.049**	0.466	0.143	0.325	0.007***
Age	1.015	0.435	1.004	0.838	0.970	0.044**
Dissatisfied with the policy unchanged for 30 years	1.874	0.377	3.042	0.096*	0.503	0.270
Satisfied with the policy unchanged for 30 years	3.277	0.077*	3.491	0.074*	1.892	0.156
Very satisfied with the policy unchanged for 30 years	7.016	0.265	0.000***	0.999	7.974	0.053*
Per capita land area of household	0.310	0.149	0.655	0.156	0.376	0.062*
The share of population working outside the home in the household population	0.267	0.296	0.326	0.358	0.562	0.565
The length of time from the year of the last land adjustment	0.818	0.000***	0.688	0.000***	0.923	0.021**
Family income is mainly agricultural income	0.614	0.625	0.743	0.770	1.336	0.750
Family income is mainly wage income	0.426	0.360	0.651	0.650	0.936	0.940
Family income is totally non-farm income	1.160	0.890	1.121	0.919	1.555	0.661

Note: *, **, *** mean significant at level 0.1, 0.05, 0.01, respectively.

As shown in Table 8, similar to land adjustment model 1, model 2 shows that gender, age, per capita land area of household, and the satisfaction with the policy unchanged for 30 years, have a significant impact on land adjustment. These results indicate that if there is great length of time from the year of the last land adjustment and there is great number of landless farmers and the rural households with landless population, farmers' willingness to adjust land will decline, and land adjustment will not be promoted. Yao Yang points out that land adjustment is the collective action with high transaction costs, and the result arising from the villagers, policies, and many other factors[19]. From the collective action theory, the rational and self-interested individuals will not take action to achieve common or group interests. As to whether a person is engaged in collective action, we need to take into account three aspects: personal benefit degrees, possibilities of exclusive gains and organizational costs. From the personal expected benefits, the expected benefits of land adjustment are first to get land and then get land income. If the land income is low, it will weaken the dependence of farmers on the land, and thus farmers' willingness to adjust land will be reduced. From the exclusiveness of benefits, the land adjustment benefit does not have exclusivity, and it creates new injustice. Relative to the person waiting for not so long, land adjustment results in a new injustice to landless farmers waiting for so long.

Finally, the organizational costs of land adjustment are very high. The rural households with landless population and landless farmers are the first action group of the collective action of land adjustment, and the high organizational costs of land adjustment increase obstacles to land adjustment. Before the abolition of public grain tasks, the rural households with landless population required the collective to distribute land for the public grain tasks which provided a strong basis for their appeal for land distribution. After the abolition of public grain tasks, the reasons for the land distribution for the rural households with landless population were not tenable, which undoubtedly increased the organizational costs of the first action group. The organizational costs are increased with the increasing number of landless farmers, and many farmers have a tendency of free-rider. Organizational costs are also affected by the opposition of households with increasing per capita land area[20].

Qian Zhonghao believes that for the purpose of pursuing their own interests, the village cadres have the propensity to frequently adjust the contracted land[20]. Zhu Dongliang thinks that rural cadres use land adjustment to manage and control the rural community[21]. In the surveyed villages, there is no collective economy, and the village committee is unwilling to organize and implement land adjustment. The land adjustment brings low expected returns to landless farmers, but the organizational costs are too high. The landless farmers want to have land, but lack the actions contributing to land adjustment. Over time, farmers' psychological expectancy of land adjustment fades, and land adjustment is no longer the expected means for farmers to obtain land.

4 Landless farmers and land transfer

Obtaining land use rights through the land transfer market is a way for landless farmers to obtain land. Farmers' transfer of land depends on family income maximization. Under the principle of household income maximization, farmers' choice is diverse: working outside the home or transfer in or out land via market. Then, whether the landless population in the family affects farmers to transfer in or out land? It needs to establish regression models for analysis. We take "whether the farmers have transferred in land" as the dependent variable. 0 means having not transferred in land; 1 means not to matter; 2 means having not transferred in land but wishing to transfer; 3 means having transferred in land. The selection of dependent variables is similar to Table 6. It includes the respondents' gender, age, education level, and other personal characteristics, as well as the number of family members, per capita land area of household, the ratio of number of persons working outside the home to total number of family members, sources of household income and other household characteristics. This paper selects ordered logistic regression model and parameter estimation adopts maximum likelihood method to calculate the estimated value. We use Stata10.0 for data processing and model analysis. Similarly,

the length of time from the year of the last land adjustment and the share of landless population in household population enter into the model, and the results are shown in Table 9. From the model results, P value is 0, so this logistic model is fitted well.

Table 9 Land transfer-in model

Variables for land transfer-in model 1	Estimation parameters	*P* value	Variables for land transfer-in model 2	Estimation parameters	*P* value
Gender	0.426	0.138	Gender	0.432	0.134
Age	−0.003	0.803	Age	0.001	0.908
Primary school	−1.060	0.150	Primary school	−0.969	0.183
Junior high school	−0.724	0.340	Junior high school	−0.557	0.457
Senior high school	−0.366	0.656	Senior high school	−0.107	0.896
Junior college and above	−1.021	0.329	Junior college and above	−0.919	0.388
Dissatisfied with the policy unchanged for 30 years	0.830	0.026**	Dissatisfied with the policy unchanged for 30 years	0.671	0.077*
Satisfied with the policy unchanged for 30 years	−0.414	0.225	Satisfied with the policy unchanged for 30 years	−0.343	0.321
Very satisfied with the policy unchanged for 30 years	−1.625	0.140	Very satisfied with the policy unchanged for 30 years	−1.155	0.303
Per capita land area of household	−0.042	0.707	Per capita land area of household	−0.024	0.835
The ratio of the population working outside to the household population	−1.336	0.051**	The ratio of the population working outside to the household population	−0.875	0.212
The proportion of landless population to total household population	0.083	0.893	The length of time from the year of the last land adjustment	−0.061	0.011**
Family income mainly based on agricultural income	0.197	0.670	Mainly based on agricultural income	0.161	0.731
Family income mainly based on wage income	−0.571	0.210	Mainly based on wage income	−0.629	0.169
Family income are all non-farm income	−1.113	0.059*	All are non-farm income	−1.089	0.064*

Note: *, **, *** mean significant at level 0.1, 0.05, 0.01, respectively.

Land transfer-in model1 and 2 show that the rural households with non-agricultural income as the family income and the rural households dissatisfied with the policy unchanged for 30 years, have a significant negative impact on the land transfer. For each additional one in the rural households with non-agricultural income, the possibility of rural households to transfer in land is 0.329, indicating that the rural households with non-agricultural income do not tend to transfer in land[22]. For each additional one in the rural households dissatisfied with the policy unchanged for 30 years, the possibility of rural households to transfer in land changes 2.293 times, indicating that the rural households dissatisfied with the policy unchanged for 30 years have strong will to own land, and transfer in land.

The length of time from the year of the last land adjustment has a significant negative impact on the land transfer. For each additional year in the length of time from the year of the last land adjustment, the possibility of rural households to transfer in land declines by 5.9%, indicating that the length of time from the year of the last land adjustment has a weak negative impact on the land transfer.

When the share of landless population in household population enters into the model, the ratio of the population working outside to the household population has a significant negative impact on the land transfer. For each additional one in the population working outside, the possibility of rural households to transfer in land declines by 73.7%, and the impact of share of landless population in household population on the land transfer is not significant, suggesting that the major factor influencing farmers' land transfer is the family net income, and whether there is landless population is not the major factor influencing farmers' land transfer.

In the same way, we establish land transfer-out model 1 and 2, and the model results are shown in Table 10. The land transfer-out model shows that all sources of household income mainly based on non-agricultural income have a significant positive impact on farmers' land transfer-out, indicating that these farmers have a very strong will to transfer out land. The share of population working outside the home in the household population has a significant positive impact.

For each additional one in the population working outside the home, the possibility of rural households to transfer out land increases by 245.6%, which confirms Yao Yang and He Zhenhua's view that farmers' non-farm employment contributes to promoting the transfer of agricultural land[13, 23]. Similar to the factors influencing land transfer-in, the share of landless population in household population has not significant impact on land transfer-out, and whether there is landless population is not the major factor influencing farmers' land transfer-out.

From the land transfer-in and transfer-out model results, we can see that the landless farmers are not correlated with farmers' land transfer-in and transfer-out, so the increase in the number of landless farmers does not promote the transfer of land. The length of time from the year of the last land adjustment has a weak negative impact on land transfer-in, but has no effect on land transfer-out, indicating that if the length of time from the year of the last land adjustment is long, the land will be no longer readjusted, which will not promote the development of land transfer. There is no necessary link between land adjustment and land transfer, thus supporting the aforementioned views of Liu Kechun *et al.* that land adjustment and land transfer are two different allocation modes of land resources, and there is no necessarily mutual restraint relationship between the two[17].

In Liangtian Village of Guangzhou, the local farmers basically quit agricultural production, and the farmers from outside are

responsible for the farming. The land adjustment is frequent in this village, but the land lease between local farmers and farmers from outside exists widely, and there is no necessary link between land adjustment and land transfer.

Table 10 Land transfer-out model

Variables for land transfer-out model 1	coef.	*P* value	Variables for land transfer-out model 2	coef.	*P* value
Gender	−0.316	0.255	Gender	−0.325	0.239
Age	−0.011	0.337	Age	−0.013	0.262
Primary school	−0.007	0.992	Primary school	−0.036	0.956
Junior high school	0.480	0.474	Junior high school	0.386	0.568
Senior high school	0.066	0.931	Senior high school	−0.068	0.930
Junior college and above	0.665	0.475	Junior college and above	0.554	0.553
Dissatisfied with the policy unchanged for 30 years	−0.198	0.616	Dissatisfied with the policy unchanged for 30 years	−0.105	0.788
Satisfied with the policy unchanged for 30 years	0.325	0.330	Satisfied with the policy unchanged for 30 years	0.304	0.361
Very satisfied with the policy unchanged for 30 years	−0.750	0.412	Very satisfied with the policy unchanged for 30 years	−0.905	0.309
Per capita land area of household	0.154	0.080*	Per capita land area of household	0.119	0.165
The ratio of the population working outside to the household population	1.240	0.048**	The ratio of the population working outside to the household population	0.999	0.100
The length of time from the year of the last land adjustment	−0.034	0.128	The proportion of landless population to total household population	−0.145	0.806
Family income mainly based on agricultural income	−0.205	0.699	Mainly based on agricultural income	−0.182	0.732
Family income mainly based on wage income	−0.096	0.846	Mainly based on wage income	−0.042	0.932
Family income are all non-farm income	1.727	0.002***	All are non-farm income	1.741	0.002***

Note: *, **, *** mean significant at level 0.1, 0.05, 0.01, respectively.

5 Landless farmers and inheritance within the family

With the implementation of the policy unchanged for 30 years, the inheritance problems of land contract rights have been increasingly highlighted. Cao Yang points out that the implementation of child inheritance is a way to address the long-term conflict between the land community ownership and land contract relations[24]. Shi Shengyao points out that the inheritance of land contract rights is of legal feasibility, favored by many farmers[25]. In the survey of several villages, when being asked how do they get the land, 7.01% of respondents answered "inheriting the land from parents", 8.23% of respondents answered "left by the married sisters" (Table 11).

Table 11 How do you get the land

Options	Frequency	Percentage//%	Valid percentage//%
Wanting all the village land to be withdrawn for reallocation	32	9.76	14.41
The families with decreasing population transfer the land to the households with increasing population	41	12.50	18.47
Inheriting from parents	23	7.01	10.36
Left by married sisters	27	8.23	12.16
Reclaiming wasteland on one's own	5	1.52	2.25
No way to change the policy implemented for 30 years	86	26.22	38.74
Others	8	2.44	3.60
Missing	106	32.32	
Total	328	100.00	

When being asked whether there is land left by someone after the last land distribution, 27.13% of natural households answered "yes", accounting for 49.17% of households with valid responses (Table 12).

Table 12 The land inherited after the last land distribution

Number of people leaving land	Frequency	Percentage//%	Valid percentage//%
No	92	28.05	50.83
0.25	1	0.30	0.55
0.5	4	1.22	2.21
1	51	15.55	28.18
2	17	5.18	9.39
More than 3	16	4.86	8.84
Missing	147	44.82	
Total	328	100.00	

When being asked whose land can be cultivated if farming, this inheritance has a more apparent impact on family land relations, and 71.96% of farmers answered "the land left by parents, in-laws, married sisters" (Table 13).

Table 13 Whose land can be cultivated if farming

Options	Frequency	Percentage//%	Valid percentage//%
Parents	160	48.78	66.95
In-laws	38	11.59	15.90
Married sisters	26	7.93	10.88
Both parents and sisters	12	3.66	5.02
Others	3	0.91	1.26
Missing	89	27.13	
Total	328	100.00	

6 Conclusions

In summary, we draw the following conclusions: It is found that in the villages which have put in place the rural land contract rights on a long term basis, if the land is adjusted too late, there will be more landless farmers, farmers' willingness to adjust land declines, and farmers will be more reluctant to transfer land. The existence of landless farmers is not the main factor influencing farmers to transfer into or out land. When there is no land, landless farmers rent the land to obtain land use rights not through land transfer market, but through working the outside the home. In addition, landless farmers obtain contractual rights through the family inheritance, which has become a common phenomenon in rural community. The conclusions mean that both working outside and family inheritance have made the problem of landless farmers hidden, and the existence of landless farmers does not pose a serious problem for the current rural community. The study also further explains the reason why the land is no longer readjusted: the expected return of land adjustment is low and the organizational costs are high, so landless farmers' willingness to adjust land declines. Thus the same policy for 30 years changes from an externally imposed institutional arrangement to an endogenous institutional arrangement, and continues down.

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