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Empirical Research on Influencing Factors of Cultivation Land Intensive Use in Chongqing

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Abstract Taking Chongqing as example, the paper ascertains the influencing factors of cultivation land intensive use from aspects of land conditions, family conditions and land operation conditions and theoretically expects the influencing relations of factors to the intensive uses. Collecting the land conditions, family conditions and land operation conditions through surveys, analyzes each influencing factors in a statistical description way. Constructing the empirical model, calculates the relations of land intensive use to the influencing factors with SPSS. The calculation results show a significant inverse correlation between land intensive use and land area, the space between land and counties, family members, the number of migrant workers, types of cultivation land, land transfer conditions. There is a significant positive correlation between land use and family average income, land investment. Based on these, the paper puts forwards corresponding suggestions and countermeasures of highlighting the land intensive using levels.

Key words Intensive uses of cultivation land, Transfer of cultivation land, OLS calculation, Chongqing City, China

With the development of economic society, contradictions between person and land become more and more abrupt, land area per capita having not covered up 0.13 hm², only one third in the world. On one hand, the process of urbanization becomes faster and faster, the needs of land increase day by day^[1]. On the other hand, desertification and soil erosion become more and more serious, the area of desertification has increased day by day. How to ensure the food safety and meet the needs of city construction with the lessening cultivation land facing us has attracted more and more people to pay attention to. And land intensified use becomes the must choice. At present, the researchers have selected the evaluation method of land intensified using^[2–4], evaluation index^[3, 5–6], method in indexes selection^[7–9], impetus of land intensified uses^[10–12], affording references to the researches on the land intensified use. While there still lacks the researches on the influencing factors of intensified land using and the realization routines. Therefore, this paper, based on the existed researches, conducts empirical research and analysis on the present using of land. And establish the calculating modes to carry out the empirical researches on the influencing factors of land intensified use, and put forward the relative countermeasures and suggestions finally.

1 Overviews of research areas

Chongqing City has a total area of 82.4 thousand km²; the cultivation land area is 2.235 9 million hm², comparing with 2002, 207.2 thousand hm² reduced, and averaging 29.6 thou-

sand hm² reduction. Chongqing's terrain is mainly mountains and hills and the quality of cultivation land is low, with dry land and water land covering the total cultivation 67.6%. According to the evaluations of cultivation land in Chongqing, the excellent and worst cultivation land are little, the mediatory quality land are the most, the ratio of excellent, mediatory and worst land area is 1:2:1. The terrain conditions of Chongqing decide the limits of storing cultivation land and the imbalanced compensation problems during exploitation and construction. The land used in construction is excellent in quality, while the later exploitation of cultivation land is low. The total cultivation land area and the averaging cultivation area per capital show a decreasing trend, contradictions between person and land become sharper and sharper.

2 Data resources and research methods

2.1 Data resources The data is gained through the surveys and questionnaires of 40 districts and counties of Chongqing. In this survey, 674 questionnaires are sent, 593 are valid after identification, and the hand-up rate is 88%.

2.2 Research methods The paper firstly conducts a descriptive analysis on the data which is gained through surveys, then constructs the mathematical mode to make a quantitative research on the relations between intensified use level and influencing factors, and makes OLS calculations on the variables with software Eviews 5.0.

3 Construction and analysis of indexes

Following the scientific, practical, systematic and hierarchical principles and combining with the present existed research results, the paper constructs 3 primary indexes and 12 secondary indexes. The primary indexes include cultivation land conditions, family conditions and cultivation land operation

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conditions; the secondary include the amount of land, the space between cultivation land and county, the area of single land, family members, the migrant population, the averaging total incomes of family, peasants vocational abilities, investment in the land, land types, cultivation land transfer, operation scales, wasteland and so on. Also the paper expects the influencing situations of secondary indexes on the intensified land usage levels.

3.1 Analysis of cultivation land condition

3.1.1 Amount of land. The amount of land to some degree reflects the scattering degree of cultivation land operation. The larger amount the land, the higher degree of land operation scatters. With the amount of land increasing, the difficulties of farmers conducting intensified management and scaled operation increase. Therefore, the amount of land and intensified degree show a contradicting trend.

3.1.2 The space between cultivation land and county. According to Du Neng's isolated agricultural zone theory, crops in the planting areas near urban areas generate higher, farther lower. The paper views that this principle is also appropriate for the intensified land using, nearer the intensification, the higher degree of land using.

3.1.3 Amount of single land. The larger amount of single land is, the easier the realization of scaled operation to gain more benefits. But the increased interests are not usually the results of the output per unit; it is the results of lowering the costs of generation and trading; the output per unit may declines, which to some degree is not consistent with the intensified management and weakens the degrees of intensification.

3.2 Analyses of family conditions

3.2.1 Family members. According to Lewis' unlimited supplying modes, in agricultural department of developing countries, there are so many remaining labors, while the marginal outputs of which are zero or even minus. The more the family members, the more labors remaining in the family means, and the more the labors are invested in cultivation. The fewer the outputs the land generates per unit, the lower degree the usage of the cultivation land.

3.2.2 Amount of migrant population. Agriculture needs to some extent the delicate jobs, requiring investing a certain amount labors in a certain time. While the increment of migration population reduces directly the investment of excellent labors and the intensification of cultivation land declines inevitably.

3.2.3 Averaging total incomes per year. The increment of investment in land may upgrade the land intensified use; the higher the averaging incomes of family, the more abilities they have to recreate or invest in land, therefore, the more intensified the use of land.

3.2.4 Peasants' vocational abilities conditions. If peasants have some vocational abilities, then their dependence on land may be reduced greatly, the excessive intensification of cultivation land will be lowered. Therefore, the vocational abilities and the land intensification show negative trend.

3.3 Analysis of cultivation land management

3.3.1 Investment in land. The investment factor is the direct

influential one, whether having invested in land decides directly the degree of land intensification.

3.3.2 Land types. Different land types needs different investment, distributing the limited energies and sources to different types of land which disable farmers to be specific and delicate, and finally lowers down the land intensification.

3.3.3 Land transfer. In the duration of land transfer, the people who transfer the land thinks that the land would be others, while the one who borrow land considers that it is not his, what he has is the transient using rights. So, under this situation, no matter the borrower or the lender would grudge to investing in land which lowers directly the land intensification.

3.3.4 Management scale. At the preliminary stage of land management, there are always people who enlarge the management scale and lower down the land intensification. Because at this stage, people gaining profits only through enlarging the land area without considering the quality. Therefore, enlarging the management scale means to lower down the land intensification.

3.3.5 Wasteland. With the increment of migrant population, the wasteland becomes more and more universal, which may generates a negative effect on land intensification. Because wasteland means nothing, all investment would have no gains at the end.

4 Conclusions and analysis

4.1 Statistically descriptive analyses Through studying on the 593 surveying test paper, we may find out that in terms of cultivation land, the most the family have are 90, even averaging 13 with averaging 0.6 per single land. All of which show that the degrees of scattering land use in Chongqing are high which would generate negative effects on land intensification; in terms of family, the ratio of head of household receiving preliminary or below, junior, senior or above are respectively 33%, 47% and 20%, which show that the entire education levels are not high. Only 115 families which do not have migrant population, covering only 19%, showing that dependence on land in the sample is very low; in terms of cultivation land management, it is universal to have wasteland. 51% have wasteland more or less. There exists also multiple land transfer in rural areas, 33% families having transferred land. At present stage, there is little investment in land, 70% families has not invested in land.

4.2 Empirical mode analyses In the mode, dependent variable is the usage of intensified land, with the output per unit as the index; the secondary indexes are numbers, space between land and county, areas of single land and family members, migrant population, land investment, land types and land transfer these 9 indexes and makes OLS calculation through Eview5.0. And results lie in Table 1.

From Table 1, we may see that when F value is 30.82, the apparent level is 1%, with fit R^2 is 0.35, DW is 1.74, which show that there is no serial correlation and it is appropriate to accept the good equation; from the test results, the significant influential factors are numbers of land, distance between culti-

vated land and county, area of single land, annual household incomes, numbers of migrant population, investment in cultivated land, land types and land transfer condition. In the results of the empirical modes, each significant factor is consistent with the above quantitative analysis.

Table 1 Regression analysis results of intensive utilization of cultivated land in Chongqing

Variable	Coefficient	Standard error	T value
Constant term	1.960	0.439	4.463 * * *
Number of land blocks	-0.020	0.003	-5.460 * * *
Distance between lands and county	-0.003	0.001	-1.942 *
Area of each land block	-0.375	0.045	-8.400 * * *
Annual household income	0.618	0.048	12.97 * * *
Number of family members	-0.054	0.027	-2.000 * *
Number of migrant workers	-0.156	0.039	-3.998 * * *
Investment in lands	0.190	0.078	2.441 * *
Land type	-0.291	0.075	-3.861 * * *
Land circulation	-0.249	0.081	-3.055 * * *

Note: * representing 10% apparent levels, ** 5%, *** 1%; samples are 593; R^2 is 0.35; DW is 1.74; F is 30.82 * * *.

4.2.1 In terms of the general situations of cultivated land, the numbers of land, distance between land and counties, areas of single land all show negative relations to intensive land using. The results of modes show that the increment of numbers of land generates the negative force on the land intensive using, because the increment numbers of land would increase difficulties of land intensive using; with the distance enlarged, the intensive degrees would be lowered, which to some degree is consistent with Du Neng's isolated agricultural theory that the nearer it is, the higher the intensive land using. Or farther, lower. The increment of areas of single land makes the intensive using of land lower, which is inconsistent with the traditional theory. At present stage, the causes of low degrees of intensive land using are that peasants are more dependent on increasing the areas of land to upgrade incomes which would be viewed as scaled economy, while in fact is to lower the tangible costs and trading costs, not consistent with the intensive land using.

4.2.2 In terms of family situations. The averaging annual family incomes and degrees of land intensive using show a positive correlation. The annual total incomes would have a positive function on the improvement of land intensive using. The family incomes are the economic basis of the investment in land. Families having a higher income would be able to amend or create better means of production and gain a higher output; the results that the numbers of family members and land intensive using showing a reverse correlation are consistent with Lewis' theory of labors unlimited supply. At present stage, there are many remaining labors in agricultural production department whose marginal production is zero or even minus; families having more migrant populations have a lower intensive land use, because on one hand, the families have a phenomenon that wasteland is universal, on the other hand, the migrant population is mainly the dominant labors in a family. Those remaining labors in family are weak ones. Once they going out for a new job, the investment of labors in land are inadequate which results in a lower intensive land using.

4.2.3 In terms of cultivated land management. The investment in land and the land intensive use show a positive correlation; the types of cultivated land and the land transfer show a reverse correlation. Investment in land including land flattering, amend and update production equipment and so on would greatly improve the land using efficiency. Therefore, investment would generate great accelerating effects on land intensive using; the diversification of land types would have a negative effect on land intensive using. In other words, farmers who having two kinds or even more have even lower intensive land using. Because farmers who own single type of land have more skills in specific production than that of farmers having different types of land and have a higher efficiency. Land transfer generates reverse functions on land intensive using, because although land transfer accelerates the scaled management of land, at present, the irregular transfer of land results in uncertainty making both the borrower and lender grudge to investing in land and finally bringing negative effects on land intensive using.

5 Countermeasures and suggestions

From the results of the empirical analysis and present situations of land intensive using of Chongqing, we should start from the following points to improve the qualities of land intensive using.

5.1 Intensifying governments' awareness of land protection, propagating intensive land using positively Land is the material basis and fundamental factor of the development of national economy, the development of economy cannot go on without the support and guarantees of land. Governments of Chongqing city should foster land protection awareness through legal propagation, policy guidance and formulated plans and propagates the intensive use of land in rural areas to form a good habit of land intensive use.

5.2 Planning development of urban and country, upgrading farmers' incomes The key to improve the levels of land intensive using is the increment of land investment. It includes, at preliminary stage, land flattering, amending and in the duration of production invests in better seeds, fertilization and more advanced equipment and means of production to upgrade the outputs per unit. Peasants are the main body of investment in land. So the increment in investment is based on the increment of peasants' incomes. Governments in Chongqing should do their best to improve the peasants' incomes to make them invest more in land and finally upgrade the intensive levels.

5.3 Enlarging supporting force in agriculture and strengthening skills training Chongqing City should formulate other beneficial policies besides foods subsidy, seeds subsidy and equipment subsidies, such as loaning small amount of loans to improve the supporting force and at the same time strengthen farmers' skills training. Distribute specific personnel to teach peasants skills in empirical sites and increase the scientific investment in land.

5.4 Accelerating system innovation and realizing regular transfer of land There are no definite laws and regulations on land transfer in Chongqing. The irregular land transfer makes the both parts have different opinions on management period of land transfer, resulting in unwillingness in land investment of

the both. Therefore, Chongqing government should accelerate system innovation in the reform experiment of urban and county development, realizing the regular transfer of land, ensuring benefits of the both, accelerating land investment and improving land intensive using levels.

5.5 Strengthening land management and restricting land wasting Chongqing is a city typical of big urban city with big rural areas, with many villagers. While most are migrant populations, among whom wasteland is universal. The situation of wasteland weakens the intensive using levels of land. Therefore, corresponding policies should be formulated, such as wasting land to some degree may lose the management rights and so on. Strengthen management on land to improve the intensive using levels of wasteland.

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