Evaluation of the Land Quality in Front and Back Land Consolidation

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Abstract. The research object of this paper is DaZu comprehensive land consolidation projects in Hechuan County of Chongqing, analysis the land comprehensive consolidation impact on land quality in hills and mountains. The results show: (1)Through comprehensive improvement of rural land, land topography factors increase the value of20.85%; Soil factors increase the value of 11.58%; Moisture factors comprehensive values improved8.09%; Landscape factors increase the value of 1.90%。(2)Overall, land quality integrated value is 1 before comprehensive improvement of rural land. Land quality integrated value is 1.4242 after comprehensive improvement of rural land, improved by 42.42 %. Visible through the comprehensive improvement of rural land, land quality has increased in the study area, a good foundation for the sustainable development of agriculture.

Introduction

In recent years, under the principle of building a new socialist countryside guidance，Launched a number of projects to benefit farmers in chongqing. Such as land development and consolidation projects, low-yielding farmland, village project, the construction of a new socialist countryside, etc [1-3].

However, under the new rural construction, land consolidation as a carrier to promote the construction of a model village just started, less empirical research on it. To this end, explore comprehensive land management mode under the new countryside construction, improve the planning of democracy, scientific, feasibility is very important[4-6]. The research object of this paper is DaZu comprehensive land consolidation projects in Hechuan County of Chongqing, analysis the land comprehensive consolidation impact on land quality in hills and mountains.

Materials and Methods

Data Sources. The original data mainly comes from DaZu town land use change survey data in 2010, DaZu town 2014 Statistical Yearbook, the author's practical survey, use Hechuan County Planning Bureau, trade and Economic Cooperation Bureau, agriculture bureau and other departments data for supplementary.

Research Methods. Learn from previous research results, combined with the actual situation of the study area, Establish evaluation indictor system of land quality in land improvement area (Tab.1) [7]. The quality index value of the default is 1 before land consolidation. Using the following formula standardization：

$$F = X_i / X_j \qquad （1）$$

Where: F is the value of i indexes after standardization, Xi is the value i indexes after the comprehensive improvement, Xj is the value i indexes before the comprehensive improvement. Normalized index value, F is greater than 1, indicates that the value of land quality indicators improved; F is equal to 1, indicating no change in the value of land quality indicators; F is less than 1, indicating that the lower value of land quality indicators.

Tab. 1 Evaluation indictor system of land quality in land improvement area

Target layer	Guidelines layer	Index layer	Indexes and grading standards	rank
		Land flatness C1	Slope $<1^0$, high flatness	1
			Slope of 1^0-3^0, relatively high flatness	2
			Slope of 3^0-5^0, general flatness	3
	Topography factors (B1)		Slope$>5^0$, low flatness	4
		Production convenient C2	convenient	1
			not convenient	2
		Plots regularity C3	regularity	1
			not regularity	2
		Topsoil thickness C4	25-40cm	1
			15-25cm	2
			$<$15 cm	3
	Soil factors (B2)	Soil fertility levels C5	fertile soil	1
			relatively High levels of soil fertility	2
			relatively Low levels of soil fertility	3
			poor soil	4
Effects of comprehensive land consolidation on land quality (A)		Land utilization C6	$>$90%, high levels of Land utilization is	1
			85%-90%, relatively high levels of land utilization	2
			80%-85%, general land utilization	3
			$<$80%, relatively low levels of land utilization	4
		Water level of assurance C7	adequate irrigation water	1
			limited irrigation water	2
			no irrigation water	3
	Moisture Factors (B3)	Irrigation level of assurance C8	irrigation guaranteed rate of more than 90%	1
			75%-90%	2
			$<$75%	3
		Drainage level of assurance C9	a perfect drainage facilities	1
			drainage facilities in general 受淹	2
			poor drainage facilities	3
		Landscape Productivity C10	$>$1000kg	1
			800-1000kg	2
			600-800kg	3
	Landscape factors (B4)		$<$600kg	4
		The beauty of the landscape C11	good	1
			common	2
			poor	3

Finally, we use the following formula to calculate the value of the land quality.

$$E = \sum_{i=1}^{n} F_i \times W_i \qquad\qquad (2)$$

Where: Fi represent the standard value of i indicators, E represent comprehensive evaluation value of the land quality, Wi representatives weight of i indicators.

Evaluation Results

The results show that(Tab.2): through comprehensive improvement of rural land, land topography factors increase the value of 20.85%. Among them, land flatness comprehensive values improved 10.27%, production convenient comprehensive values improved 4.88%, plots regularity comprehensive values improved5.70%; Soil factors increase the value of 11.58%, among them, topsoil thickness comprehensive values improved4.54%, soil fertility levels comprehensive values improved6.69%, n land utilization improved0.35%; Moisture Factors comprehensive values improved8.09%, Among them, water level of assurance comprehensive values improved2.98%, irrigation level of assurance comprehensive values improved3.77%, drainage level of assurance comprehensive values improved1.34%; Landscape factors increase the value of 1.90%, among them, landscape productivity comprehensive values improved1.24%, the beauty of the landscape comprehensive values improved0.66% 。

Tab. 2 The index standard value of land quality

Index layer	After remediation	Before remediation	Standard scores	Comprehensive value of after remediation	Comprehensive value of before remediation	added value
C1	60	90	1.50	0.2044	0.3071	0.1027
C2	80	100	1.25	0.1053	0.1541	0.0488
C3	60	100	1.67	0.0821	0.1391	0.057
小计	——	——	——	0.3918	0.6003	0.2085
C4	60	90	1.50	0.0868	0.1322	0.0454
C5	60	90	1.50	0.1148	0.1817	0.0669
C6	100	100	1.00	0.0711	0.0746	0.0035
小计	——	——	——	0.2727	0.3885	0.1158
C7	80	100	1.25	0.1161	0.1459	0.0298
C8	60	100	1.67	0.0594	0.0971	0.0377
C9	80	100	1.25	0.0413	0.0547	0.0134
小计	——	——	——	0.2168	0.2977	0.0809
C10	80	90	1.13	0.0604	0.0728	0.0124
C11	60	90	1.50	0.0583	0.0649	0.0066
小计	——	——	——	0.1187	0.1377	0.019
total	——	——	——	1	1.4242	0.4242

Overall, Land quality integrated value is 1 before Comprehensive improvement of rural land, Land quality integrated value is 1.4242 after Comprehensive improvement of rural land, improved by 42.42 %. Visible through the comprehensive improvement of rural land, land quality has increased in the study area, a good foundation for the sustainable development of agriculture. However, due to the qualitative evaluation described in more in the study, assignment method is more simple, there is a strong subjective and the result accuracy is not high. Future studies, can make use of mathematical methods and modern techniques, establish comprehensive land quality evaluation method more suitable for the comprehensive improvement of rural land.

Conclusion

The research object of this paper is DaZu comprehensive land consolidation projects in Hechuan County of Chongqing, analysis the land comprehensive consolidation impact on regional land quality. The conclusion is as follows:

(1)Through comprehensive improvement of rural land, land topography factors increase the value of 20.85%；Soil factors increase the value of 11.58%；Moisture factors comprehensive values improved8.09%；Landscape factors increase the value of 1.90%。

(2)Overall, land quality integrated value is 1 before comprehensive improvement of rural land, Land quality integrated value is 1.4242 after comprehensive improvement of rural land, improved by42.42%．Visible through the comprehensive improvement of rural land, land quality has increased in the study area, a good foundation for the sustainable development of agriculture.

However, due to the qualitative evaluation described in more in the study, assignment method is more simple, there is a strong subjective and the result accuracy is not high. Future studies, can make use of mathematical methods and modern techniques, establish comprehensive land quality evaluation method more suitable for the comprehensive improvement of rural land.

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