

The Analysis of the Agricultural Applicability of Reclamation Land under the Complementary Mechanism of Urban and Rural Construction Land and Its Strategy

Xia Bin^{1*}, Geng Ze¹

¹*School of Economics and Management, Xi'an University of Technology, Xi'an, China*

*Corresponding author's e-mail: xiabin-2100@163.com

Abstract. With the steady advancement of urban integration and poverty alleviation, it is urgent for China to form a benign complementary mechanism between the rehabilitation of rural construction land and the demand for urban construction land, ensuring the dynamic balance of cultivated land. It is the basic requirement for realizing the integration of urban rural development and industrial transformation upgrading. In the process of land redevelopment and expansion, it is inevitable to carry out the necessary suitability analysis of reclaimed land, in order to meet the crop cultivation suitability of the region and realize the expected economic benefits and effects. Therefore, this paper intends to carry out the necessary land-for-agriculture analysis of the land for rural construction that needs to be rehabilitated, under the complementary mechanism of urban rural construction land, in order to provide practical and feasible countermeasures for land reclamation.

1. INTRODUCTION

The comprehensive management of rural construction land is the key and difficult project in the linkage and reduction of land in China. It not only relates to the utilization efficiency and effect of land after reclamation, but also directly affects the sustainable development of regional ecological environment and farmers rely on land cultivation. The direct related benefits of major economic sources are reflected. In the process of comprehensive land reclamation of rural construction land, the starting point and focus of the existing research often measure the comprehensive unification of land economic, social and environmental benefits after reclamation from the perspective of macroscopic whole, less from farmers. From the perspective of the specific suitability of land after reclamation, and whether the use and capacity of reclamation land can bring tangible and relevant benefits to farmers. Therefore, this paper analyzes the water and soil suitability of rural construction land after reclamation as a research perspective, comprehensively analyzes the aptitude and cultivation conditions of the land, and plans for the farmers to rehabilitate on the basis of existing conditions and environment. To manage the economic benefits products that are compatible with them, while ensuring the effective allocation of existing land resources, we can also consider the legal rights and corresponding economic benefits of farmers from the perspective of grassroots.^[1]

2. Land Complementarity Mechanism and It's Existing Problems

2.1. Analysis on Complementary Mechanism of Urban and Rural Construction Land Use

Under the framework of our country's existing laws and regulation systems, in order to realize the



complementary mechanism of the existing construction land, China has improved the current status of unbalanced land distribution through comprehensive improvement methods. The comprehensive improvement of rural construction land can be used to demolish and rehabilitate scattered, low-utilization land, re-distribution, and centralized construction of rural residential areas, so as to adjust the surplus agricultural land indicators to a comprehensive land remediation activity used by towns, as shown in the figure1.

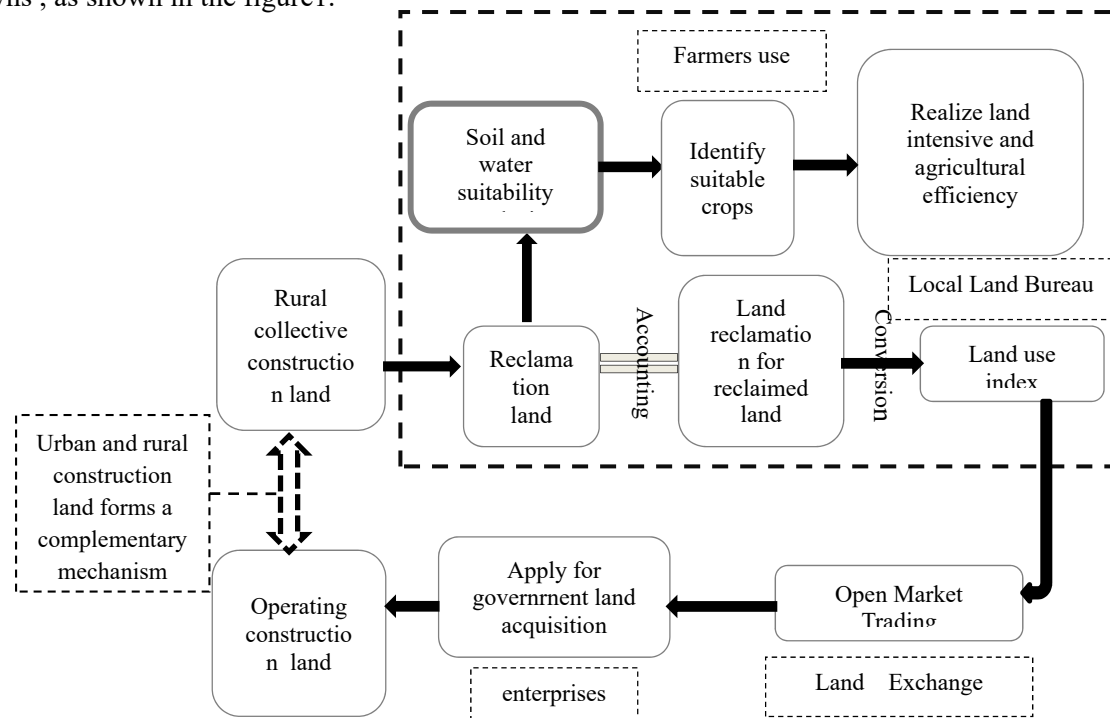


Figure 1. The complementary mechanism of urban and rural construction land

The main process is reflected in the assessment and measurement of the existing scattered rural construction land, the unified improvement of the existing construction land and the reclamation of the area, and the reclaimed land shall be used and controlled by the farmers who own the land use right. To do this, it is necessary to carry out the necessary suitability evaluation and analysis of the existing land, determine the crops that are expected to bring real economic benefits to the farmers, in order to protect the basic needs and gains of the farmers, and at the same time calculate the land area for reclamation to form a local construction^[2]. The comprehensive index of land use will be put into the market for public trading, and the land for commercial construction of urban land will be formed eventually, with a view to realizing the dynamic and complementary mechanism of existing urban and rural construction land. The specific process is shown in Figure1.

2.2. Analysis of the Problems in Reclamation of Rural Construction Land

(1) The reserve resources that can be reclaimed as cultivated land are insufficient, and the overall plan for remediation is lagging behind

For the land remediation planning, the reduction of the existing cultivated land area has become a problem that China needs to solve urgently as well as constraints on the restriction of the dynamic balance mechanism of urban and rural construction land. At present, China's rural land as a whole shows a disparity in its distribution, and it lacks effective consolidation measures. The rural construction planning time lags behind cannot be well matched with the construction of new rural areas.

(2) The use of rural construction land is inefficient and idle waste seriously

The use of rural construction land is inefficient and there is a large amount of idleness and waste. The random expansion of rural homesteads and the projects under construction that are not implemented according to regulations have led to a serious waste of the entire rural land resources. The obvious contradiction between the demand for construction land growth and the acceleration of the urbanization process has become increasingly prominent. Therefore, there is an urgent need for overall planning and reasonable arrangements for agricultural land structures.

(3) There is no guarantee for the quality of cultivated land reclaimed and damages farmers' rights and interests

The link of increase and decrease of land for rural construction uses the model of "land for land after land is first used" to achieve a balance in maintaining the total amount of arable land. However, the short-term government departments for land reclamation for land use are spurred by the interest of indicators and it is difficult to guarantee the quality of cultivated land. To some extent, the contradiction between land use has been exacerbated. According to the existing regulations, the cultivated land to be reclaimed will continue to be owned or used by the original land rights holders, and the poor-quality cultivated land will be contracted and managed by the farmers. From the long-term development trend, the farmers' rights to reclamation will surely be damaged.

3. Analysis on Suitability of Land and Water Resources of Reclaimed Cultivated Land

3.1. Division of Land Suitability Evaluation Units in Rehabilitation Project Area

For the evaluation of soil and water suitability of the reformed rural construction land, the basic land unit should be divided, according to the type of the evaluation unit, so that the divided land maintains basic consistency in the characteristics of attributes and the direction of reclamation, and the scientific method is adopted. This way means to enhance the overall efficiency and effectiveness of land consolidation. The comprehensive consideration of the actual conditions of the project parcels, combined with the damage degree of the land after the reconstruction, will be further subdivided according to the following principles and methods.

Division principle and method:

The principle of division of land for rural construction is mainly based on the principle of optimal benefits, priority of agricultural land, and principles of comprehensive analysis. According to the above basic principles of land division, combined with the actual situation of the land to be reclaimed and the expected direction of recultivation, appropriate methodological choices should be made. The existing methods of land division include: superposition method, plot method, spot method and grid method, etc. The methods are determined based on the types of land use and the suitability of land and water resources for crops, and the use of existing landforms. Based on the above, the division of land units should form a good connection with the follow-up land comprehensive improvement work to ensure the operability of the comprehensive land consolidation work and produce higher economic and social benefits^[3].

3.2. Water Resources Suitability Analysis

When researching and analyzing land and water resources, it is often necessary to consider the total demand for production and domestic water in the remediation area, and the total supply of existing water sources. In combination with the actual situation in the region and fully consider whether the distribution of water resources can meet the existing supply and demand Dynamic balance relationship. According to the analysis of water supply and demand, for a certain area, the water supply and demand for water are not evenly distributed in the region and time, and the sub-regional water resources supply and demand analysis studies are easy to understand the water supply and demand balance factors in various regions. Differences between different areas in order to take different measures and countermeasures.

a. Water supply analysis

According to the geographical differences in the project area, the distribution of precipitation in

different regions of the south and the north should be distinguished. Based on local conditions, several years with similar precipitation frequency should be used as the base for analysis and calculation. The water resources that can be used for agricultural production and life should be divided into natural precipitation, regional groundwater, irrigation return supplies, etc. are the main sources of water for agricultural fields^[4].

Available total water resources analysis:

1) Precipitation analysis

The annual variation in precipitation and seasonal differences have a great impact on agricultural production. The requirements for water storage at various stages of crop production, it is necessary to do a good job of supplemental irrigation.

Rainfall infiltration recharge formula: $W1 = 0.1\alpha PS$ (1)

content: $W1$ —Rainfall infiltration recharge (million m^3 / year);

P —Average annual rainfall (mm);

α —coefficient;

S —area size (km^2);

2) Groundwater savings

The reserve of groundwater is further determined by reference to the current status of the development and utilization of local land resources, and the average amount of available groundwater $W2$ that can be used in recent years is determined. The recoverable amount of groundwater is used as the water supply demand for precipitation-impregnated irrigation. The supplementary relationship with the regional precipitation distribution directly affects the selection of agricultural crops used for land cultivation and the laying of related infrastructure^[5].

3) Irrigation return replenishment

$W3 = \beta_3 \cdot W\alpha$ (2)

content: $W3$ —Irrigation return replenishment, million m^3 /year;

β_3 —coefficient;

$W\alpha$ —Irrigation water consumption (million m^3 /year) .

4) Total water supply W_s for estimation

Through measuring and estimating the natural rainfall, regional groundwater, and irrigation recharge of the land area in the reconstruction and expansion project area, $W_s = W1 + W2 + W3$ is calculated and analyzed, and the total water supply W_s is used as the comprehensive utilization of the project area. The state of existing water resources will reflect the basic conditions for crops that can be adapted to cultivate land.

b. Water demand analysis

The water demand includes all the total amount of water used in the project area, and the total water demand including agricultural irrigation water, livestock drinking water, and production and domestic water is calculated based on the relevant water consumption analysis. The agricultural water demand is based on the local standard water quota and the basic irrigation guarantee rate of the relevant crop, based on which the irrigation quota and the total water requirement of the crop are determined.

c. Analysis of supply and demand balance of water and land resources

Water balance analysis is an important part of rural land remediation projects. Therefore, based on the analysis of the water resources of the reclaimed land in the area, the supply and demand balance between the supply of water in the calculation area and the demand of the different crops for irrigation needs to be adequately measured. It provides an important basis for crop cultivation implementation plans for reclaiming farmland and the construction of relevant ancillary irrigation facilities, further increasing the yield and effectiveness of crop planting cultivation in the overall reclamation area, and realizing the coordination and sustainability of regional farming systems. Through a series of analysis and demonstration, it can effectively improve the environment and further optimize the farmland ecological environment, to prevent soil erosion and protect the ecological environment^[6].

3.3. Land suitability analysis

According to the natural conditions and land types in the project area, the basic unit of land suitability assessment is determined. The assessment of land suitability is a suitability assessment system based on the diagnosis of land restriction factors. Based on the evaluation of land suitability and on the premise of comprehensive principles and prevailing restrictive principles, factors such as water conditions, soil texture, and effective soil layer thickness are selected as the participation factors. The specific evaluation index rating method is as follows: Measured by grading indicators, as shown in the table 1.

In the full use of land surveys, reserve resources surveys, and surveys of agricultural natural resources, and other results, supplemented by field surveys, information on the evaluation indicators for each piece of land in the project area was obtained. The surveys mainly investigate and analyzes the natural conditions such as the natural slope, soil thickness, soil texture, groundwater level and other natural conditions in each unit, and studies the interrelationship and mutual restraint processes among various factors; then, the evaluation factors and evaluation of the evaluation units Factor index table to determine whether it is appropriate to plough. In order to simplify the evaluation procedure, the land suitability evaluation using the limit value method may be used as the main method. That is, if one index fails to meet the requirements, it is not suitable for farming.

Table 1. Evaluation index of land suitability

factor	Limiting factor	evaluating indicator	Evaluation grade
			Appropriate agro
Water condition	Soil water condition	Soil moisture suitability, Good water retention	More appropriate
		Less soil moisture, Water retention capacity	appropriate
		Too much soil moisture, Poor water retention	inappropriate
Topsoil texture	Soil organic matter、Pollution degree、Fertilizer performance	Light, medium soil	More appropriate
		Clay, sandy soil	appropriate
		Heavy clay, sand land	inappropriate
Soil erosion capacity	PH、Degree of salinization、Wind erosion degree	Micro erosion	More appropriate
		Mild erosion	appropriate
		Medium and heavy erosion	inappropriate
Effective soil thickness	Clay thickness、Root system、slope	Thick soil layer	More appropriate
		Fine soil medium	appropriate
		Thin layer of thin soil	inappropriate

3.4. Comprehensive evaluation of land reclamation for agriculture

Through the relevant water and soil suitability analysis of the land reclamation, the objective assessment of land quality is made according to local conditions, which provides a scientific basis for land reclamation. From the perspective of the technical reliability of the project and the suitability of water and soil, it is considered as the feasibility basis for restoring agricultural production capacity and output after the implementation of the project. Through a series of analysis and demonstration, it can effectively improve the environment and further optimize the farmland ecological environment to achieve the purpose of preventing soil erosion and protecting the ecological environment.

4. conclusion and suggestion

4.1. conclusion

(1) Considering the suitability of land for subsequent cultivation after reclamation of construction land, it is particularly important to analyze the suitability of soil and water according to local conditions. Whether it is the basic condition of water and soil resources or future construction conditions, it will be related to the direct use of the target area after reclamation. . Therefore, for different land status, appropriate irrigation and construction methods suitable for local conditions are conducive to the rational development and planning of subsequent land.

(2) Through the evaluation of the suitability of rural construction land and rational rectification, it will help to further realize the dynamic complementarity between urban and rural construction land and cultivated land on the premise of ensuring effective land use value.

(3) Under the basic conditions of existing land and water resources, it is necessary not only to meet the legitimate interests of farmers and to ensure the efficient use of land, but also to closely implement the matching and coordination with relevant national laws and regulations.

4.2. suggestion

(1) Improve relevant policies and regulations

Through continuous strengthening and improvement of relevant policies and regulations, we will implement the harmonization and harmonization of cultivated land complementation mechanisms in the form of legislation. The key work should be based on the establishment of legalized management planning methods for rural areas and related safeguard measures for land consolidation.

(2) Further improve the correlation between soil and water suitability assessment systems

When analyzing the suitability of land and water resources in the project area, the implementation process of suitability assessment should be used as the main reference point, and a comprehensive evaluation system for water and land resources feedback before and after the project area should be established. Therefore, it is possible to overcome the weak correlation between relevant evaluation indicators and realize the dynamic adjustment of land and water resources and the sustainable development of land.

(3) Fully respect and protect farmers' wishes and rights, and establish public participation and coordination to promote

When implementing the policy of increasing or decreasing urban and rural land, the government should regard the farmers' demands and wishes as the basic factors affecting the implementation of relevant policies. In order to further protect the vital interests and legitimate rights and interests of farmers in the comprehensive improvement of land, the implementation of the public participation mechanism is emphasized, and the effective implementation of the policy of land increase and decrease is realized by strengthening the promotion and guidance of policies

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