

Research on Landscape Ecological Evaluation and Landscape Ecological Planning Based on Land Consolidation Engineering

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Abstract: The development of land renovation has obtained good effect in our country. At the same time, it has created conditions for the improvement of rural ecological environment. But in practice, people put more emphasis on the concept of hard infrastructure construction, leading to many projects in landscape ecology construction shows deficiencies. Analysis of the reasons, one is the lack of landscape, ecological theory and technical guidance, the second is the system has not been reasonable guarantee. In some areas, the excessive pursuit of standardized construction of "fields forming squares, roads forming networks, canals connecting and trees forming lines" ignores the protection and promotion of rural landscape style, which leads to the gradual loss of local cultural landscape characteristics and plain local flavor after land consolidation.

Keywords: Land consolidation; Landscape ecology; Evaluation system.

1. Introduction

The implementation of land consolidation project not only changes the land use structure in the project area, creates a new artificial landscape, but also has an impact on the ecological environment. As the impact of land consolidation projects on ecological environment is long-term, cumulative and uncertain, it is difficult to determine whether the landscape pattern of the newly built project area is conducive to the improvement of ecological environment. In some places, the cultural landscape and historical sites with local characteristics are destroyed for short-term economic benefits, which has a negative impact on the rational development and utilization of resources.

Therefore, combining land consolidation with landscape ecological planning and design, and integrating the concept of landscape ecology into the planning and design of land consolidation project area is of positive significance for improving regional ecological environment conditions, constructing modern ecological agriculture with local characteristics, promoting regional sustainable development, and realizing the social, economic and ecological benefits of land consolidation project.

2. Project background

From many land improvement projects in our country, there are still some problems in landscape ecological construction. From a practical point of view, due to the practice of "sprinkling pepper powder", land consolidation has been unable to show achievements, and there is a "large-scale planning" with points instead of surface, so as to focus on the creation of "explicit project", which is mainly manifested in: First, in the land leveling project, some places ignore the specific geographical features and landforms, and carry out "latticed" leveling of farmland, which damages the tilled layer and increases the degree of land fragmentation,

causing farmers to be unable to cultivate, which directly affects the economic benefits. Second, in irrigation and drainage engineering, hardening slope protection of rivers, ditches and pits. As a whole, the so-called "high-grade design" obviously reduces the connectivity of the landscape and separates the water system from the land and its biological environment, thus leading to the loss of ecological functions of the land. Especially for the river bend straight, do not respect the natural nature and texture characteristics, is bound to cut the river and the river bank natural form, thus bringing some recessive problems. Third, in the field road projects, a large number of cement roads are built in some places. Although they are popular projects among the masses, the landscape connectivity is damaged. Such human interference has an impact on the biological activity space, resulting in a certain pressure on biodiversity. Fourthly, in the field protection and ecological environment maintenance project, landscape trees have become the mainstream forest network mode in some places. It seems to be a beautiful man-made landscape, but in fact it has little significance in the countryside. Fifth, in the village renovation project, the construction of "model houses" is carried out excessively, which causes the separation of people and land and affects the humanity and pastoral landscape. These problems will have adverse effects on the landscape ecological construction and sustainable development of rural areas.

Landscape ecological assessment is an assessment of the present situation of landscape ecology. It is the basis of landscape planning, management and protection. The research on landscape ecological assessment aiming at land improvement is less in our country. It is of great practical significance to study landscape ecological evaluation of land consolidation under the background of current times. Taking the unique land consolidation project of Yan 'an as the research scale, landscape ecology theory is introduced, land use status map before and after land consolidation is made on Arcgis platform, and the Fragstats software is used to

calculate the landscape pattern index before and after the renovation of Yan 'an Zhigou land reclamation project. On the basis of the existing landscape ecological evaluation method, Landscape ecological evaluation after land consolidation was carried out according to the local actual situation, and the changes of landscape pattern before and after land reclamation were analyzed and studied to optimize landscape design. Therefore, it can provide reference for the establishment of landscape ecological engineering technical standard to promote the sustainable development of landscape ecological engineering.

3. Main technological innovation content

Landscape ecological assessment is an assessment of the present situation of landscape ecology. It is the basis of landscape planning, management and protection. The research on landscape ecological assessment aiming at land improvement is less in our country. It is of great practical significance to study landscape ecological evaluation of land consolidation under the background of current times. This project takes land consolidation project as the research scale and introduces landscape ecology theory to calculate landscape index before and after land consolidation project (major and minor landscape index), establish land consolidation landscape ecological evaluation method, analyze and study landscape pattern changes before and after regional land consolidation, so as to provide reference for the establishment of land consolidation landscape ecological engineering technical standards. Promote sustainable development of land consolidation. It can be widely used in agricultural research and other fields.

(1) According to the situation before and after the implementation of land consolidation engineering, a landscape ecological evaluation method suitable for land consolidation engineering was established from three aspects: landscape classification, landscape index selection and data processing.

Land consolidation engineering has its particularity, there are specific areas, specific scale, landscape ecological evaluation for land consolidation is more complex, the land consolidation landscape ecological effect analysis and landscape optimization objectives research range is narrow. At the same time, the quantitative evaluation of landscape ecology in the project area after land consolidation is also lacking in China. Based on the particularity and difference of different research areas at different research scales, this project takes into account the systematizations and practicability of the evaluation system, and considers that soil, hydrology, vegetation and other factors are in dynamic change after land consolidation, which makes it difficult to accurately obtain the data related to biodiversity and farmland ecosystem. Through systematic classification of landscape before and after renovation, landscape index system was established, landscape index suitable for the study area scale was selected, data processing was carried out, and the land renovation landscape ecological engineering was evaluated through structural analysis of data processing. Based on the software platform, landscape ecology method was applied to analyze the changes of land use structure before and after the implementation of land consolidation projects at the county scale, township (town) scale and project scale, and the corresponding indexes were selected from the landscape

pattern index analysis software for calculation, so as to analyze the landscape ecological changes before and after the land consolidation project.

(2) According to the land use change of the project area, combined with the principle of landscape ecology, the comparative analysis of landscape ecological pattern before and after the planning and the quantitative evaluation of landscape ecological quality after the regulation planning were carried out.

In the face of the severe challenges of urbanization process, landscape ecological construction and food security under the new situation, landscape ecological concept should be reasonably implanted and the idea of "integration of heaven and human" should be integrated to create a landscape ecological land consolidation model, so as to improve landscape diversity, biodiversity and the stability of land ecosystem accordingly, and achieve the land consolidation goal of unifying economic, social and ecological benefits. Thus, promoting the sustainable development of rural economy and society, realizing the harmonious development of man and nature.

(3) Optimized the landscape pattern design scheme of land consolidation engineering.

Combined with the overall planning and design objectives, the ecological restoration and optimization of the landscape pattern of the project area follow the principle of ecological optimization, coordination and beauty, and adopt the pattern of "spot one corridor one foundation" to maximize the overall efficiency of the scenic spot. To optimize the natural vegetation patches and enhance the ecological function of ecological source, we should optimize the natural vegetation patches. To build a scientific and reasonable ecological corridor, ecological corridor can play a dual role. On the one hand, it can combine patches of various regions and scales organically, realize the exchange of energy and material among different patches, and help maintain the ecological balance in the region; on the other hand, it can make people enjoy better sightseeing. Maintain or restore the typical regional matrix. The matrix plays a decisive role in the artificial landscape shaping, and occupies an obvious position in the landscape. It occupies the largest area and has the best continuity. Therefore, in order to maintain or restore the ecological environment, the matrix plays an important role.

4. Comparison of similar technologies at home and abroad

Compared with the similar technology at home and abroad, it has the advantage of evaluating different scales and specific regions according to the particularity of land consolidation projects. The study of landscape ecological land renovation in our country is still in its beginning stage, and the theory system is still incomplete. Most studies obtain the conclusions obtained by using the case analysis method, especially the index basis selected in landscape analysis. Land consolidation is a complete systematic project, which must follow the principle of economic, ecological and social benefit. Economic benefit is the foundation of land consolidation, ecological benefit is the guarantee of land consolidation, and social benefit is the support of land consolidation.

4.1. Comparison of evaluation systems

We can divide the content of landscape ecological evaluation into two systems, which are divided according to

the content of landscape ecological evaluation. Landscape ecology, as the theoretical core of landscape ecological planning and design, has different emphases on its evaluation, which should be attributed to the different understanding and application of ecology in different stages of the development of landscape ecology. The traditional seven-degree landscape evaluation system is the core of the early ecological planning evaluation. Landscape ecological evaluation focuses on the evaluation of naturalness, openness, beauty, sensitivity, compatibility, accessibility and habitability. Modern seven-degree evaluation system: it focuses on the evaluation of compatibility, sensitivity, suitability, connectivity, locality (native degree), persistence and health degree. This project combines the traditional and modern evaluation system and the particularity of land consolidation engineering to establish an evaluation system.

4.2. Comparison of evaluation methods

Ecological evaluation of land consolidation mainly includes landscape ecological pattern analysis and landscape ecological quality quantitative evaluation. 1). Landscape ecological pattern analysis: On the basis of landscape spatial pattern, process and scale, the research scale is determined, and the landscape ecological units in the area of $\pm$ land renovation are divided; According to the landscape ecosystem of a certain scale, the landscape index was classified and the landscape index suitable for the study area was selected. Using software to process and analyze the data, quantitatively analyze the landscape composition and spatial pattern of land consolidation. 2), landscape ecological quality quantitative evaluation: landscape diversity, nature, efficacy, landscape aesthetics and other aspects of the evaluation, establish evaluation objectives to determine and index system to establish index weight using the Analytic hierarchy Process (AHP) to determine; The evaluation results were based on the investigation, analysis and comparison of the landscape units after land stop renovation, and with reference to the status quo of land class in the study area. Finally, the comprehensive evaluation results are reflected by the comprehensive evaluation index (CEI).

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