



Landscape Art Design of Public Environment Based on the Concept of Sustainable Development

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Abstract. The concept of landscape provides a comprehensive and operable framework, methods and tools for interpreting rural landscape and thinking about its multifunctional and sustainable future. Rural areas from the perspective of landscape have multiple values, involving multiple scales and multiple stakeholders, and their change management is complicated. Landscape ecology is a highly applied discipline. The principles of landscape ecology, such as landscape structure and function, ecological integrity and spatial heterogeneity, landscape diversity, scale suitability and irreversibility of landscape changes, are introduced into the tourism development and management of nature reserves. The landscape ecological planning and design of tourism development in nature reserves and the strengthening of landscape ecological management can promote the sustainable development of tourism in nature reserves and achieve the purpose of nature protection. With the accelerating process of urbanization and the increasingly obvious trend of suburbanization, the sustainable development of urban and rural areas is looking forward to strategic ecological environment construction, that is, forward-looking landscape construction. Taking the sustainable development of landscape art as an opportunity, this paper makes an in-depth analysis of the cultural characteristics of the landscape, and discusses how to better integrate the regional cultural characteristics into the landscape planning, so as to provide useful suggestions for the sustainable development of the cultural landscape.

Key words: rural areas; multifunctionality; landscape art; landscape design

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1 INTRODUCTION

Tourism is one of the effective ways for sustainable utilization of resources in nature reserves and the only way for sustainable development of nature reserves. Cultural landscape is the spirit and

soul of a city. Cultural landscape is an abstract concept, and the landscape architecture left in a city is the material carrier of cultural landscape. In the process of actively responding to the policy of "sustainable utilization of landscape resources", ecology and culture need to go hand in hand, so as to realize the sustainable development of cultural landscape. Landscape ecology, which is produced by the combination of modern geography and ecology, relies on the theoretical framework of ecology, absorbs the strengths of modern geography and system science, studies the landscape structure (spatial pattern), function (ecological process) and evolution (spatial dynamics) composed of different systems and their interaction with human society, and discusses the principles and approaches of landscape optimal utilization, management and protection. As a comprehensive representation of the whole landscape, its changes are the result of the interaction between natural and social changes. Regardless of the scale and speed of changes, under the international background of climate change, sustainable development and global open market, its core issues are the same-the landscape changes brought about by social development are inevitable, and the key lies in how to better accommodate and manage the changes [16]. The connotation of cultural landscape. Cultural landscape refers to the unique landscape that people and nature jointly create in the long-term development process and can distinguish the region through its constituent elements. It can reflect the social culture, regional characteristics and humanistic spirit of different regions. The formation process of cultural landscape is actually the process of human continuous construction and accumulation of cultural landscape. It changes under the influence of human needs and the surrounding environment, thus showing a rich landscape form. According to the production scale, product scheme and quality requirements of the construction project, select the process and technology scheme, and determine the impact of the whole main process flow from raw materials to finished products and the production process and technology scheme on the project cost, which should be selected and determined through technical and economic analysis and comparison [9]. The selection and design of equipment should give priority to the products available at home, and strive to avoid complete sets of imports or repeated imports, which is of great significance to saving investment. At the same time, pay attention to the length of equipment transportation distance, and try to select as close as possible. At the same time, pay attention to the capacity of selected equipment not to be excessive, otherwise it will cause waste. In addition, the equipment selection should be standardized, universal and easy to use and maintain.

In order to further develop and improve the landscape design, it is necessary to conduct in-depth discussion and research on the problems existing in the current landscape design. At present, there are many problems in the landscape design of cities. For example, many cities do not deeply realize the far-reaching significance of landscape design when introducing the concept of landscape design. There are also some landscape designers who, when designing the urban landscape, plan the landscape according to the characteristics of the target city, but fail to complete the landscape design under the concept of sustainable development. Therefore, although the landscape design of many cities can play a certain role in decorating the city and inheriting the culture, it cannot correct and alleviate the original environmental and ecological problems in the city. In this case, the daily living conditions of urban residents can't be further improved and perfected, and their health can't be obviously guaranteed. At this time, the urban gardens and landscape design didn't take on the role of improving the urban environment and maintaining the ecological balance, which was not in line with the concept of sustainable development. This paper puts forward several points on this issue and has several advantages:

- This paper puts forward the advantages of sustainable development in landscape design and its current problems, and introduces its prospect planning.
- This paper also uses a large number of data graphs and formulas to illustrate.
- The accuracy of this paper is improved by 20%, and the accuracy is about 80%.

2 RELATED WORK

Introducing the principles and methods of landscape ecology into the development and management of tourism resources in nature reserves is an effective way to ensure the sustainable development of tourism in nature reserves. To this end, related works are listed in this paper for reference. Massoud J et al. excavated the value of sustainable development and introduced it into landscape art design, which has an important impact on the sustainable development of landscape design [10]. Albert, Christian, et al. published a scenario-based teaching for sustainable landscape development planning [2]. Liu C et al. conducted a research on rural characteristic landscape planning and design from the perspective of sustainable development [8]. Cheng C et al. carried out the exploration and practice of sustainable development index system [4]. Lide W et al. made relevant remarks on oasis ecological protection, restoration and sustainable development [7]. Albert et al. conducted instructional scenario planning for sustainable landscape development [1]. Petlukova EA et al. took landscape planning as the basis for sustainable development of a region and conducted related research [14]. Niu S et al. carried out the landscape design of urban rail transit complex based on the concept of sustainable development [11]. Paul, Selman et al. published a paper entitled "What do we mean by sustainable landscapes? Sustainable Development" [13]. Zhuang H et al. conducted a spatiotemporal differentiation of sustainable development in cities and counties [20]. On this basis, this paper also makes a prospect planning, and analyzes the data graph and puts forward relevant suggestions and solutions to the current problems.

3 METHODOLOGY

3.1 Principles of Sustainable Development of Scenic Spots

The connotation of cultural landscape. Cultural landscape refers to the unique landscape created by man and nature in the long-term development process, which can be distinguished by its constituent elements. It can reflect the social culture, regional characteristics and humanistic spirit of different regions. In fact, the formation process of cultural landscape is the process that human beings constantly create and accumulate cultural landscape. It is influenced by human needs and the surrounding environment and changes, thus showing a rich landscape form [3]. In the past, people thought that design was only the business of the design unit, which was extremely wrong. Owners and relevant experts, project decision makers should also participate in the design from the very beginning, actively influence the design and effectively control it. During the design process, we repeatedly compared the functions and costs of the project with the designers, and adopted the optimal design through technical comparison, economic analysis and effect evaluation [6]. Landscape is the spatial composition and distribution form of landscape components. Landscape ecology uses the basic model of patch, corridor and matrix to describe it, and relatively new also puts forward "edge". This model is used in all kinds of landscapes, including desert, forest, tourism area and built-up area, where any point falls in a patch, corridor or matrix as background. It provides a popular, concise and operable language for comparing and distinguishing landscapes, analyzing the relationship between structure and function, and changing landscapes. Plaque refers to a relatively homogeneous nonlinear region different from the surrounding background. In nature reserves, it mainly refers to various consumption places of tourists, such as scenic spots, camping places, hotels, etc. In terms of tourism landscape resources, it refers to natural landscapes or areas dominated by natural landscapes, such as forests, lakes, grasslands, etc. The corridor refers to a narrow strip different from the matrix on both sides [12]. From the perspective of tourism, it is mainly manifested in the forest belts, traffic lines and the striped trees, grasslands, rivers and other natural elements between the tourism functional areas. Among them, there are 3 types of traffic corridors: section corridors refer to various transportation modes, routes and passages between tourist destinations and tourist sources and surrounding areas; intra-regional corridors refer to the

passage system inside the tourist destination; Links between attractions such as tourist routes. The matrix is the background ecosystem or land use form within the patch mosaic, which generally refers to the geographical environment and human and social characteristics of the tourist destination. The edge, also known as the edge zone, mainly refers to the peripheral protection zone of the entire nature reserve or the peripheral environment of the tourist spot, and its role is concentrated on the edge effect. Landscape spatial configuration mainly refers to the spatial arrangement of landscape patches of different sizes and shapes, which is an important manifestation of landscape heterogeneity and the result of various ecological processes at different scales [18]. The basic parameters of landscape spatial configuration are the size of the inlay, the shape of the inlay, and the distribution of the inlay.

The size of mosaic block is the main parameter to study the characteristics of landscape elements, which directly affects the biomass, productivity, species composition and diversity. Usually, the average area of mosaic block is selected as the evaluation index. Average area of embedded blocks:

$$A = \frac{1}{n} \sum_{i=1}^n A_i \quad (1)$$

In which a is the average area A_i of the blocks, the area of each block, and n is the number of blocks. The shape of the block can be measured by the fractal dimension of the block. It can indicate the complexity of the patch shape. The relationship between patch area and perimeter in fractal dimension index is defined as:

$$P = 4A^{D/2} \quad (2)$$

$$D = \frac{2\text{Log}(P/4)}{\text{Log}(A)} \quad (3)$$

The formula for the density of embedded blocks is:

$$FN1 = (Np - 1)/Nc \quad (4)$$

$$FN2 = MPS * (Nf - 1)/Nc \quad (5)$$

where Np is the total number of inlaid blocks of each type in the landscape; Nc is the value obtained by deducting the total area of the landscape in the study area from the smallest inlaid block area in the landscape; MPS is the average inlaid block area of all inlaid blocks in the landscape divided by the landscape. The minimum inlaid block area is obtained; the total number of inlaid blocks of a certain landscape type in the Nf landscape.

The degree of landscape separation refers to the degree of separation of the individual distributions of different inlays in a certain landscape type. The greater the degree of landscape separation, the more dispersed the landscape is geographically distributed, the more complex the landscape distribution, and the higher the degree of fragmentation. Its calculation formula is:

$$Ki = Wi/Bi \quad (6)$$

where Ki is the separation degree of landscape type; Wi is the distance index of landscape type i ; Bi is the area index of landscape type i .

$$Wi = \frac{1}{2} \sqrt{\frac{Ni}{A}} \quad (7)$$

$$Bi = Ai/A \quad (8)$$

where is the total number of patches of landscape type; Ai is the total area of landscape type i ; A is the total area of landscape. Corridor density index refers to the length of the corridor landscape in the unit area of the study area, and it is also an index to measure the degree of landscape fragmentation. Generally speaking, the longer the corridor in the unit area, the higher the degree of

landscape fragmentation. The calculation of the corridor density can make up for the neglected aspect of the fragmentation degree of the same landscape type in the fragmentation calculation of the embedded block. Its formula is:

$$M = Li/A \tag{9}$$

$$H = -\sum(PiLnPi) = -\sum_{i=1}^m PiLnPi \tag{10}$$

3.2 Why Sustainable Development

The principles of ecological integrity and landscape heterogeneity are the core theories of landscape ecology. Ecological integrity considers the landscape as a complex system composed of landscape elements with a hierarchical structure with independent functional characteristics and distinct visual characteristics. A healthy landscape system has functional integrity and continuity. Only by studying the structure, function and change of the landscape from the perspective of the system integrity can we draw correct conclusions. Therefore, natural reserves must consider all natural and human processes in the tourism area, that is, ecological, social and economic feasibility [5]. Landscape as a "region" is a unique synthesis between regional culture and natural characteristics, and it is multi-scale, multi-functional, multi-value, and multi-subject. The development and changes of rural areas obviously reflect the result of "interaction between man and nature". As a type of landscape, it also has many key attributes of landscape. The village defined in the planning is a regional concept that covers natural areas, including natural landscape, agricultural production landscape and village settlement landscape. As a broad overall concept, the operation of the rural-urban system is no longer the relationship between the core of an independent city and its hinterland, but the interaction and connection between different fields on a regional scale [15]. "Rural area" from the perspective of landscape involves many issues such as geography, society, economy, history, culture, etc. For different disciplines or fields, there are multiple definitions and interpretations. These analysis and research methods are professional and reductive in nature.

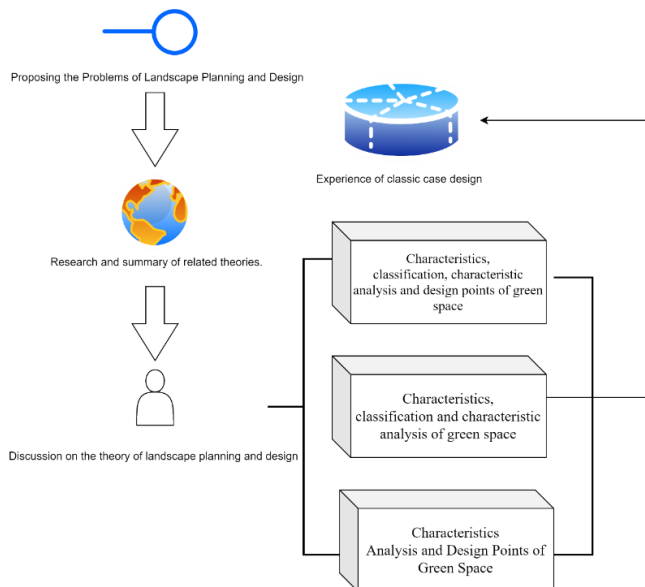


Figure 1: Technical Summary.

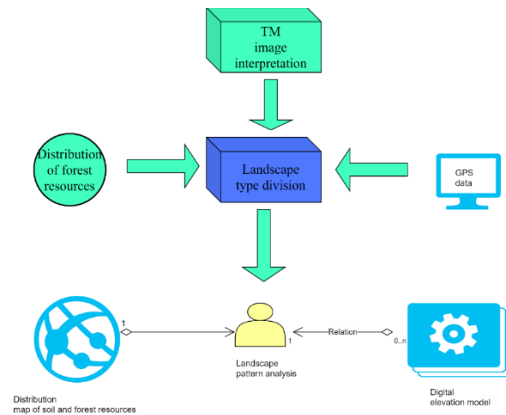


Figure 2: technical route.

However, the landscape entity itself as a multi-dimensional interaction of the overall presentation, reductive and holistic perspective is indispensable. Nowadays, rural multi-scale, multi-dimensional and multi-functional research is receiving more and more attention, which is the reflection on the overall characteristics of the landscape area. Because of its interdisciplinary nature, the word "landscape" provides an important concept and way to interpret and understand the key characteristics of "region". Establishing and protecting the diversity of local ecological environment system, scenic spots formed in history and areas designated as national, provincial and municipal nature reserves certainly need to be protected [19]. However, these areas only account for a few percent or more of the land area, which is not enough to maintain a sustainable and healthy land ecosystem.

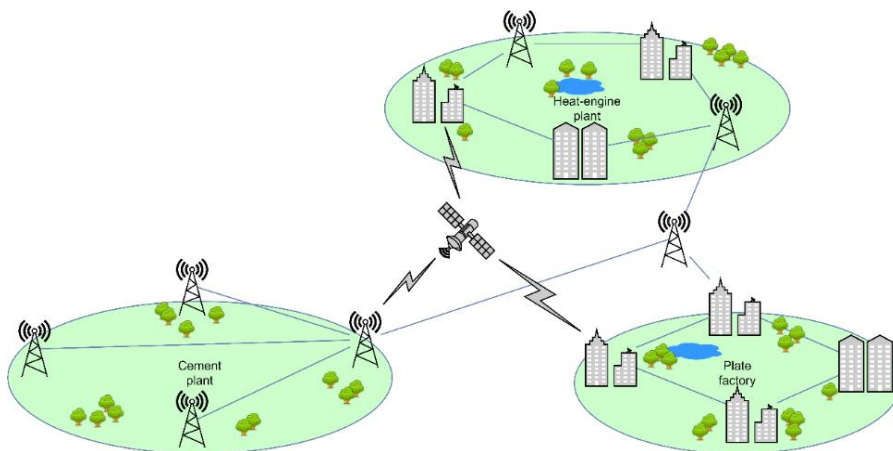


Figure 3: Eco-industrial park.

Even if the urban green space rate reaches even, due to too single plant species and too artificial greening methods, especially because of people's long-term preference for the introduction of exotic flowers and trees, hostility and aesthetic prejudice to native species, its green space system the comprehensive ecological service function is not strong. On the contrary, on the land before it was

engulfed by urban construction, there existed a series of ancient and diverse environments and native habitats [17]. These places often have very important ecological and recreational value, and preserving the heterogeneity of this landscape is of great significance to maintaining the ecological health and safety of the city and the country.

3.3 How to Carry Out Sustainable Development

Pollution, early dry cut-off and flood are the three serious problems faced by urban river systems at present, especially pollution is the most difficult to solve. People often aim at the river channel itself, spend huge sums of money on river channel regulation, use cement and stone to protect the dike substrate, cut and straighten the river channel, and even cover the river channel. As a result, the problem to be solved is more serious, many animals and plants have nowhere to live, and the role of rivers in reducing floods is weakened. Restoring the natural form of rivers and coasts is the call to restore and protect the source of our life. The multi-function and multi-value of the landscape are very obvious, and they have obvious positive externalities. This means that the problems and issues in rural areas are very complicated, involving nature protection, biodiversity, food security, characteristic industries, building regional communities and many other aspects. It should be recognized that the supply of landscape regional functions and values is determined by the landscape elements and their structures. The whole is greater than the sum of its parts, and the whole (or landscape) composed of all kinds of landscape elements makes a wide range of rural areas have diversified agricultural production, ecological, historical, social and educational values. We should give play to the following countermeasures. (1) Protect and restore basin wetland system. In the process of urbanization, the area of different types of wetlands gradually decreases, tends to disappear, and the water body becomes eutrophic. Wetlands have a variety of ecological service functions and socio-economic values for cities and residents, such as providing rich and diverse habitats, regulating local microclimate, mitigating early waterlogging disasters, purifying the environment, meeting perceived needs and becoming the source of spiritual culture. Protecting and restoring wetland system is the way for cities to return to vitality. (2) The urban green space system is combined with the suburban shelter forest system. The belt shaped farmland shelterbelt network is a major feature of the earth landscape. Represented by the shelterbelt system, it is a strategic project for the ecological security of the country on a regional scale. Although these land ecosystem projects have made brilliant achievements, they have neglected the relationship with cities, culture and art, citizens' leisure, health care and other aspects in the overall layout, design, forest structure, tree species selection and so on. Therefore, it is absolutely necessary to integrate the shelter forest network into the urban green space system. By gradually enriching the single tree species structure of the original forest belt, the protective forest belt can be transformed from a single function to a comprehensive multi-functional urban green space. (3) Open urban green space. The unit system is a major feature of urban form, and the green space in the fence is often limited to the personnel of the unit, especially some government compounds and university campuses. The realistic safety and management considerations also strengthen the "unit" awareness of green space. But modern security technology has long broken through the era of walls and barbed wire. In fact, the process of letting the public enjoy the open green space is the process of improving its moral quality and public awareness. Under the supervision of an invisible security system, an open green space can be safer than a closed courtyard green space. Urban forest is a natural factor that has been artificially processed and transformed, and is a biological group affected by both the natural environment and the social environment. The system components in urban forests are significantly different from those in natural forest systems. Urban forests are located in cities or on the edges of cities, and are greatly disturbed by human activities. In order to improve the environment, human beings also consciously manage urban forests, such as fertilization, watering, pruning, and pest control. The impact of urban forest is very profound, so urban forest is a special type of forest in a specific environment.

| System type | Producer | Consumer | Decomposer | Environmental factor |
|---------------------------------|---|--|--|--|
| Natural forest ecosystem | <i>Natural vegetation</i> | <i>Primary consumers (herbivores) and secondary consumers (carnivores)</i> | <i>Scavengers and a large number of microorganisms</i> | <i>There are a lot of rocks and a certain amount of water.</i> |
| Urban forest ecosystem | <i>Natural vegetation and artificial vegetation</i> | <i>Humans, a few herbivores, and few carnivores.</i> | <i>And there are fewer earthworms.</i> | <i>A large number of buildings and other infrastructure, some water bodies</i> |

Table 1: Characteristics of components of urban forest ecosystem and natural forest ecosystem.

| Layout features | Scope of inclusion |
|------------------------|--|
| <i>Point</i> | <i>Street green space, traffic island green space, unit attached woodland, residential woodland</i> |
| <i>Line</i> | <i>Road woodland, forest along the river, recreational forest belt, slope protection green space, shelterbelt.</i> |
| <i>Face</i> | <i>Parks, Gardens, Gardens and Scenic Woodlands</i> |
| <i>Band</i> | <i>Ecological economic belt along the Yangtze River</i> |
| <i>Net</i> | <i>Main roads, forests and various green spaces</i> |

Table 2: Composition of Urban Forest.

4. Dissolve urban public green space. In modern cities, the main park of public green space should be an organic part of residents' daily production and living environment. With the urban renewal and further suburbanization, the park will be replaced by open urban green space. Isolated, bordered parks are "dissolving" and become the matrix between and within various types of land use in the city. In the form of simple, ecological and open green space, they penetrate into residential areas, office parks and industrial parks, and merge with the matrix of suburban natural landscape.

4 RESULT ANALYSIS AND DISCUSSION

The reality we face is that the farmland around the city will be requisitioned sooner or later, and agricultural land is not allowed in the city. However, with the development of network technology and modern transportation and the subsequent changes in the way of life and work, the urban form will also change, the urban-rural gap will narrow, and the city is also "dissolving". A large area of rural farmland will become the "solution" of urban functional bodies, and high-yield farmland will permeate the urban area, and the urban body will extend into farmland. Farmland will be combined with the urban green space system, and become the green matrix of urban landscape. The development and progress of modern agricultural technology has both edible and ornamental functions.

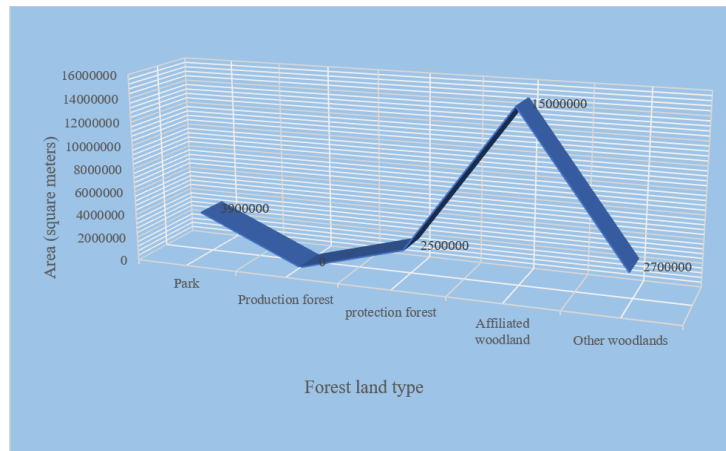


Figure 4: Areas Of Different Forest Land Types.

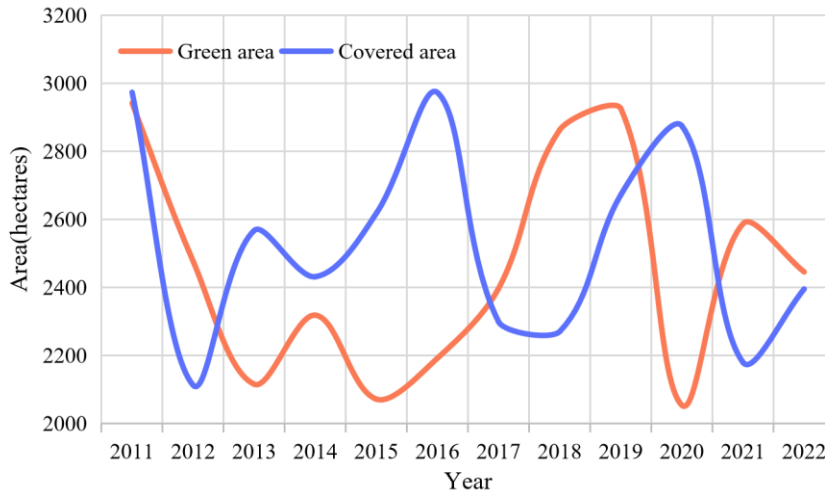


Figure 5: Changes in green space area and green space coverage in recent years.

This not only improves the ecological environment of the city, but also provides a good place for leisure and education while providing agricultural and sideline products for urban residents. Various picking gardens, ornamental gardens and urban agricultural gardens in the suburbs have made useful attempts and achieved gratifying social benefits. The reality we face is that the farmland around the city will be requisitioned sooner or later, and agricultural land is not allowed in the city. However, with the development of network technology, modern transportation and the accompanying changes in living and working methods, the urban form will also change, the gap between urban and rural areas will be narrowed, and cities will be "dissolving". A large area of rural farmland will become the "solution" of urban functional bodies. The development and progress have both the functions of eating and viewing.

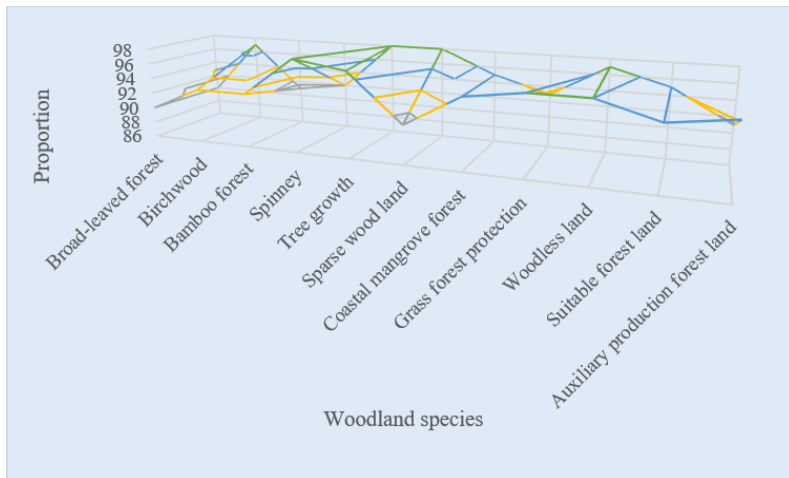


Figure 6: Percentage of patches in grain structure diagram of secondary forest landscape elements.

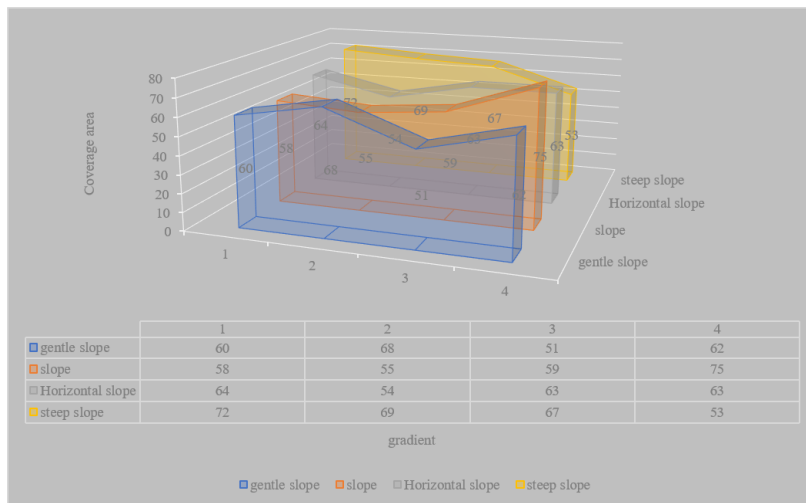


Figure 7: Average forest coverage of different slopes.

This not only improves the ecological environment of the city, but also provides urban residents with agricultural and sideline products as well as good leisure and educational places. All kinds of picking gardens, ornamental gardens and urban agricultural gardens in the suburbs have made beneficial attempts and achieved gratifying social benefits. The reason why an ecosystem has the ability of self-renewal and self-maintenance is that there is a close interaction between the species existing in it. These relationships are the basis for maintaining the health of the ecosystem. In the field of international landscape policy, policy makers are aware of the importance of comprehensive management methods, and the concept of protection is moving from isolated sites to wider landscape areas, from frozen static protection to dynamic and positive interaction and landscape management.

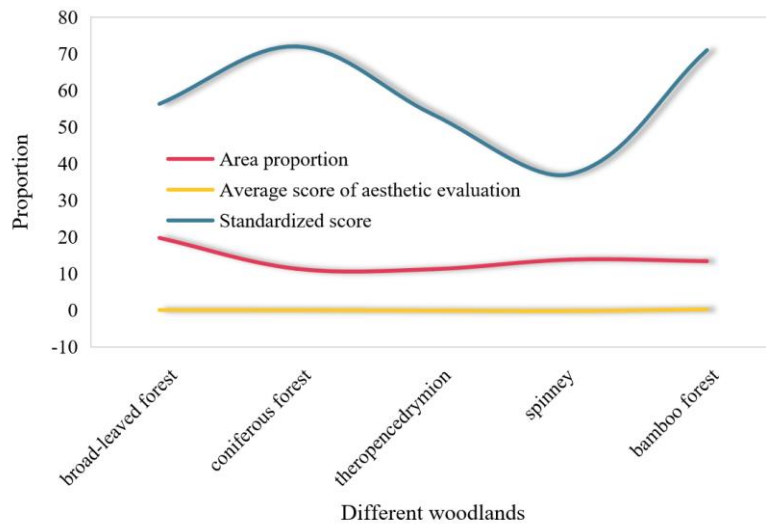


Figure 8: results of investigation and analysis method.

In summary, from the long-term debate and research, three key issues of rural landscape planning are emphasized: 1) how to integrate different goals and functions to achieve the balance of economic, environmental and social needs; 2) How to connect different scales, and how to better reflect local needs and their differences while effectively implementing national decisions? 3) How different management institutions and interest groups collaborate. People are increasingly calling for a more integrated, coordinated and spatially coherent approach to build a common framework to integrate and coordinate future actions and respond to local specific problems and diverse policy objectives; These goals, methods and actions should be sensitive to local characteristics, recognize the versatility of the landscape and respect natural boundaries. The reflection and revival of the concept of landscape provide new ideas for landscape planning. The concepts of multi-functional landscape and ecosystem services emphasize the necessity of managing change in an integrated and collaborative manner, which is of fundamental significance for formulating an integrated spatial strategy.

5 CONCLUSIONS

The transition of key agendas and related policies to landscape issues and landscape methods and tools proves that landscape is not only a concrete objective object, but also an important abstract concept, theory, method and tool. Due to its comprehensive integrity, multi-scale, multi-functional, multi-subject and other characteristics, it is not only necessary to "plan for landscape", but also "through landscape planning", which can provide a new way for China to realize new urbanization and sustainable development. method and approach. Landscape provides a general perspective for interpreting regions and their driving forces: 1) Landscape is multi-scale, and its changes are the joint action of local, regional, urban and national, and the management of change must be considered and responded to from multiple scales; 2) Landscape involves multiple sectors such as agriculture, forestry, animal husbandry, and fishery, and needs to integrate economic and market policies with relevant policies aimed at sustainability; 3) Landscape has multiple values and multi-functionality, and it is necessary to analyze agricultural production from a comprehensive perspective. , ecological environment, tourism and recreation, residence and other functions are integrated and coordinated; 4) There are multiple stakeholders, and it is urgent to comprehensively

coordinate methods of multi-party interests and tools to promote public participation; 5) Strengthen the understanding of local characteristics and differentiated development. The regionality of the landscape itself leads to its development goal being differentiated. Nowadays, the overall regional framework and regional policies with site sensitivity are relatively lacking. Multifunctional and sustainable landscape is the inevitable trend and challenge in the future. It is still necessary to clarify the comprehensive integrity of the concept of "landscape" in the relevant plans, policies and strategies of decision makers and management agencies, adjust the rights and responsibilities, and transform it into planning management methods and tools in the new meaning and context. Based on its own political and land system and regional characteristics, it establishes a multi-level nested spatial framework from national territory to local scale through multi-levels, and then establishes a national and regional landscape policy framework and management strategy as a whole; Explore differentiated local landscape strategies and actions to realize landscape planning and design based on regional characteristics; Assist in the construction of landscape spatial planning and governance system, and promote the integration and coordination of goals and interests among various departments and subjects by improving the bottom-up public participation and multi-party consultation mechanism, so as to move towards a sustainable landscape. Therefore, we should formulate reasonable and effective protection measures to protect biological resources, prevent species loss, and prevent the ecosystem from being disturbed and destroyed. Such as forbidden to pick specimens, forbidden to climb, forbidden to pollute, forbidden to scare animals, etc. Formulate scientific and reasonable protection and management measures to strengthen the protection of the natural landscape, and prohibit any human activities from affecting or changing the natural ecological landscape; Strengthen the special protection of human landscape and pay attention to the excavation and collation of national culture.

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