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Green Low Carbon Environmental Protection under the Landscape Tourism Development Trend of the Research

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Abstract: After the development in recent years, many countries in the world have proposed measures to develop a low carbon (LC) economy. China has also formulated carbon emission control indicators, and has strengthened the research and development and promotion of LC energy technologies and environmental protection technologies, which shows that the development of LC economy has attracted the attention of the world. This paper studies and analyzes the development trend (DT) of landscape tourism (LT) under the background of green, LC and environmental protection. Discusses the concept and characteristics of LC tourism and the relationship between LC tourism and sustainable development, LC economy; Taking forest park tourism as the research object, this paper studies and analyzes the comprehensive evaluation method of LC tourism resources in forest parks, discusses the design method of forest tourism development, and then analyzes the DT of garden tourism under green, LC and environmental protection; Under the background of green, LC and environmental protection, it is of great significance for the transformation, upgrading and sustainable development of garden tourism in the future to explore the development of LC tourism in national forest parks by applying the concept of LC tourism development and combining theory with practice.

1. Introduction

Global climate change has become an international problem. Different industrial departments and academic fields have carried out research on energy conservation and emission reduction, strengthened publicity and education on LC tourism, improved the city's LC tourism function and strengthened the development and application of LC energy and materials; Tourism enterprises should create a LC environment through scientific planning, improving facilities, LC management, supporting projects and strengthening guidance; Tourists should practice LC tourism in terms of food, accommodation, transportation, travel, shopping and entertainment. Through the joint efforts

of stakeholders, realize the healthy and sustainable development of LT industry. This paper studies the DT of garden tourism under the green, LC and environmental protection.

A large number of studies have shown that the ecological benefits can be brought into full play and the ecological functions of forest vegetation can be maximized through planning layout and community configuration. The ecological function is the most important part of the forest park function, and the commercial function is also an indispensable part of the forest park. The interaction of the two constitutes the main function of the forest park [1]. Through reasonable planning of space, the contradiction and conflict between ecological function and commercial function can be effectively solved, and the coordinated development and common improvement of the two can be promoted. The core of LC tourism planning and design of forest parks is to achieve the dual improvement of carbon sequestration and economic benefits while ensuring the coordinated and orderly development of ecological resources and ecological environment through certain planning methods, ecological means and LC technologies [2].

This paper uses the relevant theoretical basis of LC tourism, such as LC economy theory, sustainable development theory, tourism system theory, etc., combined with the relevant research results of LC development at home and abroad, based on understanding the LC situation of forest park tourism development, analyzes the development principles of LC tourism in forest parks, gives the planning and design methods of LC tourism in forest parks, and then studies the DT of garden tourism. It has certain practical reference significance for the future research on LC LT, and contributes to promoting the sustainable development of LT [3, 4].

2. Analysis of Tourism Development under Green, LC and Environmental Protection

2.1. Concept and Characteristics of LC Tourism

2.1.1. LC Tourism Concept

Based on the research results of scholars, this study believes that LC tourism refers to a new sustainable development tourism model that takes green, ecological and environmental protection as the concept, takes "three low" as the basis, and takes institutional innovation, technological innovation, new energy utilization, LC services and product promotion as the way to finally achieve a win-win situation of economic development and environmental protection. LC tourism not only meets the needs of tourists to relax, maintain the bearing capacity of the environment, but also drives the local economic development, which is a mainstream direction of future tourism development [5].

2.1.2. Basic Characteristics of LC Tourism

LC tourism is a highly practical way of tourism, which has four basic characteristics: LC, guidance, integration and driving.

Integration. The historical process of the development of world tourism shows that tourism is an industrial development model that spans the primary, secondary and tertiary industries and focuses on the characteristics of the tertiary service industry. It mainly integrates the production and consumption of tourism. From the perspective of economics, the tourism production field integrates the construction of carbon sink tourism experience environment, the construction of LC tourism attractions and the improvement of LC tourism equipment and facilities [6, 7]. It is reflected in the control of the supply of tourism products and services and the production and emission of greenhouse gases in tourism consumption, which objectively requires the integrated development of various LC tourism production and consumption factors.

Driving. The driving force of the industry is to drive the development and upgrading of the tourism industry cluster through technology, resources and markets. The social impetus is the positive interaction between tourism products and services and consumption, which promotes the improvement and optimization of tourists' humanistic quality and tourism environment [8].

2.2. Relationship between LC Tourism and Sustainable Development and LC Economy

LC tourism, sustainable development and LC economy have both similarities and priorities. They are mutually penetrating, interdependent, interactive and influential.

Developing LC economy and LC tourism is also an effective way to achieve the goal of sustainable development [9, 10]. LC economy and LC tourism both require to achieve "three lows" while the economy is developing rapidly. These are consistent with the requirements of sustainable development to reduce environmental pollution, reduce resource consumption and waste as much as possible, and achieve sustainable development of ecology, society and economy. The core concept of LC economy is to achieve the maximum economic benefits as far as possible by minimizing carbon emissions and energy consumption, and ultimately achieve the goal of sustainable economic and social development [11, 12].

LC tourism is an important part of LC economy, and it is also a model to deal with tourism. LC tourism consumption is an important part of the whole tourism system. The main development of production and consumption of tourism products has LC content. Its goal is to achieve LC tourism economy, and achieve the goal of sustainable tourism development by developing LC tourism [13].

3. Study on the Development of LC Tourism in Forest Park

In this paper, the LC tourism resources in the forest park are comprehensively investigated and comprehensively evaluated to determine their development and utilization value and external conditions, and provide basic data and scientific basis for their rational development and protection. On this basis, the LC tourism development system of the forest park is studied, which mainly includes four aspects: LC tourism development principles, planning and design methods, management and feedback mechanisms, and finally forms a circular development system of "development planning management feedback".

3.1. LC Tourism Development Principles of Forest Parks

3.1.1. Principle of Green Cycle and LC

LC tourism development should focus on reducing carbon emissions, and the LC principle should run through the entire development process. The LC principle is the key principle to distinguish other forms of tourism [14, 15]. LC is embodied in carbon reduction, carbon fixation and other aspects. Among them, in terms of carbon reduction, in the planning process of forest parks, try to use buses to reduce or restrict the access of private cars. In terms of accommodation, we will vigorously develop LC technologies and use energy-saving electrical equipment. In terms of carbon fixation, CO_2 is mainly converted into organic carbon for storage through plant photosynthesis through measures such as changing forest morphology and afforestation. At the same time, forest resources should be protected and upgraded to increase carbon absorption [16].

3.1.2. Principle of Sustainable Development

The development of forest parks should follow the principle of sustainable development, put

resource and environmental protection in the first place, realize the sustainable use of tourism resources, sustainable economic growth and a virtuous cycle of tourism environment, further improve the coordination between society, culture and economy, realize LC tourism in the real sense, and achieve sustainable development of LC tourism in forest parks.

3.1.3. Principle of Attaching Importance to Tourism Quality

LC tourism has the characteristics of high quality. From the above evaluation of tourism resources, we can see that forest quality is an important aspect to increase tourism attraction, and tourism development mode, operation and management mode are also important factors to attract tourists and affect tourism quality [17, 18].

3.1.4. Principle of Adapting Measures to Local Conditions

The tourism industry in different regions of China has obvious differences in development level, resource characteristics, carbon dioxide purification and absorption capacity, economic and technological level, etc. In addition to different environmental conditions and tourism product characteristics, when choosing the tourism industry development model, it needs to be developed according to the principle of adjusting measures to local conditions.

3.2. Comprehensive Evaluation Method of LC Tourism Resources in Forest Parks

3.2.1 Construct pairwise comparison judgment matrix to calculate weight

On the basis of selecting the comprehensive evaluation indicators of LC tourism resources, this paper uses the more scientific and widely used analytic hierarchy process (AHP) and relevant software to calculate the weight of each indicator. The calculation steps of AHP are as follows:

Establish the hierarchy of indicators: analyze the comprehensive indicator system of LC tourism resources in forest parks, decompose the relevant factors, and classify them according to the relationship of each factor to form a multi-level structure. Linear algebra method is used to calculate the weight of indicators at each level.

Consistency test: after the weight calculation of indicators at all levels is completed, the judgment matrix must be checked for consistency. The calculation formula is as follows:

$$C.R. = C.I. / R.I. \tag{1}$$

$$C.I. = (\lambda_{max} - n) / (n - 1) \tag{2}$$

C. When R<0.1, it means that the judgment matrix has acceptable consistency, otherwise it needs to be corrected. R. I. It is a random consistency index obtained by querying Table 1.

Table 1. Random consistency index table

n	1	2	3	4	5	6	7	8	9	10
I	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

3.2.2. Combination Weight of Elements in Each Layer

That is, the overall ranking of levels is the relative importance scale of the indicator level to the target level. The calculation formula is as follows:

$$W_i = \sum_{i=1}^{n} WB_i WC_{ij}$$

(3)

Wherein, WBi is the weight value of Bi relative to target layer A; WCij is the weight value of Cij relative to Bi. Less cost, making the forest park faster.

4. Research on the DT of LT under the Environment of Green, LC and Environmental Protection

4.1. LC Tourism Planning and Design Method of Forest Park

On the basis of referring to the Overall Design Specifications for Forest Parks issued by the Ministry of Forestry of China and other existing research results, this paper introduces the concept of LC planning, and focuses on exploring the planning and design methods of LC tourism from the perspective of planning layout. The process of LC tourism planning for forest parks is shown in Figure 1.
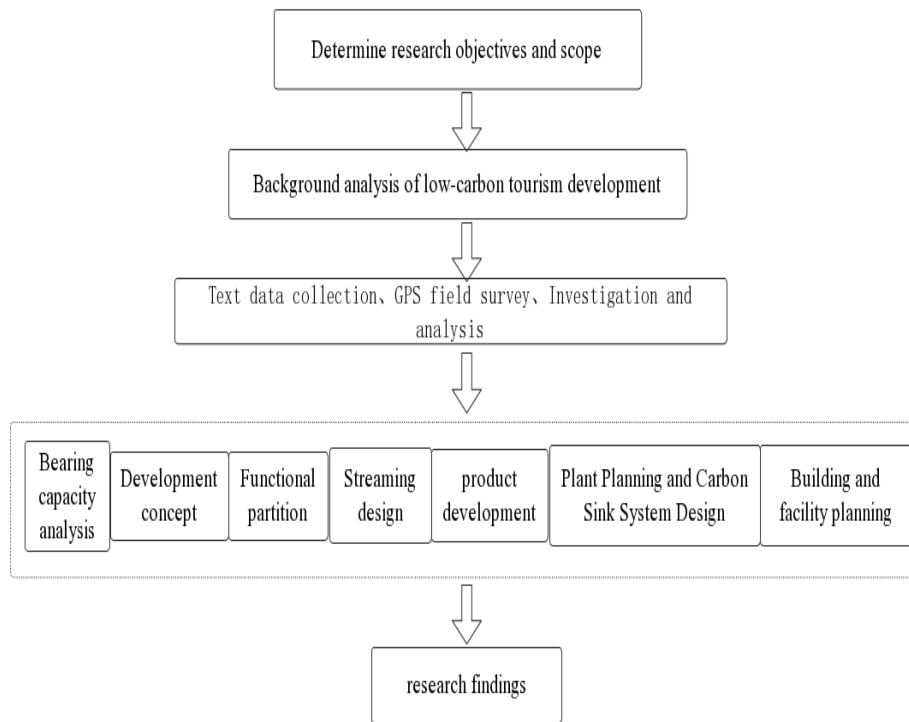

Figure 1. Planning and design flow chart

4.2. LC Tourism Line Design of Forest Park

In the LC tourism planning and design of forest parks, the design of tour routes is an important aspect. In addition to effectively connecting various scenic spots in the park, the tour line can also meet people's needs for tourism, science education, functional zoning, management, production, life and other aspects. According to the design requirements, the road area of the forest park generally accounts for 2%~3% of the total area of the park, which can be increased to 5%~10% in areas with large pedestrian flow.

During the design, it is necessary to provide convenient and safe routes for tourists to minimize the impact on the natural environment, guide people to LC travel through the design of tour routes, and minimize the traffic carbon emissions. According to the characteristics of LC tourism, the tour route system is divided into trunk roads, secondary trunk roads and hiking trails. Among them, the main road is mainly used to connect with the external roads, mainly for the functions of traffic, management and protection. Secondary trunk roads are mainly used to reach scenic spots, sightseeing, recreation and other functions, including sightseeing bus roads, greenways, etc. Walking trails are mainly used to provide people with walking roads for rest. They are of various types. The design of route selection and slope of walking trails should be based on the height, do not damage the mountain and conform to the design specifications. The selection of materials should be based on local materials and be coordinated with the landscape.

When designing the streamline, the problem of carbon emissions should be considered while meeting the functional requirements. The carbon emissions of tourism transportation in the forest park mainly consist of external transport carbon emissions and internal travel routes carbon emissions. The external transport carbon emissions are mainly generated by the means of travel of tourists to the scenic area, and the internal travel routes carbon emissions are mainly generated by various types of transport vehicles (mainly sightseeing vehicles) in the park. The calculation formula is:

$$elit = \sum(\beta m \times Sm \times \varepsilon m \times DFm)$$

(4)

Where, elit is the CO_2 emission of tourism traffic; β M is the emission coefficient of specific traffic mode; Sm is the travel distance; ε M is equivalent coefficient; DFm is the bypass coefficient, as shown in Table 2.

Table 2. Emission coefficient, equivalence coefficient and bypass coefficient of different traffic modes

mode of transportation	Emission coefficient （kgCO2/km）	Equivalence coefficient	Detour coefficient
train	0.025	1.05	1.15
bus	0.018	1.05	1.15
aircraft	0.140	2.70	1.05
Sightseeing Boat	0.070	1.05	1.30
a car	0.075	1.05	1.15
other	0.075	1.05	1.15

When planning the internal route of the forest park, the carbon emissions generated by using different vehicles within a certain distance will be displayed in the form of signboards, and carbon compensation will be made according to the principle of consumption traceability.

4.3. Forest Carbon Sink

4.3.1. Carbon Sink of Forest Aboveground

The research shows that the carbon sequestration of plants per unit area can be effectively improved by reasonable multi-layer planting structure and mixed planting of trees of different ages and types. The carbon fixation capacity of each plant is different, as shown in Table 3 and Figure 2.

Table 3. CO2 absorption capacity index of natural vegetation

Vegetation type	Net primary productivity (kg/m2 * year)	CO2 absorption capacity (kg/hm2 * day)
broad-leaved evergreen forests	1.3	67.7
Tropical dry forest	1.6	83.5
Marshes and wetlands	2.0	104.1
Shrub	0.7	36.4
Deciduous broad-leaved forest	1.2	62.5
Tropical rain forest	2.2	114.5
Northern coniferous forest	0.8	41.6
Temperate grassland	0.6	31.2
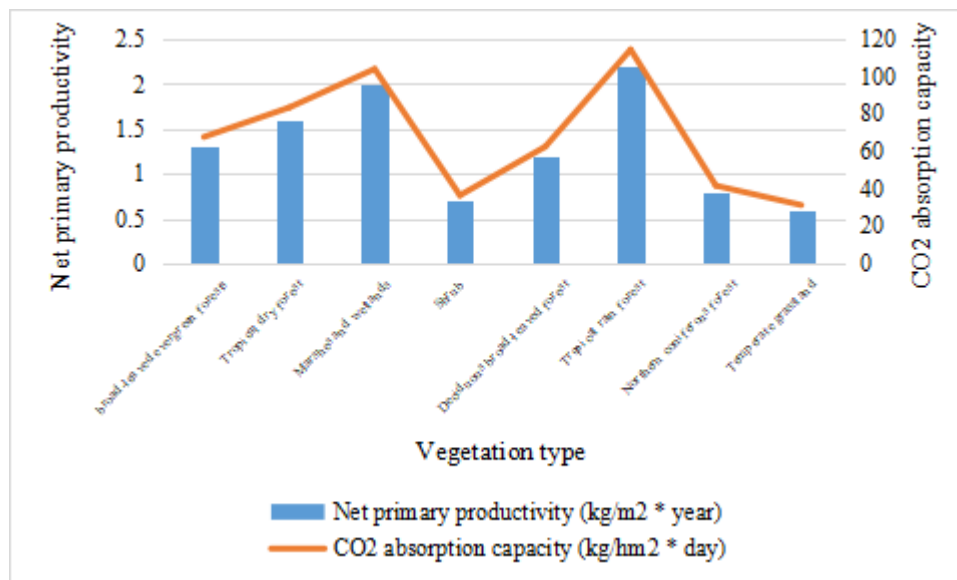
Figure 2. Comparative analysis of CO2 absorption capacity of natural vegetation

When planning and designing, the natural attributes of plants should be fully utilized, and plants should be combined with landscape planning techniques to establish a multi-level, three-dimensional and continuous forest system, While building a rich landscape space, better play the ecological service function of the forest park.

4.3.2. Underground Carbon Sink of Forest

The underground carbon sink of forest refers to soil carbon sink. The research shows that the vegetation condition of the surface has a great influence on the carbon fixation capacity of the soil. The average carbon content of the soil where the forest has been maintained and managed is 79mgC/hm2, 34% lower than that of the soil without conservation forest, which also verifies that the natural forest has the strongest carbon fixation capacity. Therefore, the destruction of forest vegetation and human intervention should be reduced, the original forest vegetation should be retained to the maximum extent, its nature and biodiversity should be maintained, and carbon sequestration should be increased.

4.4. LT DT under Green, LC and Environmental Protection

LC LT refers to paying attention to the carbon fixation and carbon reduction function of gardens in the LT industry, requiring all links in tourism activities to adopt LC methods, such as tourism enterprises developing LC products, optimizing the energy structure, tourists choosing LC travel methods, etc., so that the LT can walk on the road of sustainable development.

4.4.1. Carbon Sink Capacity of Forest Parks Is the Material Basis for LC Economic Development

The largest ecosystem on land is forest, which has huge carbon sink capacity. According to statistics, the forest ecosystem stores 1.15 trillion tCO_2, accounting for 46% of the CO_2 stored in the terrestrial ecosystem. The forest stores CO_2 in the form of biomass, absorbing 1.83 t CO_2 on average and releasing 1.63 t O_2. Therefore, afforestation is equivalent to carbon sequestration, and greening is equivalent to emission reduction, and carbon sequestration and carbon reduction is the main task of developing LC economy. Now, a low-cost policy tool is to increase forest resources. Forest resources are also one of the biomass energy materials for LC economy, which can promote economic development while fixing carbon in forestry.

4.4.2. LC Tourism Is an Important form of Healthy and Sustainable Development of Garden Tourism

LC tourism is to reduce CO_2 emissions as the core, and achieve the best comprehensive benefits of tourism environment, economy and society through certain LC technologies or means. Its good development will certainly promote the healthy and sustainable development of tourism. The development of tourism can not be separated from LC. Practicing the concept of LC and adhering to the principle of sustainable development in all aspects of tourism will make garden tourism flourish and develop well.

4.4.3. LC Tourism Is the Inevitable Choice for LT to Cope with Global Warming

Developing LC in garden tourism is one of the effective ways to deal with climate warming. The ecological environment of some tourist destinations is changing due to global warming, which will affect tourists' choice of tourist destinations and restrict the development of tourism. Therefore, we should pay attention to these environmental problems and take effective measures to solve them. The development of LC is a shortcut.

5. Conclusion

This paper studies the DT of garden tourism under the environment of green, LC and environmental protection, through the evaluation of LC tourism resources and the analysis of LC tourism development; The feedback mechanism of LC tourism development principles, planning and design, operation and management, and development responsibility model in each link has been studied in depth. Due to the limitation of time and the author's level of knowledge, this question also has some shortcomings: this paper lacks the analysis of the benefits of LC tourism from economic, social, environmental and other aspects through quantitative indicators combined with qualitative analysis; Forest parks of different regions, types and scales have their own characteristics in terms of resource environment and development planning. The development of LC tourism in forest parks of different regions, types and scales needs further research.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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