

Research on Ecological Tourism Landscape Planning and Design

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Abstract: *With the increasing severity of global environmental issues and the gradual rise in environmental awareness, ecotourism has emerged as a new form of tourism that combines ecological conservation with economic development. Ecotourism aims to provide opportunities for intimate contact with nature through the sustainable development of natural resources, while also promoting the economic growth of local communities. In recent years, ecotourism has become an integral part of the tourism industry, showing significant growth. Ecological tourism landscape planning and design emphasize the rational utilization of natural resources while preserving ecological integrity and sustainability. This approach not only aids in the protection and restoration of natural ecosystems but also enhances the landscape quality and visitor experience of tourist destinations, thereby achieving multiple ecological, economic, and social benefits. Therefore, research on ecotourism landscape planning and design holds significant practical and theoretical value.*

Keywords: *ecotourism; tourism; landscape planning; design*

1. The Basic Concept of Ecotourism

Ecotourism is a form of tourism centered on natural environments, emphasizing environmental protection and sustainable development. It not only provides opportunities for close encounters with nature but also promotes ecological conservation and the development of local communities through tourism activities. The core idea of ecotourism is to reduce the negative impact of tourism on the environment by responsibly developing and utilizing natural resources, thereby achieving harmonious integration of environmental, economic, and social benefits.

Ecotourism is characterized by low environmental impact, sustainable use of natural resources, and respect for and protection of local cultures. Unlike traditional tourism, ecotourism places greater emphasis on environmental protection and sustainable resource management in its design and implementation. For example, ecotourism sites often adopt strategies of low-impact development to minimize environmental disruption and enhance environmental education and interactive experiences to raise visitor awareness and promote ecological conservation behaviors. In ecotourism, landscape planning and design play a crucial role. Ecotourism landscapes not only showcase natural beauty but also embody principles of ecological conservation. Through scientifically sound planning and design, natural ecosystems can be protected and restored, enhancing both ecological and aesthetic values. Ecotourism landscape planning and design emphasize the integrity of ecosystems, maintaining ecological balance, and avoiding environmental degradation from overdevelopment. For instance, when designing ecotourism trails, considerations include vegetation protection, soil conservation, and wildlife habitat needs, utilizing eco-friendly materials and low-impact construction techniques. Additionally, ecotourism emphasizes interaction and collaboration with local communities. By distributing tourism revenues and reinvesting in local economies, ecotourism stimulates economic development, improves local residents' quality of life, and fosters community engagement and ownership[1].

2. The Essence of Ecotourism Landscapes

The essence of ecotourism landscapes encompasses several dimensions, primarily focusing on environmental protection, enhancing visitor experiences, and promoting sustainable development. Ecotourism landscapes emphasize the protection of natural environments. They are not merely showcases of natural landscapes but also uphold the integrity and functionality of ecosystems through scientific ecological principles and methods. This involves considering factors such as local

biodiversity, hydrological cycles, soil conservation, and the continuity of ecological landscapes in the planning and design of ecotourism landscapes, ensuring that tourist activities do not disrupt or harm the environment. Ecotourism landscapes aim to enhance visitors' natural experiences and educational values. By designing various facilities and paths, visitors can closely interact with nature, learn about the workings of ecosystems and biodiversity. For example, setting up ecotrails, bird-watching platforms, and eco-education centers provide opportunities for visitors to experience nature up close, while guides and interpreters introduce local biology and ecosystem knowledge, enhancing environmental awareness and conservation consciousness among visitors. Ecotourism landscapes also emphasize promoting sustainable development. This includes implementing environmentally friendly strategies and practices in site management and operations, such as energy conservation, water resource management, waste disposal, and the use of renewable energy. Furthermore, ecotourism contributes to the economic development and social welfare of local communities by creating employment opportunities, increasing local income, and improving infrastructure, making ecotourism a sustainable economic activity[2].

3. Principles of Ecotourism Landscape Planning

The principles of ecotourism landscape planning revolve primarily around sustainability, localization, and participation. Firstly, sustainability is the core principle of ecotourism landscape planning. This principle requires thorough consideration of ecosystem health and sustainable development throughout the planning and design processes, ensuring that tourism activities do not cause permanent damage to the natural environment. Specific practices include assessing the environmental carrying capacity of the area, employing Low-Impact Development (LID) technologies and strategies, promoting the use of renewable energy, and establishing effective resource management plans to achieve a balance between environmental protection and tourism economic development.

Secondly, the principle of localization emphasizes integrating local culture and natural landscapes to create unique tourism experiences. Ecotourism landscape planning should incorporate landscape elements and facilities that reflect local characteristics and cultural identity, while respecting and protecting local cultural heritage. This includes conserving local traditional architecture, cultural symbols, and ways of life, promoting local culture through tourism activities, enhancing visitors' cultural experiences and sense of identity, and fostering local economic development[3].

Lastly, the principle of participation emphasizes community involvement and engaging stakeholders. Ecotourism landscape planning requires establishing open and transparent decision-making mechanisms, collaborating closely with local communities, governments, non-governmental organizations, and other stakeholders. This participatory planning process ensures that the opinions and interests of all parties are fully considered, leading to the development of planning solutions that are practical and feasible. Additionally, through community involvement and education, local residents' awareness and support for ecological conservation are enhanced, cultivating a shared ecological culture and effectively promoting the sustainable development of ecotourism.

These principles collectively form the foundational framework of ecotourism landscape planning. By applying them in practical planning and design processes, they contribute to achieving a triple integration of ecological, economic, and social benefits in tourism. They provide effective guidance and assurance for the sustainable development of ecosystems and tourist destinations.

4. Strategies for Ecotourism Landscape Design

4.1 Conservation and Restoration of Natural Landscapes

In ecotourism landscape design, the conservation and restoration of natural landscapes are paramount. The aim is to protect existing natural landscapes through scientific methods and technological means, while restoring ecosystems that have been damaged or degraded. This ensures the sustainability of ecotourism and maintains the long-term beauty of landscapes. This involves protecting key elements of pristine ecosystems such as vegetation, water bodies, soils, and wildlife habitats. Conservation measures may include establishing protected areas and restricting human activities to prevent disruption and damage to the ecosystem within the tourist area. Secondly, efforts are directed towards restoring natural landscapes already affected or damaged. This restoration work may involve re-vegetation, biological restoration of water bodies, soil improvement, and ecosystem regeneration. Techniques like ecological restoration methods such as planting native species, enhancing biodiversity,

and soil restoration are employed to restore landscape functions and biodiversity affected by destruction. During implementation, ecotourism landscape design also considers potential impacts of human activities on natural landscapes. To minimize adverse effects on ecosystems, measures such as establishing restricted areas, setting guidelines for visitor behavior, and promoting environmental education are typically incorporated into the design.

4.2 Protection of Existing Natural Resources (Vegetation, Water Sources, Wildlife, etc.)

A key strategy in ecotourism landscape design is the protection of existing natural resources, including vegetation, water sources, and wildlife. These resources are not only integral components of ecosystems but also core elements that attract tourists and enhance their experiences. Therefore, effective measures must be taken in the design of ecotourism landscapes to protect and manage these resources, achieving dual goals of ecological conservation and sustainable tourism development. Protecting vegetation is critical to maintaining ecosystem stability and aesthetic landscapes. Vegetation plays vital roles in food chains, ecological niches, geological stability, soil conservation, and hydrological cycles. In ecotourism landscape design, reducing human-induced damage to vegetation is achieved through methods such as establishing vegetation protection zones, limiting human activity, and promoting awareness of plant conservation. Suitable management practices are implemented to enhance vegetation growth and prosperity while minimizing human impacts. Protecting water sources is crucial for ensuring the sustainable development of tourist areas. Proper management and conservation of water resources are essential for maintaining ecosystem health and meeting the basic needs of visitors. Techniques such as rainwater harvesting systems, water reuse systems, and water-saving facilities are employed in landscape design to minimize water consumption, prevent water pollution, and maintain hydrological stability[4]. Wildlife is an important resource and attraction in ecotourism landscape design. To protect and promote wildlife habitats, designers consider animal habitats and requirements, and implement strategies such as wildlife conservation areas, biodiversity conservation strategies, and minimizing human disturbance to protect and maintain healthy and diverse wildlife populations.

4.3 Low Impact Development (LID)

Low Impact Development (LID) strategies in ecotourism landscape design are critical design concepts and implementation methods aimed at minimizing adverse impacts on the natural environment while optimizing ecological, economic, and social benefits of tourist areas. The core idea of LID is to minimize environmental impacts of human activities through innovative technologies and strategies, promoting sustainable development of tourist areas. Firstly, LID strategies emphasize minimizing land development and surface alterations in site planning and construction processes. This involves selecting developed areas and avoiding damage to pristine ecosystems. For instance, existing roads and infrastructure are used to reduce new land development, minimizing land use impacts and ecosystem disturbances. Secondly, LID strategies include using environmentally friendly building and infrastructure designs to reduce resource consumption and environmental pollution. Designers choose renewable materials and eco-friendly technologies such as energy-saving lights, solar photovoltaic systems, and water-saving facilities to reduce energy consumption and carbon footprints in tourist facility construction. Additionally, LID emphasizes water resource management and protection. Techniques such as rainwater harvesting systems, optimized irrigation technologies, and water reuse measures minimize surface and groundwater consumption, prevent water pollution, and ecosystem damage. Importantly, effective environmental monitoring and management measures are adopted throughout tourist area operation and management. This includes regular environmental impact assessments, emergency response plans, and environmental education to enhance staff and visitor awareness of environmental protection, ensuring long-term sustainable development of tourist areas[5].

4.4 Renewable Energy and Resource Recycling

Renewable energy and resource recycling are indispensable strategies in ecotourism landscape design aimed at reducing natural resource consumption and maximizing sustainability and environmental benefits of tourist areas. This strategy involves effectively utilizing natural energy sources and optimizing resource utilization processes to promote energy self-sufficiency and reduce carbon footprints in tourist areas. In ecotourism landscape design, designers typically consider using renewable energy technologies such as solar, wind, and hydro energy to replace traditional fossil fuels. For example, installing solar photovoltaic panels, wind turbines, or hydroelectric facilities can provide

clean and sustainable energy supply for tourist areas, reducing reliance on traditional energy sources and lowering carbon emissions. In tourist area operation and management, water resource recycling technologies such as rainwater collection and irrigation systems minimize water use and achieve water reuse. Waste management is also a key link in resource recycling, involving techniques such as promoting waste classification recycling and organic waste composting to transform waste into resources, reducing pollution and environmental loads. During implementation, designers also consider the applicability and cost-effectiveness of technology choices to ensure effectiveness and sustainability of renewable energy and resource recycling measures. This requires comprehensive consideration of geographical features, climate conditions, and socio-economic backgrounds of tourist areas, designing optimal technical solutions consistent with overall planning and development goals of tourist areas.

4.5 Ecological Aesthetics and Experiential Design

Ecological aesthetics and experiential design in ecotourism landscape design aim to create deeply engaging and attractive tourist landscapes while protecting the natural environment. This strategy combines ecological principles with aesthetic design to enhance both ecological value and aesthetic effects of landscapes. Ecological aesthetics emphasizes integrating elements and features of natural beauty into landscape design. Designers carefully select vegetation, topography, and water bodies to create landscape layouts and styles that reflect ecosystem structure, function, and environmental protection and sustainable development goals. For example, selecting locally unique plants and terrain features and configuring landscape elements to enhance natural and local characteristics of tourist areas. Experiential design is a key component of ecotourism landscape, aiming to enhance visitor participation, educational experience, and emotional connection through interactive and educational design elements. This includes designing facilities such as ecological trails, bird-watching platforms, natural interpretation routes, and ecological education centers to provide visitors with rich natural experiences and platforms for knowledge transmission[6]. Through interactions with guides and interpreters, visitors can gain in-depth understanding of ecosystem complexity and biodiversity, enhancing their awareness of environmental protection and conservation. Additionally, ecological aesthetics and experiential design emphasize creating opportunities for intimate contact with nature, such as designing ecological camping areas, stargazing points, and outdoor activities to allow visitors to experience the tranquility and beauty of nature firsthand. Such designs not only satisfy visitors' demand for natural experiences but also stimulate their love for and awareness of environmental protection, promoting sustainable development of ecotourism.

4.6 Visitor Experience Design (Ecological Trails, Observation Platforms, etc.)

Visitor experience design strategies in ecotourism landscape design focus on enhancing visitor engagement, educational experiences, and emotional connection in natural environments through creative design elements and facilities. These designs aim not only to attract visitors but also to promote their understanding and support of ecological conservation while maintaining respect for and protection of the natural environment. Firstly, ecological trails are integral parts of visitor experience design. These trails are designed to traverse core ecological areas of tourist areas while avoiding damage to ecosystems. Trail designs prioritize visitor safety and comfort, selecting natural paths, areas with wide vistas, and avoidance plans for ecologically sensitive areas. By guiding visitors through various ecological landscapes such as forests, wetlands, and grasslands, trail designs enhance visitors' natural perception and ecological education experience, increasing their understanding and respect for the natural environment. Secondly, observation platforms and scenic towers are another common design of visitor experience. These structures are typically located in strategic positions within tourist areas, providing opportunities to overlook the entire tourist area or important ecological landscapes. Construction of observation platforms and scenic towers considers landscape visibility, ecological sensitivity, visitor safety, and comfort. Through these structures, visitors can enjoy unique perspectives, deepening their understanding of terrain, vegetation, and wildlife in tourist areas, while promoting their awareness of and participation in ecological conservation. In addition to trails and observation platforms, ecotourism landscape design may include other forms of visitor experience facilities such as natural interpretation centers, ecological education exhibitions, interactive displays, and outdoor activity facilities. These facilities aim to enhance visitors' educational experiences and emotional connection through interactive learning and participatory activities, sparking their interest and awareness of the natural environment.

5. Challenges in Ecological Tourism Landscape Planning and Design

5.1 The Conflict Between Environmental Pressure and Tourism Development

Ecological tourism landscape planning and design face a significant challenge: the conflict between environmental pressure and tourism development. This conflict arises from tourism's reliance on natural resources, which simultaneously poses potential threats and damage to these resources. As the number of tourists increases, natural scenic areas confront the issue of ecological carrying capacity. Excessive tourist activities can lead to habitat destruction, soil erosion, and biodiversity loss. For instance, a surge of tourists might trample vegetation, pollute water sources, and disrupt the normal living conditions of wildlife, thereby affecting the stability and health of the ecosystem. On the other hand, tourism development plays a crucial role in local economies and community development by creating job opportunities and increasing residents' incomes, motivating local governments and communities to promote tourism. However, the construction of tourism facilities, such as hotels, roads, and entertainment venues, occupies large areas of land, alters the topography and hydrological environment, increases waste and sewage discharge, and exerts long-term negative impacts on the environment. Additionally, some tourism projects might engage in overdevelopment to attract visitors, neglecting fundamental ecological protection principles. Although ecological tourism landscape planning and design advocate for sustainable development and environmental protection, balancing these with tourism development in practice remains challenging. This requires scientific planning, strict management, and extensive public education to raise environmental awareness among all stakeholders, establish reasonable visitor capacity limits, adopt low-impact development technologies, and enhance the protection and restoration of natural resources. Only by doing so can we minimize environmental pressure while promoting tourism development, achieving a win-win situation for both ecological protection and economic growth. Resolving this conflict demands not only technical and policy support but also concerted efforts from all parties to collectively advance the sustainable development of ecological tourism.

5.2 Balancing Economic and Ecological Benefits

A major challenge in ecological tourism landscape planning and design is how to balance the pursuit of economic and ecological benefits. Tourism development is often seen as a vital engine for local economic growth, driving related industries such as accommodation, dining, and transportation, thereby increasing employment opportunities and local fiscal revenue. However, an excessive emphasis on economic benefits can lead to neglect of the ecological environment, ultimately jeopardizing the sustainability of tourism resources. Ecological tourism stresses development without damaging the natural environment, requiring landscape planning and design to consider the carrying capacity of ecosystems and the necessity of environmental protection. However, pursuing ecological benefits often means investing more resources and time in environmental assessment, protection, and restoration, potentially increasing initial project costs, extending the return on investment period, and reducing short-term economic gains.

Moreover, designing and implementing ecological tourism projects necessitate strict adherence to environmental protection principles, employing low-impact development technologies and renewable resources, which can increase construction and operation costs. These factors may impose significant economic pressures during the initial stages of ecological tourism projects, affecting the enthusiasm of investors and developers. Additionally, attracting enough visitors to generate sufficient tourism revenue to support the long-term operation and maintenance of the project is a practical challenge that needs addressing.

Neglecting ecological benefits in favor of economic gains, while potentially bringing short-term economic growth, will ultimately lead to the depletion of tourism resources and a decline in visitor satisfaction, severely impacting the sustainable development of tourism in the long run. Thus, balancing economic and ecological benefits is not just a short-term economic issue but a strategic matter for the long-term development of tourist destinations.

Therefore, ecological tourism landscape planning and design must adopt comprehensive management and coordination mechanisms, develop reasonable planning schemes, and use scientific methods and technologies to minimize environmental impact, ensuring the health and sustainability of ecosystems. Additionally, through environmental education and public participation, community and visitor environmental awareness can be heightened, collectively promoting the harmonious

development of ecological protection and tourism. Only by finding the optimal balance between economic and ecological benefits can the long-term sustainable development of ecological tourism be realized.

5.3 Constraints of Regulations and Policies

In the process of ecological tourism landscape planning and design, regulatory and policy constraints constitute a significant challenge. These regulations and policies aim to protect the environment, maintain ecological balance, and ensure the sustainable use of resources, but they often impose strict limitations on tourism development and landscape design. These restrictions may include land use regulations, environmental impact assessment requirements for construction projects, delineation of resource protection areas, and standards for waste management and discharge. Although these measures are crucial for protecting the natural environment and maintaining the health of ecosystems, their implementation can obstruct the execution of tourism projects.

Firstly, the diversity of regulations and policies across different regions means that landscape planning and design teams must spend considerable time and effort understanding and complying with these rules, increasing project complexity and potentially delaying project approval and implementation, thereby slowing development progress. Particularly in ecologically sensitive areas, regulations may be more stringent, requiring detailed environmental impact assessments and long-term environmental monitoring, all of which necessitate additional resources and funding.

Secondly, the continuous evolution of regulations and policies poses another challenge. With the growing awareness of environmental protection and advances in science and technology, relevant laws and regulations may be adjusted and updated, necessitating projects to constantly adapt to new standards. This dynamic change requires project teams to possess strong adaptability and continuous compliance management capabilities to ensure ongoing alignment with the latest regulations. However, this also increases project uncertainty and risk, especially for long-duration projects that may face multiple challenges due to regulatory changes.

Furthermore, the effectiveness of regulations and policies often relies on the enforcement and supervision capabilities of various levels of government and relevant departments. In some areas, limited regulatory resources and technical means may result in inadequate enforcement or insufficient supervision, impacting the actual effectiveness of ecological protection and creating an unfair competitive environment for compliant projects. In this context, how to strictly adhere to regulations while promoting project implementation and sustainable development becomes a pressing issue to address.

Facing these challenges, ecological tourism landscape planning and design need to seek innovative solutions and flexible response strategies within the regulatory and policy framework. This includes enhancing communication and cooperation with governments and communities, actively participating in policy formulation and revision processes, and promoting the optimization and improvement of the policy environment. Simultaneously, through scientific planning and design, projects can enhance their environmental benefits and social value, garnering broader support and recognition. Only under the guidance of regulations and policies, through proactive exploration and practice, can the dual goals of ecological protection and tourism development be achieved.

6. Conclusion

This paper has explored multiple strategies in ecotourism landscape planning and design, covering key issues such as ecological aesthetics and experiential design, low impact development (LID), protection of existing natural resources, renewable energy, and resource recycling. Through comprehensive analysis and detailed exposition, it has been revealed how these strategies promote a win-win situation for ecosystem conservation and tourism development in practice. Ecotourism landscape design not only emphasizes ecological conservation and sustainability but also strives to enhance visitor educational experiences and emotional connections. Through innovative design elements and facilities, it provides visitors with rich and immersive natural experiences.

Future research and practice should further explore and promote these strategies to achieve long-term sustainable development goals in ecotourism, making a positive contribution to the preservation of the Earth's natural heritage.

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