

Discussing the environmental issues of Taiwan's national parks to explore sustainable development strategies

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ABSTRACT

Taiwan has a complex, fragmented, and sensitive natural and cultural ecosystems. With the rise of the concept of “sustainable development” and “eco-tourism”, how should the national park establish an ecological environment that integrate “conservation, recreation, and research”? This research wants to explore the problems and countermeasures of the sustainable development of Taiwan's national parks. The first problem of the sustainable development is “ecosystem fragmentation”. For Taiwan's natural ecological environment, continuous fragmentation will increasingly deviate from “sustainable development”. “The status of sustainable development is even out of balance. The second problem of the sustainable development is “dynamic ecological balance.” Sustainable development requires not only the dynamics of trends, but also the environmental structure and characteristics of trends in order to understand and manage them. Therefore, the first sustainability issue of Taiwan's national parks is “suitability”, which interprets multi-faceted, locality, and suitability into the planning concepts and frameworks. So, the sustainable development strategy is “planning frameworks using landscape patterns.” The second sustainability issue is “dynamics”, which interprets the instability of the environmental foundation, systemic and balanced variability into the planning strategies. So, the sustainable development strategy is “planning strategies for diversified environments”.

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KEYWORDS

Taiwan's national park; Sustainable development; Dynamic balance; Suitability; Fragmentation.

INTRODUCTION

Taiwan's complex, fragmented, sensitive nature and humanistic ecosystem has the trend of accelerated and unbalanced in recent years. Although the national park protects the ecological lifeline of Taiwan's main island, is its ecological development inclined to be out of balance? With the rise of the concept of “sustainable development” and “eco-tourism”, how to establish an ecological environment that integrates “conservation, recreation and research” and develop a feasible and perfect operational

framework is the purpose of this paper.

The forest ecosystem is the main type of Taiwan's national parks mostly, and their sustainable development should back to the study of environmental matrix to effectively manage the development of natural ecological environment. However, the National Parks Act does not clearly define the relationship with “sustainable development” and fails to clearly identify its direction and strategy for its operation and development.

This paper believes that the origin of national parks is the concept of land use developed by human beings

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in the face of the ever-expanding and shrinking nature and human environment. Their systems and models are adjusted with the concept of human beings and the use of environmental resources. Therefore, under the trend of global environmental change and sustainable development, how to adjust the planning and management of Taiwan's national parks is one of the focuses of this paper.

METHODOLOGY

This research is exploring the problems and countermeasures of the sustainable development of Taiwan's national parks, using the references discussion, problem discovery and issue diagnosis methods to describe the possible strategies.

References discussion

A. Phillips^[15] believes that there are many differences between the new paradigm of protected areas and the traditional paradigm. This paper concludes that it is diversified, systematic and localized. It is believed that the future challenges of national parks will include: rebuilding the relationship between man and nature and seeking integrated coexistence^[9,13], re-interpretation of local communities (especially aborigines) and the island network as the key partners^[4,5,11], and integrating and planning more sectors and resources through the continuity of cross-border thinking and regional scales^[6,10,12,16,17], to withstand external environmental influences and changes.

The "development" of sustainable development is the goal, the process of change, not just "growth". The "sustainable" is a factor that constrains development, rather than "extending the deadline"^[14]. This paper argues that sustainable development should be interpreted as "the attitude and process of maintaining efforts". The focus is not on "can we achieve it", but on "how much we need to work hard".

Environment problems discovery

Taiwan's highly divergent geography and ecological environment have changed with the times, and the biological evolution of the invasion, colonization, and competition of various planting groups has been synchronized with the changes in habitats, resulting in ethnic variation of the same species on different mountain

peaks, resulting in many inherent plant species^[3], developed into a unique and slightly different plant ecosystem. At the same time, various animal groups survive across the above-mentioned unique and slightly different plant ecosystems. In addition to making it difficult to accurately predict the ecological distribution of animals, it also makes the natural environmental ecosystem of Taiwan's mountainous areas tend to be fragmented, complex and diverse. Therefore, the first sustainable development problem of Taiwan's national parks is "ecosystem fragmentation", especially the current situation and trend of fragmentation. That is to say, this planning of the ecosystem should consider its internal structure and function as a whole to connect the broken ecosystems. At the same time, this ecosystem is not large enough and has not yet developed into a stable system. If it is slightly externally involved, it may break again. For Taiwan's natural ecological environment, the continued fragmentation will gradually deviate from the goal of "sustainable development" and even unsustainable development.

If the physical environment is the only consideration of the plant population in the mountainous area of Taiwan, it will migrate rapidly and rise slowly. The migration rate is related to the number of seeds, the efficiency of germination or the size of the population, the growth range and the number of reproductions. In the early stage, environmental factors affected the species distribution greatly, and later changed to the competitive effect of species^[2]. The plant ecosystem in Taiwan's mountainous area is in a dynamic balance between environmental impact and species competition, especially in sub-alpine areas with the largest dynamic range, and the animals move with it. In general, the ecological evolution trend of Taiwan's natural environment should belong to the "dynamic trend to extreme phase". Due to the changes in environment, time and space, its scope and composition may be dynamically adjusted accordingly and regain the scale of the extreme stage. Therefore, the second sustainable development problem of Taiwan's national parks is "dynamic ecological balance", and the core of the problem is that the dynamics may be out of balance. And so, the planning of sustainable development not only needs to care about the dynamics of trends, but also needs to pay attention to the environmental structure and characteristics of the trends, in order to understand and manage them.

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Sustainability issues diagnosis

The sustainable development of Taiwan's national parks is a balance between the values of ecology and recreation, and the relative comparison between conservation and development. The mountainous terrain in Taiwan is volatile and geologically fragile. Genshlea et al.^[7] emphasized that the sustainable development must understand its natural and social cycle, the unstable change process of the environmental base, then propose appropriate and effective management models to effectively achieve the sustainable development of the region. Therefore, the first sustainability issue of Taiwan's national parks is "site suitability".

Taiwan's mountainous terrain is variable and fragile, which is the main key of the instability of the national park's environmental base^[1] and the fragmentation of the landscape pattern. The planning, allocation and behavioral activities of national parks by human are the main disturbance factors of the environment. We can refer to the international trend of "cross-boundary thinking", constructing a network of ecological conservation system, and paying attention to its changing trends. The permanent approach needs to begin with the education strategies such as rebuilding the relationship between man and nature^[9,13] and local partnership^[4,5,11]. Therefore, the second sustainability issue of Taiwan's national parks is "dynamics".

RESULTS AND DISCUSSION

From the discovery of environmental problems and the diagnosis of sustainability issues in Taiwan's national parks, this study identified its sustainable development strategies as "planning frameworks using landscape patterns" and "planning strategies in response to diversified environments".

The combination and their forces of natural and human environment factors in Taiwan's national parks had formed a somehow unique environment. From the overall landscape structure, process and function, the state of completion and evolution can be analyzed. Therefore, "site suitability", the first sustainability issue of Taiwan's national parks, interprets the planning concepts and frameworks about multi-faceted, locality, and adaptability. So, this study introduces a sustainable development strategy that is "planning framework using landscape patterns".

On the other hand, the sustainable development object of Taiwan's national parks is to allow humans' needs for environmental use to be appropriately met and developed under the dynamic balance of environmental changes, while continuing to maintain the ecological environment and resources, without affecting the survival and development of descendants of humans and other organisms. Therefore, "dynamics", the second sustainability issue of Taiwan's national parks, interprets the planning strategies about the instability of the environmental base, the systemicity, and the variability of balance. So, this study introduces a sustainable development strategy that is "planning strategy response to the diversified environment".

CONCLUSION

Sustainable development and diversity

The diversity of Taiwan's national parks must be analyzed in terms of its environmental phenomena, characteristics, and causes, so that the structure and changes of diversity can be grasped from the origin. And, the change behind the diversity is contained in a larger trend, from complex to simple, or can be regarded as a cyclic process in which a homogeneous state is formed and then gradually split into a complex state.

Diversity and sustainable development jointly promote the integrity and balance of the overall nature. The connotation of diversity is sustainable development. The outreach of sustainable development is diversity. Diversity can moderately maintain sustainable development, while sustainable development can maintain the face of diversity. Finally, the implementation of sustainable development is the maintenance of diversity, while returning to the belief in sustainable development.

Sustainable development and dynamic balance

Ecological succession has the characteristics of advancing evolution and shifting cycles. Its characteristics are dynamic and balance, a state of balance between changing situations and static states, which is the essence of sustainable development. Succession is based on the trend toward extreme prosperity, presenting a dynamic balanced development, with changes in environmental characteristics as a cause, and dynamic balance as a

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result. With the intervention of external forces, it jumps to another dynamic equilibrium state. Sustainable development is the dynamic balance of the natural flow of energy and species, not the static balance of human observation data, but the state of maintaining dynamic balance on a longer time scale.

Sustainable development and temporal and spatial scale

At a large temporal and spatial scale, sustainable development's focal point is development and its dynamics. The focus of sustainable development is on trends and forces that cause development and dynamics, rather than the internal components. At a small temporal and spatial scale, sustained development's focal point is sustainability and its balance. The focus of sustainable development is on the interaction relationship of internal components. Trends and forces are often regarded as constant factors. Therefore, when applying the temporal and spatial scale of sustainable development, one can refer to Lin's^[8] discussion on the concept of development and sustainability. For sustainable development with a larger temporal and spatial scale (relativity), it is advisable to adopt the "concept of development" for discussion. Then, the sustainable development on a small temporal and spatial scale is discussed in terms of "sustainability".

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