

The Management Model of Nature Reserves Exploration: Case Analysis Based on the Nature Conservancy

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Abstract: The purpose of this paper is to explore the management model of nature reserves, especially the role of private subjects and national management in nature reserve protection and its potential synergistic effect, to provide feasible suggestions for the promotion of nature reserves in China. This paper in the literature review section for the existing literature for private protected areas in the governance of adaptive co-management methods, governance process, in the theoretical analysis section in-depth discussion of the characteristics of public goods, the causes of market failure. On the basis of both, the successful experience of the real-life case The Nature Conservancy (TNC) is elaborated, and the roles of the private subject and the nation in the case are analyzed. This paper proposes that although private organizations such as TNC play a positive role in providing public goods, the limitations of the market mechanism mean that nation intervention is maximizing the efficiency of resource allocation critical. Finally, combining the successful experiences derived from theory and case studies, and based on an overview of the challenges faced by China in promoting the construction of nature reserves, including the complexity of the management system, the lack of financial input, and the low level of community participation, the paper puts forward recommendations for the governance of China's nature reserves to strengthen public-private cooperation, optimize the management system, improve the mechanism of financial input, and enhance the capacity of community participation.

Keywords: Nature Reserve Management; Private Subjects and State Management; Biodiversity Conservation; Public Goods

1. Introduction

Globally, the construction and management of nature reserves, as an important tool for protecting biodiversity, maintaining ecological balance and promoting sustainable development, has been a hot topic in the field of environmental protection. With the increasingly severe environmental problems, how to manage and protect these valuable natural resources more effectively has become an urgent issue. In China, the construction and management of nature reserves face special challenges, including the complexity of the management system, insufficient financial investment and low community participation. The existence of these problems not only affects the conservation effect of nature reserves, but also poses a threat to ecological security and sustainable development.

Against this background, it is particularly important to explore the advantages and limitations of different management modes, especially the roles of private actors and government management in the construction of nature reserves. The Nature Conservancy (The Nature Conservancy, or TNC), as a relatively successful private environmental protection organization in the world, its experience in nature reserve construction and management The Nature Conservancy (TNC), as a relatively successful private environmental organization in the world, provides us with a useful reference case. By analyzing TNC's successes and shortcomings, we can gain a deeper understanding of the role of private actors in the management of nature reserves and how public-private cooperation can improve conservation efficiency and effectiveness.

2. Literature Review

This study synthesizes several pieces of literature in order to explore the roles of private agents and government management in nature reserve conservation and their

synergistic effects. The literature generally agrees on the importance of private protected areas in biodiversity conservation and emphasizes the role of cooperation and community participation in enhancing sustainable management of protected areas. The study noted that through an adaptive co-management approach, multiple stakeholders were able to effectively collaborate in the implementation of tourism activities in protected areas, demonstrating the importance of multi-stakeholder participation in the governance of tourism in protected areas. In addition, community-based ecotourism research highlights issues of participation and power of indigenous communities in ecotourism decision-making and the need to respect community interests and cultural values. Stakeholder analysis further strengthens the governance process of tourism benefit sharing in protected areas, noting that effective stakeholder engagement and communication can improve the economic benefits of tourism activities in protected areas and ensure that local communities receive an equitable distribution of benefits.

McDonald (2021) explored strategies for supporting and growing private protected areas in Australia through an interview with James Fitzsimons of The Nature Conservancy [1]. The article emphasizes the importance of private protected areas in biodiversity conservation and discusses the enhancement of sustainable management of protected areas through collaboration and community engagement. Islama et al. (2018) examined the application of adaptive co-management approaches in tourism governance in protected areas [2]. The empirical analysis revealed how multiple stakeholders can effectively collaborate through the co-management framework when implementing tourism activities in protected areas. Farrelly (2011) explored the democratic decision-making of community-based ecotourism in Bouma National Heritage Park, Fiji [3]. The article paid particular attention to the participation and power of indigenous communities in ecotourism decision-making, emphasizing the importance of ensuring that community interests and cultural values are respected. Heslinga et al. (2019) strengthened the governance process for tourism benefit-sharing in protected areas through stakeholder analysis

[4]. The study noted that through effective stakeholder engagement and communication, the economic benefits of tourism activities in protected areas can be improved and local communities can be ensured a fair distribution of benefits. This study provides empirical support on how to achieve sustainable development of tourism activities in protected areas through governance improvement.

In summary, these literature reviews show that private agents and government management each have their own advantages in nature reserve conservation, and that the public-private partnership (PPP) model can integrate the resources of both parties and improve conservation efficiency. Based on these theoretical and empirical studies, this study will further analyze the case of The Nature Conservancy and make specific recommendations for the governance of nature reserves in China.

3. Theoretical Analysis

As shown in Figure 1, two consumers - A and B - have different individual demand curves for biodiversity conservation. Because biodiversity is a public good, it is exclusive and indivisible for consumption, which means that once a public good is provided, no one can be excluded from using it, and one person's use will not reduce the use of others. So within the same environment a and b can consume the same amount of biodiversity at the same time, then we can determine the market demand by vertically summing these two individual demand curves.

In the diagram, Q represents the level of efficiency, the point at which the market demand curve intersects the marginal cost curve (MC). This point represents the allocation that maximizes economic surplus, which consists of the area below the market demand curve and above the marginal cost curve. At this point, social welfare is maximized because the total value consumers are willing to pay exceeds the marginal cost of providing the public good.

The level of efficiency, Q, is determined by the intersection of the market demand curve and the marginal cost curve. At this point, the total value society is willing to pay for biodiversity conservation (consumer surplus) minus the marginal cost of providing such conservation yields the greatest economic surplus. This

point represents the optimal level of societal investment in biodiversity conservation. However, in real markets, due to the non-exclusive nature of public goods, the prevalence of “free-rider” behavior prevents the market from reaching this efficiency maximization point.

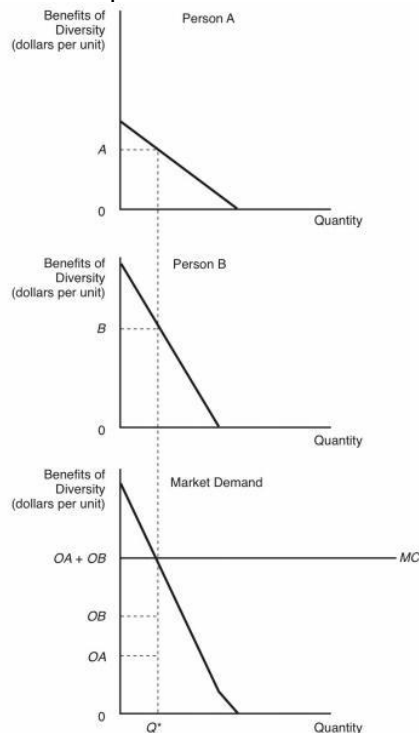


Figure 1. Efficient Provision of Public Goods

Specifically, due to the difference in the marginal willingness to pay (WTP) of consumers A and B for the same public good, theoretically, if it is possible to fully price discriminate between each consumer, i.e., to charge each consumer the highest price that they are willing to pay, then it is possible to achieve the efficiency level Q through marginal cost pricing; however, in practice such price discrimination is not feasible because consumers have no incentive to reveal their true preferences and it is costly to implement. Thus in a non-exclusive setting, consumers lack incentives to truthfully express the strength of their preferences for the public good and thus tend to underestimate their preferences with a view to shifting the cost burden to other consumers. This behavior results in consumers paying less than their original willingness to pay, thus making the total payment lower than the potential total, which in turn leads to a reduction in the total

surplus and fails to reach the level of social welfare maximization when $MC=MR$.

In further analysis, when free-riding behavior is prevalent, the total amount of individual contributions to public goods is insufficient to cover the cost of providing an efficient amount of public goods, resulting in the supply of public goods being below the efficient level, i.e., under-supply. Taking The Nature Conservancy as an example, although as a private organization it is able to provide incentives for biodiversity conservation to a certain extent through voluntary donations, etc., its incentives are not sufficient to drive the supply of public goods to the maximum level of efficiency due to the market failure problem mentioned above. Therefore, despite the positive role that private organizations play in the provision of public goods, their level of provision is still limited by the inherent limitations of the market mechanism and cannot independently maximize the efficiency of resource allocation. This analysis emphasizes the importance of government intervention in correcting market failures and providing public goods.

4. Key Problems to Solve—Current Situation and Problems of Nature Reserve Protection in China

4.1 Complex Management System

China's nature reserves involve the management of many departments, including forestry, environmental protection, agriculture, land, etc., and there are problems of cross responsibilities and coordination difficulties. For example, in some wetland nature reserves, the forestry department is responsible for the protection of wetland vegetation, the environmental protection department is responsible for water quality monitoring and pollution prevention, and the agriculture department is responsible for the management of the surrounding farmland. This kind of multiple management system leads to the lack of effective communication and coordination between departments in the process of some protection decision-making and project implementation, which affects the efficiency and effect of protection work.

4.2 Insufficient Financial Input

Although the government has continuously

increased the financial investment in nature reserves, there is still a big gap compared with the actual demand. Infrastructure construction, scientific research and monitoring, ecological restoration and community development in nature reserves all require large amounts of funds, but the current funding sources mainly rely on government financial allocations, with less participation of social capital, resulting in outdated protection facilities, lagging scientific research and slow community development in some reserves, which affects the overall protection capacity and sustainable development of the reserves.

4.3 Low community Participation

In some protected areas, the participation of local community residents is low, mainly because the contradiction between conservation and development has not been effectively solved [5]. Some protected areas have taken the approach of restricting the production and living activities of the community residents for protection, but failed to provide enough alternative livelihood and development opportunities for the residents, resulting in the residents' resistance to the protection work, and even behaviors of destroying the resources of the protected areas, which is not conducive to the long-term and stable protection of the nature reserves [6].

5. Analysis of the Experience of the Nature Conservancy

The conservation of nature reserves is critical to the maintenance of biodiversity, the provision of ecological services, and the promotion of sustainable development. Globally, different management models play a role in nature reserve development, with private actors and governments each having their own unique strengths and limitations, and The Nature Conservancy's experience as a successful private environmental organization in nature reserve development and management provides a useful reference for exploring the roles of both. The Nature Conservancy is a successful private environmental organization.

5.1 Introduction of the Nature Conservancy

Founded in 1951, The Nature Conservancy is one of the world's largest international nature conservation organizations, dedicated to

protecting vital ecosystems and biodiversity around the world, addressing environmental challenges such as climate change, and promoting sustainable natural resource management and conservation practices through collaboration with local communities, governments, businesses and other partners.

It is an international nonprofit conservation organization that has earned a four-star rating from Charity Navigator as one of the ten best public service organizations, is accredited by the BBB Wise Giving Alliance, and was named one of the top ten best public service organizations in a Harrison Inter active's poll as one of the 13 most trusted nonprofit organizations. The organization employs more than 700 scientists and 3,500 staff members who work globally in four major areas of conservation: climate change, fresh water conservation, marine conservation, and protected areas.

5.2 Successful Experiences of the Nature Conservancy

5.2.1 Scientific conservation planning

The Nature Conservancy uses advanced science and technology and methods to conduct detailed assessments and analysis of ecosystems around the world and identify areas of high conservation value. For example, it pioneered the Conservation by Design (CbD) method, whereby priority conservation areas are selected through scientific research and analysis, and systematic conservation is practiced locally according to local conditions, and species richness is taken into account when assessing the conservation value of a piece of land, in assessing the conservation value of a piece of land, species richness, ecosystem service function and threatening factors will be taken into account. Based on the results of the assessment, targeted conservation plans are formulated, specifying the key areas for conservation, target species and priority conservation measures, and such scientific planning ensures the effective utilization of conservation resources.

5.2.2 Diversified fund-raising

Its funds mainly come from member donations, government funding, enterprise cooperation and foundation support, such as Salesforce and other companies have funded it, these funds are mainly used for global nature conservation projects, and through cooperation with

enterprises to carry out ecological conservation projects, the enterprise provides financial support, and at the same time, obtains a certain degree of environment and land social benefits in return. This diversified fund-raising method enables The Nature Conservancy to obtain sufficient funds for the construction, maintenance and management of nature reserves, which guarantees the continuity of conservation work. In 2022, TNC's private fundraising approached a record \$827 million, and government revenues increased by \$22 million to \$126 million.

5.2.3 Effective community engagement

The Nature Conservancy focuses on working with and integrating into local communities, respecting their needs, values and cultural traditions, and working to build mutually beneficial and trusting relationships. For example, in some developing countries, the Nature Conservancy provides employment opportunities for local communities, conducts environmental education activities, and helps communities develop sustainable livelihood programs, such as ecotourism and organic agriculture, so as to enable community residents to gain practical benefits from nature conservation, and thus increase their support and participation in conservation work.

5.3 Implications of The Nature Conservancy's Experience

5.3.1 Flexibility and innovation

The private sector is able to respond quickly to environmental changes and conservation needs, and to experiment with new conservation methods and technologies without being bound by traditional bureaucratic systems. For example, The Nature Conservancy, in response to emerging ecological issues, such as urban ecological space protection or emergency protection of specific species, is able to quickly deploy resources, carry out innovative conservation programs, and formulate flexible conservation strategies, such as the adoption of new ecological monitoring techniques or the establishment of innovative ecological compensation mechanisms.

5.3.2 Fund replenishment and resource integration

Private entities can raise funds through various channels to provide additional financial support for the construction of nature reserves. In addition to donations and corporate

cooperation, social capital can be attracted to enter the field of nature conservation and integrate the resources of all parties. For example, some private foundations specifically provide funds for The Nature Conservancy's related projects, or private enterprises indirectly support the construction and operation of nature reserves by investing in The Nature Conservancy's ecotourism projects, which helps to alleviate the institution's pressure on nature conservation funds and expand the sources of conservation funds.

5.3.3 Advantage of specialized technology and knowledge

Many private environmental organizations have professional scientific research teams and technical talents, which can provide professional technical support and scientific knowledge in ecological monitoring, species protection and habitat restoration. For example, in the breeding and release program of endangered species, The Nature Conservancy can carry out scientific research and practical operation with its professional and technical advantages, so as to improve the success rate of species protection and contribute to the biodiversity protection of nature reserves.

5.4 The Participation of Private Subjects in the Construction of Nature Reserves Cannot Be Separated from the Participation of the Government

5.4.1 Policy formulation and regulatory guarantee

The government can formulate and improve the relevant policies and regulations for the construction and management of nature reserves, clarify the protection objectives, scope, standards and management system, etc., so as to provide a solid legal basis for the construction of nature reserves. For example, in many projects in which The Nature Conservancy is involved, the government has demarcated the boundaries of the nature reserves through legislation, stipulated the areas where development is prohibited and restricted, and formulated specific measures for the protection of biodiversity and ecosystem services, so as to make the construction and management of the nature reserves based on the law, and to ensure the standardization and stability of the protection work.

5.4.2 Macro planning and coordination

The government carries out the planning and layout of nature reserves at the macro level, taking into account factors such as regional ecological balance, bio-geographical distribution and social-economic development, and coordinates conservation efforts between different regions and sectors. For example, The Nature Conservancy looks for opportunities to cooperate with the government and participates in the government's coordinated plan for conservation, and the government formulates nature reserve network planning at the national or provincial level, co-ordinates the construction of various types of nature reserves, avoids fragmentation and duplication of conservation work, and realizes the overall protection and optimization of the ecosystem.

5.4.3 Public resources deployment and infrastructure construction

The government can deploy public resources, such as land, water resources and financial funds, for the infrastructure construction and daily maintenance of nature reserves. For example, The Nature Conservancy actively cooperates with the government and seeks the government's support in various aspects, such as funds, etc. The government provides the necessary conditions for the implementation of the protection work by constructing the infrastructure of the nature reserve, such as patrol roads, monitoring stations, scientific research bases, etc.; at the same time, the government can also organize and carry out large-scale ecological restoration projects, such as wetland restoration, forest vegetation restoration, etc., to At the same time, the government can also organize large-scale ecological restoration projects, such as wetland restoration, forest vegetation restoration, etc., to improve the ecological environment of the nature reserves, which often require a large amount of public resources, and are difficult to be undertaken by private entities.

6. Suggestions for the Governance in China Based on the Experience of The Nature Conservancy

6.1 Strengthen Public-Private Cooperation

China should encourage and guide private entities to participate in the construction of nature reserves and establish mechanisms and platforms for public-private cooperation. The government can attract private enterprises,

social organizations and individuals to invest in ecological protection projects in nature reserves, such as ecotourism development and eco-products production, by means of policy preferences and financial subsidies, etc[7]. Meanwhile, it can strengthen the supervision and guidance of private subjects' participation in protection work to ensure the realization of protection goals. For example, in the vicinity of some nature reserves, the government can cooperate with enterprises to develop tourism projects with the theme of ecological experience, where the enterprises are responsible for investment, construction and operation, the government provides policy support and supervision, and part of the proceeds gained will be used for the protection of the protected areas and community development [8].

6.2 Optimize the Management System

China should further clarify the responsibilities of various departments in the management of nature reserves, strengthen coordination and cooperation between departments, and establish a unified and efficient nature reserve management organization or coordination mechanism. For example, we can learn from the experience of foreign countries and set up nature reserve management committees composed of several departments, which are responsible for formulating unified protection plans and policies, coordinating the actions of various departments, solving the contradictions and problems in the management system, and improving the management efficiency of nature reserves.

6.3 Improve the Financial Input Mechanism

In addition to increasing the government's financial input, China should actively explore diversified financial input mechanisms. Set up a special fund for nature reserve protection to attract social donations and corporate investment; establish an ecological compensation mechanism to give reasonable compensation to communities and individuals whose development is restricted due to the construction of nature reserves; at the same time, promote the realization of the value of ecological products in nature reserves, and convert the ecological service function of the reserves into economic gains through market-oriented means, such as carrying out carbon

sink trading and water resource trading, etc., to raise more funds for the construction of nature reserves. At the same time, promote the realization of the value of ecological products in nature reserves, and transform the ecological service function of nature reserves into economic benefits through market-oriented means, such as carrying out carbon sink trading and water trading, so as to mobilize more funds for nature reserve construction [9].

6.4 Enhance the Capacity of Community Participation

China should pay attention to the interests of community residents in nature reserves, and formulate conservation plans and policies conducive to community development. By carrying out environmental education, skills training and other activities, we can improve the environmental awareness and employability of community residents; develop a community participatory conservation model, encourage residents to participate in protected area patrols, monitoring, ecological restoration and other work, and get corresponding economic returns from it, for example, establish a community patrol team, and give the team members a certain amount of subsidies for their labor, and at the same time, use some of the proceeds from ecotourism for the construction of public facilities in the community and for dividends for the residents, so as to enhance the community residents' commitment to the nature reserves. At the same time, part of the ecotourism proceeds will be used for the construction of community public facilities and the residents' dividends, so as to enhance the sense of belonging and responsibility of the community residents towards the nature reserve, and to realize the benign interaction between nature conservation and community development [10].

7. Conclusion

Both private subjects and government management have irreplaceable roles in the construction of nature reserves. On the basis of literature review and theoretical analysis, by analyzing the successful experience of The Nature Conservancy, it can provide useful reference for the governance of nature reserves in China. China should give full play to the leading role of the government, strengthen the

protection of policies and regulations and the coordination of macro-planning, and at the same time, actively guide the participation of private subjects, optimize the mechanism of capital investment, and enhance the capacity of community participation, so as to realize the effective protection and sustainable development of the nature reserves, and to safeguard China's ecological security and biodiversity.

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