

Sustainable Development of Forestry Ecology in the Context of Internet Plus

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Abstract: Forest is an important natural resource. It can not only provide wood and various kinds of biological feed, but also have many functions such as purifying air and regulating climate. However, with economic development and social progress, human destruction of the environment and deforestation have occurred from time to time, leading to serious degradation of forest resources. Therefore, there is a certain conflict between economic development and the ecological environment. How to coordinate the relationship between the two and realize their harmonious coexistence is a problem that needs to be considered together. As an advanced technology, the Internet has become an indispensable part of people's life. Applying it to forestry work through network information technology can improve the efficiency of information exchange and make people more convenient to understand the forestry ecosystem and related conditions. Based on "Internet plus" and the theory of forestry sustainable development, this paper establishes a system model, and uses the analytic hierarchy process (AHP) and fuzzy comprehensive evaluation method to build an index system for ecological civilization construction. This paper calculates the weight of each index, and then grasps the current forestry ecological situation and its development trend as a whole, so as to formulate corresponding countermeasures to promote the sustainable development of forestry. This paper compares the traditional nature conservation strategy with the optimized nature conservation strategy of "Internet plus", and the results show that the optimized ecological environment plays a certain role in improving the quality of forest resources and improving biodiversity. The forest naturalness has also increased by about 5.28%, which is conducive to maintaining the balance and stability of the natural ecosystem, guiding people to pay more attention to and protect the environment, and reducing the excessive consumption of natural resources and man-made destruction.

1. Introduction

Natural environment protection is the fundamental guarantee for human survival and

development. It requires people to reasonably develop and utilize all kinds of organisms in the nature, and constantly create new material products on this basis, so as to achieve harmonious coexistence between human and nature. Forest is an important carrier that nature gives people life and vitality. However, with the increasing reduction of the total amount of forest resources, the area of natural forest is declining year by year, and the afforestation technology and management level are receiving more and more attention. Therefore, how to scientifically and effectively carry out the forestry ecological construction work has become one of the urgent problems to be solved at present.

Forest ecological protection has always been the focus of attention, and many scholars have studied it from different angles. Gordon Igor made an analytical summary of a series of relevant environmental and economic solutions, and proposed a sustainable development evaluation method based on the perspective of system risk, providing some experience for environmental policy makers [1]. Hou Na studied the role of technological innovation model guided by the concept of ecological civilization in promoting the green transformation of enterprises in the context of rapid economic growth and increasing resource and environmental constraints [2]. Mickiewicz Pawel made an in-depth discussion on the forestry environmental protection in the local space policy, and proposed that the forest product processing industry should be vigorously developed, the added value of the forest product industry should be increased, and the total consumption of wood should be expanded on the basis of improving the forest fire prevention mechanism and the natural reserve system [3].

Li Yanwei has made a new understanding of environmental protection policies based on the current social network environment, liberated environmental protection from traditional concepts, and stressed that there should be an equal relationship between human and nature, and that human beings should respect and protect the natural environment [4]. Whitburn Julie made a meta-analysis of the relationship between human and nature and environmental behavior, revealing various complex factors and their interactions commonly existing in the relationship between human and nature, and putting forward new ideas for people on environmental protection [5]. Li Chunmei studied the dual performance of environmental regulation on economic and environmental development, analyzed the relationship between environmental regulation and economic growth by introducing the coefficient of technological progress, and believed that the role of environmental regulation in different periods has a phased feature [6]. The protection of forestry ecological environment is not overnight, but more importantly, long-term, gradual and dynamic implementation of ecological restoration.

Today, with the rapid development of Internet technology, people pay more and more attention to the relationship between the development of forestry and environmental protection, and many scholars have studied it. Lechner Alex M. analyzed the application of remote sensing technology in forest ecology and management, introduced a new model of forest resources management combining remote sensing and geographic information system, and put forward scientific decision support opinions for the implementation of effective protection and rational use of natural resources [7]. Brieuc Marine SO investigated the importance of random forests in ecology and evolution, and established a new ecosystem evaluation system to evaluate natural or social system functions and biodiversity [8]. Zhang Jianqing investigated the impact of environmental protection policies on regional innovation efficiency, and proposed to establish an ecosystem service value evaluation system with the goal of resource conservation to improve the efficiency of enterprise technological innovation activities from two aspects of ecological protection and economic development [9].

Bidone Francisco uses the critical academic of environmental research to discuss the dominant position of ecological modernism, and believes that forest is one of the most important components of sustainable development. Dynamic monitoring of forest resources can achieve comprehensive

evaluation of resources and environment conditions and real-time feedback of the evaluation results to decision makers [10]. Galeka-Drozda Anna described the typical problems and phenomena in the Reserve, which are also affected by the pressure of urbanization, and are reflected in the improvement of afforestation rate, the increase of the number of developed areas and the reduction of cultivated land area [11]. Bekezhanov Dauren is committed to solving environmental and legal problems in the digital era and helping government agencies, enterprises and consumers formulate sustainable development strategies [12]. Forest is one of the key elements to maintain the ecological balance. Only by actively promoting the forestry ecological construction can we achieve the goal of long-term and stable maximization of ecological benefits.

In order to solve the current shortage of forest resources and how to better carry out the forestry ecological construction and other outstanding problems, it is necessary to establish a perfect afforestation model and management technology system [13]. As a new business idea, "Internet plus" can realize the transformation from traditional to modern and then to the future. It is one of the effective ways to promote this process. To a certain extent, it has improved the efficiency of afforestation, reduced resource waste and protected the environment. Compared with the traditional production mode, it is more in line with the requirements of the scientific outlook on development and the construction of an environment-friendly society, and is conducive to creating a sustainable forestry ecological environment.

2. Development Status of Forestry Ecological and Natural Environment

2.1. Problems in the Protection of Forestry Ecological and Natural Environment

Forestry ecological engineering is a new type of engineering project aimed at protecting and improving the ecological environment and promoting the sustainable development of social economy. It mainly includes afforestation, forest resource cultivation, production and sales of forest products, etc. Its fundamental purpose is to achieve the rational use of biodiversity and resource development and improve people's living standards. However, limited by human factors and natural environmental conditions, the current forestry ecological construction is still in an extensive state, with many outstanding environmental hazards, which seriously restricts the healthy and rapid development of economic society, as shown in Figure 1 for details.

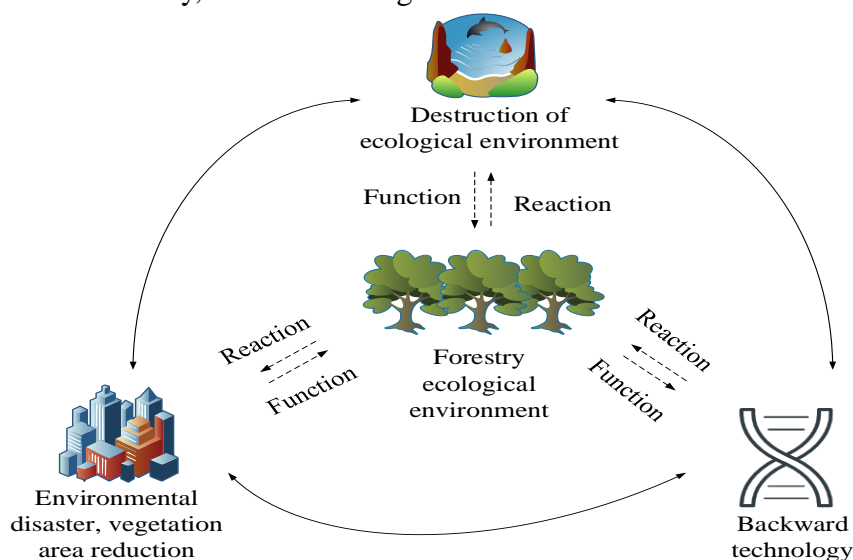


Figure 1. Problems existing in forestry ecological and natural environment protection

First of all, the ecological environment of forest resources has been seriously damaged in the process of development and utilization, such as deforestation, indiscriminate killing of wild animals and plants, and illegal hunting, which will have a great negative impact on the ecological balance of the surrounding areas, and then lead to a sharp decline in biodiversity, ecosystem imbalance and other consequences, directly threatening the natural environment on which human beings live, and bringing great harm to human production and economic activities.

Secondly, a series of environmental disasters and ecological crises, such as land desertification, have occurred due to the excessive use of resources and the irrational use of human beings, especially the problems of drought and water shortage, air pollution and water pollution, which are increasingly prominent. With the growth of population, the expansion of urban area and the increasing demand for urban land, these will exacerbate the deterioration of the ecological environment and destroy the ecological balance.

Finally, because people blindly pursue economic benefits or ignore the awareness of ecological and environmental protection, the afforestation technology is backward, water and soil loss is serious, and vegetation coverage is low, which affects the improvement of local residents' living standards and social stability. This vicious circle not only harms social and economic development, but also hinders the healthy development of ecological construction. To solve this contradiction, we must prevent and control pollution from the source, improve the quality of forest resources, promote the restoration of biodiversity, and make it an important part of the earth's environment.

In short, the forest ecosystem has strong self-regulation ability, can resist the impact of external environmental changes, and can maintain biodiversity and ecological balance to a certain extent. Forestry ecological engineering can effectively maintain various elements in the system, improve its stability and sustainability, and better provide good production and living conditions for human beings. Therefore, it is very necessary to improve and repair the ecological environment in the forest area [14].

2.2. Application of "Internet Plus" in Ecological Environment Protection

With the acceleration of industrialization, the rapid growth of population and the increasing consumption of natural resources, and in order to alleviate the increasingly serious environmental pressure, the government has actively taken various measures to carry out environmental governance, but these can not fundamentally solve the problem of people's growing material needs, resulting in resource waste and serious damage to the natural environment. The emergence and promotion of the Internet plus model provides people with a new way of thinking and new environmental management ideas, and plays an increasingly important role in ecological environment protection. Its specific application is shown in Figure 2.

First, improve the quality of forest resources. This is because the use of Internet technology can effectively promote the transformation of forest management mode to the intensive direction, accelerate the reform of forest planting mode, optimize the structure of forest species, increase the area of forest land to meet the growing material needs of society, reduce the consumption of natural resources, improve the ecological environment, and improve the efficiency of afforestation. Second, promote the virtuous cycle of economic society and ecological environment. In particular, digital design by means of modern information technology can minimize various operating costs, such as human costs, material costs and management costs, so that timber production enterprises can obtain higher economic benefits. At the same time, it can also greatly alleviate the contradiction between supply and demand of forest resources and maintain ecological balance. Third, give play to the network effect to improve people's awareness of environmental protection [15]. Through the establishment of an information sharing platform, it is convenient for the public to obtain resource

dynamics and relevant information, guide the public to actively participate in environmental protection, form a new social culture, stimulate the enthusiasm of the whole nation for environmental protection, and enhance the consciousness and sense of responsibility of the whole people to participate in ecological construction.

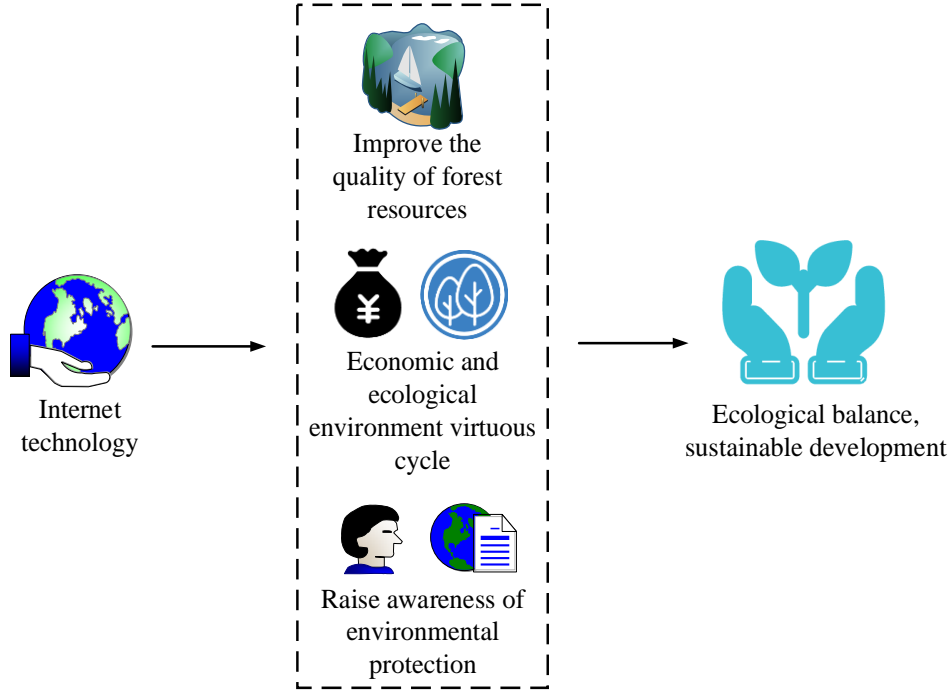


Figure 2. Application of "Internet Plus" in ecological and environmental protection

3. Analysis of Forestry Ecological Environment Impact Based on Fuzzy Evaluation

Fuzzy evaluation is a widely used comprehensive evaluation method at present. It links the uncertainty of the environment with the relative importance of individuals, and can realize the combination of subjective judgment and objective decision-making. The qualitative and quantitative analysis of the influencing factors of forestry ecological environment based on fuzzy evaluation can provide important reference for forestry ecological management.

Assume that there are factor sets A, $A = \{a_1, a_2, \dots, a_i\}$, evaluation set B, $B = \{b_1, b_2, \dots, b_j\}$, and weight set C, which are composed of weights, and the expression is:

$$C = \{c_1, c_2, \dots, c_i\} \tag{1}$$

Then the fuzzy relation matrix can be expressed as:

$$R = \begin{bmatrix} x_{11} & \dots & x_{1j} \\ \dots & \dots & \dots \\ x_{i1} & \dots & x_{ij} \end{bmatrix} \tag{2}$$

In the formula, x_{ij} represents the possibility that the i th evaluation factor is rated as j .

According to the knowledge of mathematical matrix, the comprehensive evaluation result Z is:

$$Z = C \times R = \{c_1, c_2 \dots c_i\} \times \begin{bmatrix} x_{11} & \dots & x_{1j} \\ \dots & \dots & \dots \\ x_{i1} & \dots & x_{ij} \end{bmatrix} \quad (3)$$

4. Protection Strategy of Forestry Ecological Natural Environment Based on "Internet Plus"

As a special artificial vegetation, forest is both a material carrier and a service function. It not only has economic attributes, but also has important cultural connotations, such as enriching human and historical knowledge and conserving water and soil. Its main value is to maintain the harmonious balance of nature and strengthen the natural environment basis on which people live. Therefore, it is particularly important to protect the forestry ecological environment. The protection strategy based on "Internet plus" is shown in Figure 3.

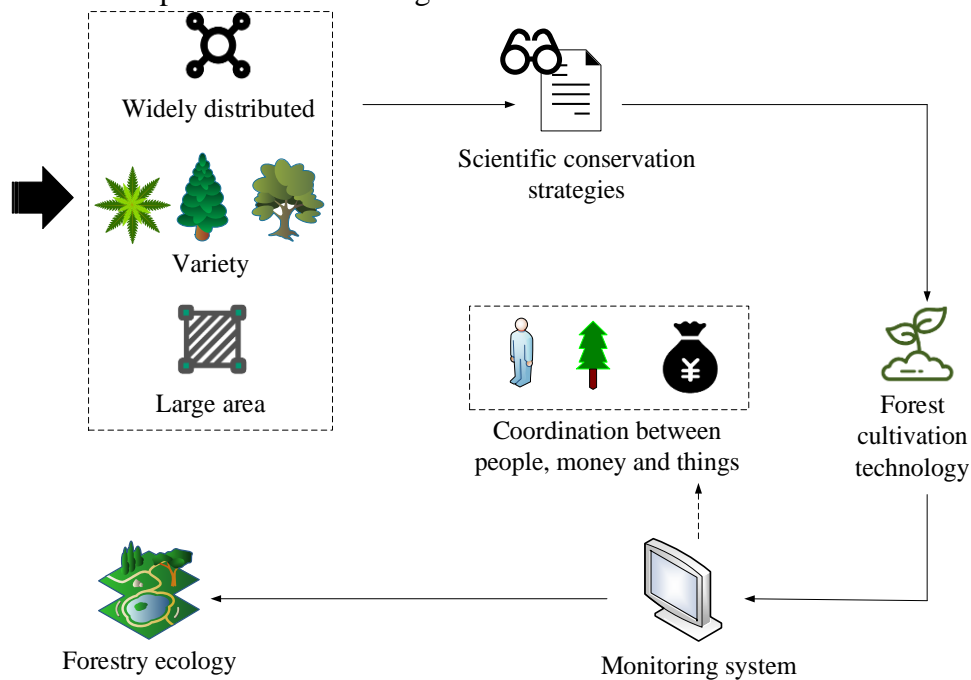


Figure 3. Protection strategy of forestry ecology and natural environment based on "Internet +"

First, adopt scientific protection strategies for forestry ecological resources. At present, there is a serious shortage and uneven distribution of forest resources. There are many problems, such as large area, wide distribution, many species and complex types of forest resources, which have brought great economic pressure and social burden to government governance. If effective measures are not taken, it will face huge losses and even the risk of extinction. Second, adopt diversified forest cultivation technology for protection. The traditional afforestation method is manual digging and planting, which is not only time-consuming and laborious, but also easy to cause a series of environmental damage problems such as soil erosion and soil hardening, which is not conducive to improving the quality and survival rate of trees, and can not meet the growing material and cultural needs of people. Internet technology has changed this situation. It can effectively reduce human factors, reduce wood loss, and achieve the goal of improving the efficiency of forestry management to a certain extent. Third, improve the dynamic monitoring system of forest resources. Through the analysis of the relationship between the forest ecosystem and human activities, take forestry as the main body, coordinate the interests of human, financial

and material parties, comprehensively promote the ecological civilization construction goal of harmonious coexistence between human and nature, and carry out scientific conservation of forests.

5. Analysis of Forestry Ecological Environment Protection Results

Randomly select the forests in five regions for investigation of forest ecological and natural protection environment, analyze the changes of natural protection environment before and after optimization based on "Internet plus" technology from the perspective of forest coverage and tree species richness in the evaluation indicators, and the results are shown in Table 1.

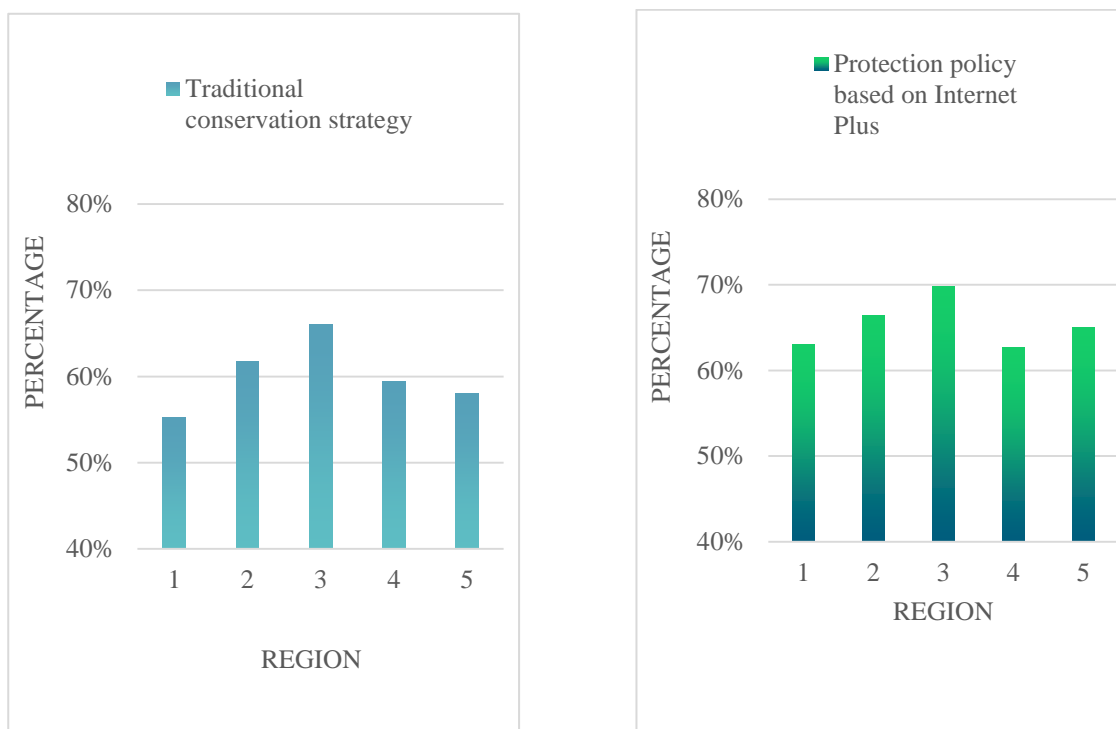
Table 1. Comparison of forest coverage and tree species richness before and after optimization based on "Internet +" technology

	Forest coverage		Species richness	
	Before	After	Before	Afte
Region 1	18.6%	21.8%	44.1%	50.2%
Region 2	22%	25.1%	52%	57.6%
Region 3	17.1%	20.4%	47.2%	51.9%
Region 4	30%	34.3%	58.4%	61%
Region 5	24.6%	27.9%	55.8%	58.5%

As shown in Table 1, before the introduction of the "Internet plus" technology for nature conservation, the forest coverage rate was only about 30% at the highest and less than 20% at the lowest. It can be seen that the forest resources were seriously deficient. However, after the optimization of the protection strategy based on the "Internet plus" theory, the coverage rate of these five regions has exceeded 20%, up to about 34.3%, which can only be achieved when the annual rainfall is sufficient. Therefore, it is necessary and feasible to transform the traditional forestry model into a modern forestry system relying on the Internet. From the perspective of the richness of tree species, the richness before optimization is basically maintained at 40%~60%, belonging to the medium level, and has a certain scale and strength. However, the richness of tree species after optimization has been increased to more than 50%, and has maintained a continuous increasing trend. Therefore, the optimized forest resources are in a better condition, which is convenient for vigorously developing afforestation and greening work, improving the utilization rate of forest resources and the level of forestry ecology.

The impact of the traditional nature conservation strategy and the nature conservation strategy based on "Internet plus" on the forestry ecological environment is measured according to the degree of forest naturalness. The results are shown in Figure 4.

As shown in Figure 4, Figure a is the traditional protection strategy, and Figure b is the protection strategy based on "Internet plus". The data range of Figure a is 55%~70%, and the data stability is poor. The forest naturalness gap between different forest regions is large, which can not be managed uniformly and is easy to cause resource waste. In Figure b, the forest naturalness of the five regions is in the range of 60%~70%, and the plant community in the forest region is natural and the forest ecological level has been improved. Through calculation, the average forest naturalness based on the traditional nature conservation strategy is about 60.1%, while the average forest naturalness based on the Internet plus technology optimization strategy is about 65.38%, which is about 5.28% higher than before. Therefore, the forestry nature protection strategy based on "Internet plus" has certain advantages, which can better promote the sustainable development of forest resources and ecological environment, and maximize the ecological and social benefits of forest resources.



a: Traditional conservation strategy

b: Protection policy based on Internet Plus

Figure 4. Comparison of forest ecological nature protection strategies before and after optimization

6. Conclusion

The protection of natural environment is the premise of forestry ecological construction. In the case of decreasing forest resources, in order to ensure the full utilization of forest resources, it is necessary to strengthen the management of natural resources, so as to achieve the goal of improving economic and ecological benefits. The nature protection strategy based on "Internet plus" can apply modern science and technology to forest management, so that people can better understand the nature and natural environment, help forests to be effectively restored, meet people's growing material and cultural needs, and promote the healthy and orderly development of forestry. Starting from the current situation of forest resources, this paper discusses the current situation of forestry ecological protection, and discusses the existing problems. It focuses on the research of forestry ecological evaluation indicators and protection strategies based on fuzzy evaluation. On this basis, a forestry ecological management plan suitable for the actual situation is constructed to promote the maximization of ecological benefits.

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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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