# OPTIMIZATION OF CHINA'S ECOLOGICAL TAX SYSTEM BASED ON GEP DEVELOPMENT STRATEGY

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**Reception**: 04/03/2023 **Acceptance**: 01/05/2023 **Publication**: 01/07/2023

**Suggested citation**:

Lei, W. (2023). **Optimization of China's ecological tax system based on GEP development strategy**. *3C Empresa. Investigación y pensamiento crítico, 12(2)*, 236-255. https://doi.org/10.17993/3cemp.2023.120252.236-255

# ABSTRACT

*To reduce ecological environmental pollution and economic loss, and improve national environmental awareness, this paper puts forward the optimization of China's ecological tax system based on the GEP development strategy. Firstly, the analysis shows that GDP focuses on economic operation, while GEP focuses on ecosystem operation. Then, GEP is used to calculate the data of water conservation, soil conservation function, flood regulation and storage, air and water purification, carbon fixation and oxygen release, climate regulation, biological community, and other indicators to obtain the corresponding value. We will use fiscal principles to adjust the sensitivity of economic changes, the principle of fairness to narrow income disparities, and the principle of efficiency to adjust market collection and management, simplify the tax system, and improve national treatment. Finally, the maximization of tax benefits is realized with the minimum tax cost under the tax system. Through experiments, it is proved that this method can effectively explore the development of an ecological tax system, to optimize the overall optimization of tax collection and management up to 0.77.*

# KEYWORDS

*GEP development strategy; Ecological taxes; Tax optimization*

# INDEX




https://doi.org/10.17993/3cemp.2023.120252.236-255

# 1. INTRODUCTION

For a long time, China's economic development has excessively relied on the extensive [1] economic growth mode of expanding investment scale and increasing material input, thus making the contradiction between economic development and resources and environment more and more acute [2]. To coordinate the harmonious development of man and nature, higher requirements are put forward for the construction of a sustainable economic system in China [3]. Arable land resources, forest resources, grassland resources, water resources, and some mineral resources, as well as Marine fish resources, have been in a rather tight state of supply and demand [4]. Contrary to the overall situation of resource shortage in China, it is a huge waste in resource exploitation and utilization [5].

According to the Bulletin on China's Environmental Situation, the trend of worsening environmental pollution in China has been basically controlled, but the problem of environmental pollution is still serious, and the scope of ecological damage is still expanding. The air quality of two-thirds of the cities does not meet the second-class national standard for the water environment. Organic pollution of surface water is widespread, oxidation of major lakes is prominent, groundwater is polluted by spots or planes, and the water level is falling. Mild or above environmental pollution is one of the four major factors affecting the health and death of residents in 84.6% of cities. In terms of resource utilization, China is still in a state of high input and low output, and resources have been hollowed out [6], which does not meet the requirements of sustainable development. Therefore, the waste of resources exploitation and utilization, and the problem of environmental pollution have increasingly become the factors that restrict China's social and economic development, as well as the important factors that endanger people's health and affect local social stability.

Taxation is an important means of national macro-control [7], and the taxation system is an important part of the formal system of national economic management. Introduction of ecological tax, setting up ecological tax system is a director of environmental policy innovation, and contemporary issues of sustainable development of ecological tax can be either as an economic tool for manufacturers and consumers of energy waste, environmental pollution behavior constraints [8], but also can increase the corresponding public finance income in our country can not only bring environmental improvement of social and economic benefits, Moreover, under certain conditions, it is beneficial to the improvement of China's overall tax system [9].

Literature [10] emphasizes the cultural basis and life proposed in ecosystem services described in the International Common Classification method of Ecosystem services and proposes a new social landscape order. Taking Hequ County of Shanxi Province as a case study, the gravity method is used to evaluate the ecological level of social capital. Literature [11] on urban agricultural ecological space evaluation is helpful to optimize land space and high-quality social and economic development. Urban development and ecological protection in urban agglomeration are evaluated, and the ecological security model of sustainable land space utilization is described.


https://doi.org/10.17993/3cemp.2023.120252.236-255

Literature [12] studies that China's current tax system structure contradicts the concepts of economic structure optimization and upgrading, coordinated development of regional economy, improvement of ecological environment, improvement of people's well-being, and narrowing of the income gap. To solve these problems, the reform of income tax, turnover tax, resource tax, property tax, and behavior tax must be carried out with the help of modern development concepts. Literature [13] uses urban agricultural ecological space evaluation to help optimize land space and high-quality social and economic development, evaluates the urban development and ecological protection of the Changsha-Zhuzhou-Xiangtan urban agglomeration as the research area, and describes the ecological security model of sustainable utilization of land space. From the above, we know the importance of the ecosystem in economic development, indicating that tax revenue has a great relationship with production and life, and it is very important to optimize the tax system. Therefore, this paper puts forward an analysis of eco-tax system optimization based on the GEP development strategy. Through the analysis of GDP and GEP accounting, the ecological system is used to calculate each indicator to complete the optimization of ecological tax collection and management.

# 2. GDP, GEP ACCOUNTING ANALYSIS

## 2.1. INADEQUATE GDP ACCOUNTING

As a measure of the total value of final products and services produced and provided by a country or region in a certain period, the traditional GROSS Domestic Product (GDP) accounting system reflects the economic strength and social wealth of a country or region [14] and has become the most widely used economic and economic accounting indicator in the world. But the defects of the GDP accounting system are also very obvious, it ignores the natural resources and ecological environment of great value, not the resource consumption, environmental pollution, and ecological damage cost included in the national accounts, even translating the environmental pollution of economic contribution in pairs, this will lead to the one-sided pursuit of economic development and ignore the resources and environment protection, It is an unsustainable view of development and achievements [15]. As the adjustment and correction of traditional GDP, "green GDP" refers to the remaining GDP after deducting the loss costs of resource consumption, environmental pollution, and ecological damage from the current GDP, to get the real total national wealth.

The concept of sustainable development advocated by the United Nations calls for the coordinated development of ecology-economy-society. However, both GDP and adjusted "green GDP" focuses on the operation of the economic system, without paying attention to and accounting for the existing value of the ecosystem and its contribution to human beings, even though "green GDP" focuses on the loss and cost of resources and environment to a certain extent [16].

### 2.2. GEP ACCOUNTING

The ecosystem and the whole biospheres are the life support system of the earth and the material basis for human survival and development. The degradation of ecosystem services makes people re-examine the relationship between themselves and the ecosystem and the conservation and restoration of the ecosystem from a scientific perspective. Gross Ecosystem Product (GEP) accounting refers to the analysis and evaluation of the economic value of the products and services provided by the Ecosystem for human survival and well-being and is the sum of the value of Ecosystem products, Ecosystem regulation services, and ecosystem cultural services [17]. GDP focuses on the health of the economy, while GEP focuses on the health of the ecosystem.

Ecosystem products mainly include productive products and non-productive products provided by an ecosystem that can be directly used by human beings, such as food, medicinal materials, wood, fiber, freshwater resources, gene resources, etc. Ecosystem regulation services mainly include water conservation, climate regulation, carbon fixation, oxygen release, soil conservation, pollutant degradation, pollination, and other regulatory functions, as well as wind prevention and sand fixation, flood storage, pest control, storm prevention, and mitigation and other protective functions. Ecosystem cultural services mainly include landscape values such as tourism value and aesthetic value, as well as cultural values such as cultural identity, knowledge, education, and artistic inspiration, which are spiritual, entertainment, and cultural benefits. The value of ecosystem products is usually called direct use-value, and the value of ecosystem regulation service and ecosystem culture service is called indirect use-value. Some scholars call all Ecosystem products and Services that contribute to human survival and quality of life Ecosystem Services.

## 3. ECOSYSTEM (GEP) DATA ACCOUNTING

The water conservation function is that the ecosystem passes through the forest canopy and litter layer. Roots and soil layers intercept stagnant precipitation [18] and increase soil infiltration and storage, thus effectively conserving soil water, mitigating surface runoff, supplementing groundwater, and regulating river flow. Using water conservation as an evaluation index, water conservation is calculated by the water balance equation. Using the shadow engineering method, the value of water conservation is calculated according to the construction cost of the reservoir.

$$Q_{\mathrm{w}} = \sum_{\mathrm{i}=1}^{j} \left(P_i - R_i - ET_i\right) \cdot A_i \tag{1}$$

$$V_w = Q_w \cdot P_w \tag{2}$$

Where, $Q_{\mathrm{w}}$ describes water conservation; $P_i$ describes the rainfall; $R_i$ is rainstorm runoff; $ET_i$ represents evapotranspiration; $A_i$ describes the area of type $i$ ecosystem;


https://doi.org/10.17993/3cemp.2023.120252.236-255

$i$ describes the category $i$ ecosystem type in the study area; $j$ describes the number of ecosystem types in the study area; $V_w$ describes the value of water conservation services; $P_w$ describes the engineering cost of the reservoir per unit capacity [19].

Soil conservation function ecosystems (such as forests and grasslands, etc.) reduce the erosion energy of rainwater at various levels, such as forest canopy, litter, and root system, and increase soil erosion resistance to reduce soil erosion, reduce soil loss, and maintain soil function. Soil conservation, i.e., the amount of soil loss reduced by the ecosystem (the difference between potential soil loss and actual soil loss), was selected as the evaluation index of the soil conservation function of the ecosystem. Soil conservation was calculated by the general soil erosion equation. Using the substitution cost method, the value of the soil conservation function is calculated by the sum of sediment reduction and non-point source pollution reduction. Among them, the value of sediment reduction is:

$$V_{s1} = \lambda \cdot \frac{A_s}{\rho} \cdot P_s \tag{3}$$

Where, $V_{s1}$ describes reduced sedimentation value; $\lambda$ describes the sedimentation coefficient; $A_s$ describes the amount of soil conservation; $\rho$ describes the bulk density of soil; $P_s$ describes the cost of dredging the reservoir.

The value of reducing non-point source pollution is:

$$V_b = \sum_{i=1}^{2} A_e \times c_i \times p_i \tag{4}$$

Where $V_b$ describes the reduction of non-point source pollution; $A_e$ describes the amount of soil conservation; $c_i$ describes the pure content of $N$ and $P$ in soil; $p_i$ describes the cost of environmental engineering degradation.

Flood regulation and storage function refer to the wetland ecosystem (lake, marsh, river) having special hydrophysical properties, has a strong storage function. The reservoir plays the flood regulation and storage service function mainly, so the adjustable flood storage volume of the reservoir is selected as the flood regulation and storage service function quantity of the wetland ecosystem. The value of flood regulation and storage is calculated by the cost of reservoir construction using the shadow engineering method.

$$V_t = C_r \cdot P_{\mathrm{w}}$$

Where $V_t$ describes the flood regulation and storage value; $C_r$ describes the flood storage capacity of the reservoir; $P_{\mathrm{w}}$ describes the engineering cost per unit capacity of the reservoir.

The air purification function is that green plants absorb harmful substances in the air through the stomata on the leaves and the lenticels on the branches within the


https://doi.org/10.17993/3cemp.2023.120252.236-255

range of its resistance, and transform them into non-toxic substances through the REDOX process in the body. At the same time, it can rely on the special physiological structure of its surface (such as villi, grease, and other viscous substances) to block, filter, and adsorb the air dust, to effectively purify the air and improve the atmospheric environment. The air purification capacity of the ecosystem was calculated by using the indexes of sulfur dioxide absorption, carbon oxide absorption, and dust absorption. The value of air purification is evaluated by the control cost of sulfur dioxide, carbon oxide and industrial dust.

$$Q_{ap} = \sum_{i=1}^{m} \sum_{j=1}^{n} Q_{ij} \times A_i \tag{6}$$

$$A_{ap} = \sum_{i=1}^{3} Q_{ap} \times c_i \tag{7}$$

Where $Q_{ap}$ describes the atmospheric purification amount of the ecosystem; $Q_{ij}$ describes the purification amount of type $j$ air pollutants per unit area in type $i$ ecosystem; $i$ describes the type of ecosystem, dimensionless; $j$ describes categories of air pollutants, dimensionless; $A_i$ describes the area of category $i$ ecosystem type; $A_{ap}$ is the value of air purification; $c_i$ describes the cost of treating different types of air pollutants.

Water purification function refers to the ability of the water environment to partially or completely restore the ecological function of the water body to its original state through a series of physical and biochemical processes such as adsorption, transformation, and biological absorption of pollutants entering the water environment [20]. The absorption of COD, ammonia nitrogen, total phosphorus and other indicators of wetland ecosystem are used to calculate the capacity of ecosystem water purification. Using the control cost method, the value of water purification of the ecosystem was calculated by the treatment cost of COD, ammonia nitrogen and total phosphorus discharge.

$$Q_{wp} = \sum_{i=1}^{n} Q_i \times A \tag{8}$$

$$V_{pw} = \sum_{i=1}^{3} Q_i \times c_i \tag{9}$$

Where $Q_{wp}$ describes the amount of ecosystem water quality; $Q_i$ describes the purification amount per unit area of class $i$ water pollutants; $A$ describes the wetland area; $i$ describes the pollutant category, dimensionless; $V_{pw}$ is the value of water purification; $c_i$ describes the treatment costs of different types of water pollutants.

Carbon fixation and oxygen release function refer to the function of green plants to absorb carbon dioxide from the atmosphere through photosynthesis and convert it into

 https://doi.org/10.17993/3cemp.2023.120252.236-255

carbohydrates such as glucose, which are fixed in the plant body or soil in the form of organic carbon and release oxygen. The carbon sequestration and oxygen release were used as the evaluation indexes of ecosystem carbon sequestration and oxygen release. The afforestation cost method and industrial oxygen production cost method were used to calculate the value of ecosystem carbon sequestration and oxygen release, and finally, the value of ecosystem carbon sequestration and oxygen release was obtained.

$$V_g = Q_e \cdot P_e + Q_o \cdot P_o \quad (10)$$

Where $V_g$ describes the value of carbon fixation and oxygen release; $Q_e$ represents the amount of carbon sequestration; $P_e$ represents the cost of carbon sequestration; $Q_o$ is oxygen release; $P_o$ is the cost of oxygen production.

Climate regulation function refers to the ecological effect that the ecosystem reduces the temperature, reduces the temperature variation area and increases the air humidity through transpiration, photosynthesis [21] and water surface evaporation, to improve the comfort level of the human living environment. The energy consumed by ecosystem cooling and humidification was used as the evaluation index of ecosystem climate regulation function. Through the substitution cost method, the value of electricity consumption and electricity price to climate regulation is calculated.

$$Q = \frac{\sum_i^3 GPP \times Si \times d}{3600 \cdot R \cdot 2} + \left(EQ \times q \times 10^3/3600 + EQ \times \gamma\right) \quad (11)$$

$$V = Q \times P \quad (12)$$

Where $Q$ describes the energy consumed by the transpiration and evaporation of the ecosystem; $GPP$ describes the amount of heat consumed per unit area by transpiration in different ecosystem types; $S$ describes the area of ecosystem type $i$; $R$ describes the energy efficiency ratio of air conditioning; $d^d$ describes the number of days with air conditioning; $i$ describes different ecosystem types in the study area; $EQ$ is water surface evaporation; $q$ describes volatile latent heat; $\gamma$ describes the power consumption of the humidifier to convert 1m3 water into steam; $V$ describes the value of climate regulation; $P$ is the price of electricity.

By increasing the level of species diversity, the community can increase natural enemies and reduce the population number of herbivorous insects [22], to achieve the purpose of disease and insect pest control. The area of forest pest control was used as the evaluation index of the pest control function, and the cost method was used to calculate the value of ecosystem pest control by the area of self-healing and the cost of artificial pest control.

$$V_f = FS \times \left(\gamma_1 - \gamma_2\right) \times FP \quad (13)$$

Where $V_f$ describes the value of forest pest control; $FS$ is natural forest area; $\gamma_1$ describes the incidence of pests and diseases in plantation forests; $\gamma_2$ is the incidence


https://doi.org/10.17993/3cemp.2023.120252.236-255

of pests and diseases in natural forests; $FP$ describes the cost per unit area of forest pest control.

The ecological gross product accounting method is the premise of specific accounting [23]. On the whole, GEP is the accumulation of ecosystem products, ecological regulation services and ecological culture services. The specific accounting method of the three factors in Ecological Gross Product Accounting is mainly the product of product output and price.

$$GEP = \sum_{i=1}^{n} EP_i P_i + \sum_{j=i}^{m} ER_j P_j + EC_t P_t \tag{14}$$

Where $EP_i P_i$ describes the total value of ecosystem products; $R_j P_j$ is ecological regulation services; $EC_t P_T$ describes the total value of ecological and cultural services; $i$, $j$ and $t$ corresponds to ecosystem products, ecological regulation services and ecological culture services respectively; $P_i$, $P_j$ and $P_t$ correspond to the prices of different ecological value measurement factors.

In the accounting method, the ecological value accounting system of the forest region constructed according to GEP is further interpreted. On the one hand, it is helpful to understand the algorithm of different factors [24] in total ecological production. On the other hand, it helps to construct the relationship between the existing economic and social statistical dimensions and these factors. Through the calculation of the above dimensions and indicators, the optimization method of the ecological tax system is analyzed.

# 4. OPTIMIZATION OF THE ECOLOGICAL TAX SYSTEM

## 4.1. OPTIMIZATION PRINCIPLE OF THE ECOLOGICAL TAX SYSTEM IN CHINA

1. Fiscal principles

The basic meaning of the tax fiscal principle is as follows: the establishment and reform of a national tax system [25] must be conducive to ensuring national fiscal revenue and realizing national intelligence.

The fiscal principle requires that the revenue obtained through taxation can fully meet the needs of fiscal expenditure in a certain period. Therefore, the design adjustment of ecological tax should choose abundant and reliable tax sources. Another requirement of fiscal principle is that tax revenues be flexible. In case of a fiscal increase, tax revenue should be able to increase tax revenue by law or automatic revenue increase [26].

Tax elasticity refers to the ratio between the tax revenue growth rate and the economic growth rate. The expression is:

$$E_{\mathrm{T}} = \frac{\Delta T / T}{\Delta Y / Y} \tag{15}$$

Where $E_T$ describes the tax elasticity; $T$ describes the tax revenue; $\Delta T$ describes the increment of tax revenue; $Y$ describes the national income; $\Delta Y$ describes the increment of national income; Tax elasticity reflects the sensitivity of tax revenue to economic changes. The tax system should be designed and adjusted to make the tax more flexible. Generally speaking, $E_T > 1$ to ensure that fiscal revenue grows in step with national income.

2. The principle of equity and efficiency

First, is the principle of equity.

The basic principle of the market economy is fair competition, and one of the elements of fair competition is fair to tax burden [27]. Most countries in the world regard the principle of fairness as the universal principle followed in the design and application of the tax system.

The principle of equity contains two interrelated aspects: one is horizontal equity, that is, people with the same ability to pay taxes bear the same tax. The other is vertical fairness, which means that people with different tax capabilities pay different taxes. That is, the excessively high income is adjusted to narrow the income difference and achieve fair distribution. This is conducive to maintaining social stability. Horizontal unfairness will directly lead to the loss of economic efficiency. Therefore, given the current economic situation, the optimization of the tax system should be strengthened in the realization of horizontal fairness.

Second, is the principle of efficiency.

Efficiency is divided into administrative efficiency and economic efficiency.

The administrative efficiency of taxation can be considered from two perspectives: tax collection cost and tax payment cost. The levy tax charge is to point to all sorts of charges that the duty department produces in the levy tax process. To improve the administrative efficiency of tax collection, on the one hand, advanced means of collection and administration should be adopted to save manpower and material resources. On the other hand, the tax system should be simplified to make it easy for taxpayers to understand and grasp [28] and reduce tax payment costs.

Economic efficiency refers to the efficient use of resources. In a completely free competitive market, producers adjust their output according to the market price until the marginal cost is equal to the price and the producer can get the maximum profit, while consumers adjust their purchase quantity according to the market price until the


https://doi.org/10.17993/3cemp.2023.120252.236-255

marginal effect is equal to the price and the consumer can get the maximum effect. Tax distorts the price, making the price obtained by producers lower than that paid by consumers. In this way, the price cannot truly reflect the marginal cost and marginal effect, resulting in an additional loss of economic efficiency, also known as the additional burden of the tax.

3. National treatment

National treatment means that the government of a country applies uniform standards to foreigners or foreign enterprises in its territory in terms of economic and trade policies with its nationals or enterprises. Now widely introduced in the field of taxation, mainly refers to the territory of foreign taxpayers and shall not be discriminatory tax policies. National treatment is not an independent tax principle, but the embodiment of the efficiency principle and fairness principle of a country's tax under certain conditions, which belongs to the scope of national sovereignty. Emphasizing the principle of national treatment mainly points out how to treat and grasp the preferential policies for foreign businessmen.

4. The principle of gradual progress

Taxation, as a kind of distribution and superstructure, cannot exist independently from the economic foundation. According to the theory of building socialism with Chinese characteristics, economic, political and social choices must be based on China's actual national conditions. It is impossible to set up a complete tax system quickly. China's current ecological tax situation is not perfect, there are many problems, in the design and adjustment of forest ecological tax, according to the actual situation, step by step.

## 4.2. ECOLOGICAL TAX COLLECTION AND MANAGEMENT OPTIMIZATION MODEL

The mode of tax collection and administration is the confirmation of the rights and obligations of the taxpayer in the process of tax collection and payment under a certain tax system. The collection and management mode is the overall grasp and target positioning of collection and management work under a tax system. The current collection and management mode in China is based on tax affection and optimized service, relying on a computer network, centralized collection and key inspection [29].

The collection and management of ecological tax are carried out with the cooperation of the tax department and related ecological departments, which requires regular monitoring of the ecological environment. The tax department provides various tax data, and the tax department calculates and collects taxes, and supervises and manages taxpayers. This mode of collection and management gives full play to the expertise of ecological departments and tax departments and improves the efficiency of taxation. The goal of tax collection and management mode should be to maximize tax benefits with a minimum tax cost. To provide taxpayers with services in the best,


https://doi.org/10.17993/3cemp.2023.120252.236-255

fastest and most convenient way of handling tax; To provide the most level playing field for taxpayers with the best level of enforcement; The most appropriate economic regulation activities to provide financial resources for the state to meet the needs of social public goods. The Forest area ecological tax collection management model can be optimized from the following aspects.

First of all, the forest ecological tax collection mode should echo the current economic system and tax system as well as social and cultural Beijing. We should not blindly adopt other tax collection and management modes but should combine them with the actual situation. Secondly, the management of tax sources should be strengthened in the management of the forest ecological tax system. Thirdly, the collection and management of the forest ecological tax system should permeate legal principles. The legal principles of taxation are mainly reflected in tax enforcement. The first is the legal constraints on taxpayers, the second is the legal norms of tax collectors, tax collectors must be by the provisions of tax substantive law and procedural law, should be collected, should not be collected resolutely cannot be collected, all advance collection, tax, tax return, idle are illegal. Finally, the collection of forest ecological tax should pay attention to collection efficiency and cost-saving. The level of tax cost and tax efficiency is an important symbol of the legalization, institutionalization, and conscientization of tax collection and administration. With scientific management and reasonable allocation of personnel and property [30-34], the maximum expected tax benefits can be obtained with the minimum labor cost and cost of tax collection and administration.

The forest ecological tax system should be based on the current tax collection and administration mode of the citizen's tax awareness as the prerequisite, based on the tax sources management, to improve the collection efficiency and the quality of collection and management as the goal, to speed up the development and application of electronic computer in tax work, strengthen the tax inspection, strictly by the law ZhiShui, adjust measures to local conditions, scientific and accurate block tax revenues. In specific practice, also want flexible use, and adjust measures to local conditions.

In addition, the optimization and adjustment of forest ecological tax in China need to take into account the characteristics of unbalanced economic development between urban and rural areas and between regions and adopt a collection and management mode suitable for China's national conditions.

# 5. RESULTS AND ANALYSIS

## 5.1. ANALYSIS OF ECOSYSTEM CONTRIBUTION

To calculate the total ecological production of the forest region in GEP, a city was selected as the research object. It was found that the ecosystem products, ecological regulation function, and ecological cultural services of the city all had a certain importance in the GEP accounting results, among which the ecosystem products contributed 21.02 billion yuan, and GEP contributed 56%. Ecological regulation services amounted to 12.58 billion yuan, accounting for 33%; Ecological and cultural services amounted to 4.25 billion yuan, accounting for 11% of the total. Among the contributions, ecocultural services are the lowest, and GEP's contribution cannot be ignored. In terms of ecosystem products, the forest area of the city has more than 2 million hm2, covering 66.3% of the total area. Meanwhile, the city is rich in water resources, which makes a high contribution to ecosystem products. There are many wetlands, swamps, and lakes in this area, which have obvious advantages in ecological regulation. In terms of ecological cultural services, the number of tourists is small, the service awareness is poor, and the development of ecological products is not enough, so the contribution of ecological cultural services is the lowest. The possible impact of this aspect is to restrict the development of the city's ecotourism industry, and improve the development level of the city's ecotourism industry is an important attempt to comprehensively improve the GEP accounting value and promote the high development of the city's forest region by carrying out regional ecotourism.

**Table 1.** GEP forest area ecological gross production calculation

| Production system product and service summary | Total value/100 million yuan |
|---|---|
| Crop | 265.13 |
| Tree breeding | 212 |
| Afforestation | 12.151 |
| Timber mining and transportation | 171.26 |
| Fruit growing | 3.214 |
| All kinds of planting | 8.159 |
| Irrigation water | 187.54 |
| Industrial water | 399.75 |
| Urban public water | 87.545 |
| Energy usage | 9.178 |
| Water conservation | 111.246 |
| Soil fertility | 187.48 |
| Sedimentation | 145.97 |
| Vegetation carbon sequestration | 180.55 |
| Oxygen released by vegetation | 40.258 |
| Water accumulation | 210.54 |
| Wetland storage | 19.49 |
| Lake storage | 98.48 |
| Swamp storage | 25.487 |
| Amount of pollutants absorbed | 158.45 |
| Ammonia nitrogen purification effect | 17.52 |
| Temperature regulation | 45.25 |
| Eco-tourism | 415.25 |


https://doi.org/10.17993/3cemp.2023.120252.236-255

According to the statistics of CITY's GDP, its annual GDP was 27.27 billion yuan, and the comparison between the GEP accounting results and GDP accounting results in the forest region was as high as 10.58 billion yuan. Based on the accounting results in Table 1, the differences are mainly from the above three aspects:

First, the ecological value of forestry products is difficult to be transformed into commercial value because of the country's restricted logging mechanism. In an analysis of the city's GEP, it was found that the total amount of agricultural products accounted for only 7.11%, while forest resources accounted for 21.48%. In GDP accounting, the output value of agricultural products is the main accounting object of GDP, and the accounting of forest resources is limited to economic forest harvesting, but the potential value of forest resources is not calculated. It is difficult to measure the input-output value of forest resources, which is caused by the absence of forest resources in the total value of the existing ecosystem, and also by the low input-output efficiency of forest resources, which makes it difficult to transform the ecological value of forest products into commercial value. Relevant departments should pay close attention to promoting the upgrading of the forestry industry, promoting the value of forestry products with the upgrading of the forestry industry, ensuring the protection and restoration of forest grass paper cups, increasing the area of forest land and the stock of standing trees, thus enhancing the value of forest resources and realizing the transformation from the ecological value of forestry products to commercial value.

Second, in terms of ecological services, the GDP contribution of water resources comes from industrial water use, farm irrigation, and household water use. GEP accounts for carbon sequestration, oxygen release and water conservation. So, the GEP calculation result is helpful to accurately measure the amount of forest ecosystem services, and explain its ecological value not only in terms of water, but also in all aspects, such as carbon, and oxygen release to measure the value of forest ecosystem services, avoiding the single measure for water-resources based on the measuring deviation, and comprehensive measurement of forest ecosystem services value contribution. Given the ecological service the lack of docking with the international accounting system of the accounts, the ecological service value of the new size may be used for carbon and releasing oxygen and water conservation value of various factors, to establish a new measuring diameter and measurement standard also can try to translate the ecological service quantitative measurement factors.

Thirdly, in terms of ecological and cultural services, the tourism economy in the forest region of the city has not been effectively developed. As the primeval forest with a fragile ecological environment, only combining development and protection can release the maximum value. At present, the absolute value and relative value of the ecological cultural service are low, which indicates that it has great potential for development. The development of ecological tourism and other industries will activate the tourism development pattern in the forest region of the city, and form the industrial linkage mechanism of "ecological agriculture + tourism", that is, relying on ecological agriculture and under forest economy to achieve a substantial increase in the output value of tourism. This is the way to realize the integration of industry in the forest


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region, and also the strategy to maximize the value of its ecological cultural services and improve the gross value of ecosystem production.

To sum up, under the background of ecological civilization construction, there are significant regional differences in forestry production efficiency. The ecological contribution of the forestry resource-based city represented by this city is very obvious. Its contribution is not only reflected in its contribution to the overall social benefits of the city but also in the achievements that can be transformed into economic value. Combing the contribution of forest areas such as this city to the regional economy and society further improves the calculation accuracy of the forest ecological total value accounting system. Improving the understanding of the importance and necessity of GEP accounting in forest areas is of great significance to protecting forest ecology. It is because of the huge ecological contribution value of the forest region in the city, ignoring its multiple ecological values will affect the actual value of the forest region represented by the forest region in the city from a comprehensive perspective, and lead to one-sided development. The ecological service value of the forest region is huge, and it is of great significance to the sustainable development of ecology, economy and society.

## 5.2. ECOLOGICAL COST EXPENDITURE AND OPTIMIZATION

To better verify the feasibility of this method, experiments were carried out. According to ecosystem data and parameter assignment under current conditions, Vemsim software was used to calculate the simulation results of national forest ecological costs from 2009 to 2018, to conduct research. By analyzing the consistency between the simulation results and the actual data, the simulation trend of some data running results is compared with the historical data, and the relative error between them is calculated.

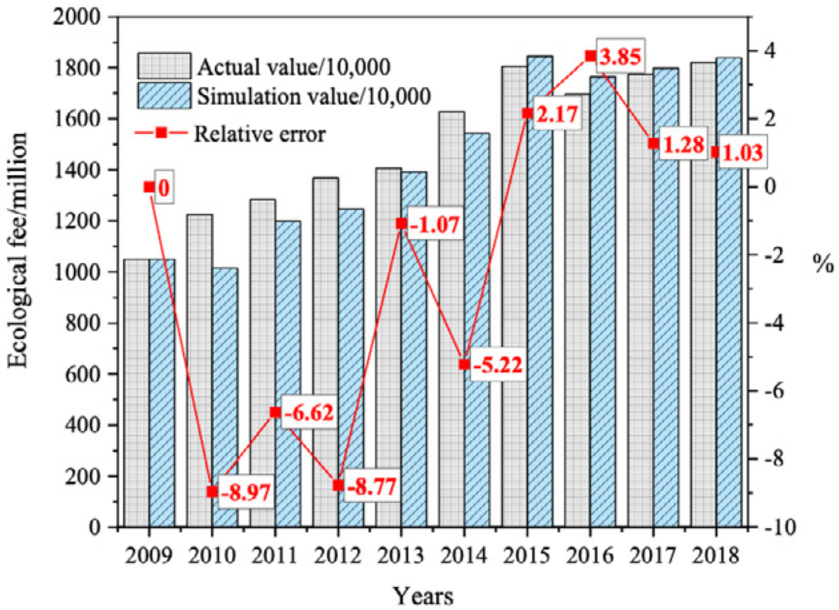


**Figure 1.** Comparison diagram of simulation value and the actual cost of ecological cost in the forest region


https://doi.org/10.17993/3cemp.2023.120252.236-255

Through comparison, it can be found that the absolute relative error of ecological cost in more than 70% of years is within 6%, and only the absolute relative error of some years is beyond 6%, but it can be controlled within 9%. In 2016, the actual cost decreased because people began to pay attention to ecological aspects, reduce damage, and pay attention to protection in daily production and life. However, the simulation value is still calculated based on historical data, but the relative error is 1.05%. In 2010, there was a large difference of 8.97% in the data. The analysis indicated that a certain area suffered large-scale unnatural damage and needed large-scale repair. For the comparison of the two kinds of data, it can be intuitively observed from Figure 1 that the ecological cost budget result is consistent with the actual cost trend. Therefore, it can be believed that the ecological system accounting used in this paper has certain authenticity and accuracy. Before 2014, the predicted value is lower than the actual cost. Consumers do not care about whether the ecology is damaged, but only care about their interests, and spend a large amount. Therefore, consumers pay more ecological taxes, and tax authorities collect more. Since 2015, the actual cost has decreased, indicating that people begin to pay attention to the ecological environment and reduce the destruction of resources, which is conducive to the ecological and economic balance.

The ecological tax optimization proposed in this paper is based on ecosystem accounting. According to the optimization measures, the important tax factors are changed, and the operation results are tested to whether they can achieve the desired optimization goals, to realize the research value of this paper.

After-tax system optimization. The changes of key variables are mainly reflected in the following three aspects: 1) the reduction of payment fees in the stage of ecological development; 2) The cancellation of land farming fees, reduced taxes and fees in the stage of land development and transfer, and reduced development tax rates; 3) Increase the tax intensity of consumption of ecological resources to prevent damage to the ecological environment, so the optimized ecological cost is shown in Table 2.

**Table 2.** Simulation results of ecological costs from 2009 to 2018

| year | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|---|---|---|
| Actual value/Ten thousand yuan | 1050 | 1225 | 1284 | 1368 | 1406 | 1628 | 1805 | 1696 | 1775 | 1820 |
| Simulation value/Ten thousand yuan | 745 | 789 | 845 | 1051 | 1124 | 1284 | 1358 | 1420 | 1468 | 1504 |

The simulated ecological cost data from 2009 to 2018 in Table 2 shows a decrease compared with the actual data. As shown in Figure 2, the trend of the impact of tax system optimization on ecological costs can be intuitively shown, which increases at a slow rate and is lower than the actual data. It can be seen that the optimization and integration of the ecological tax system can play a certain control role in ecological tax and prevent excessive waste.


https://doi.org/10.17993/3cemp.2023.120252.236-255

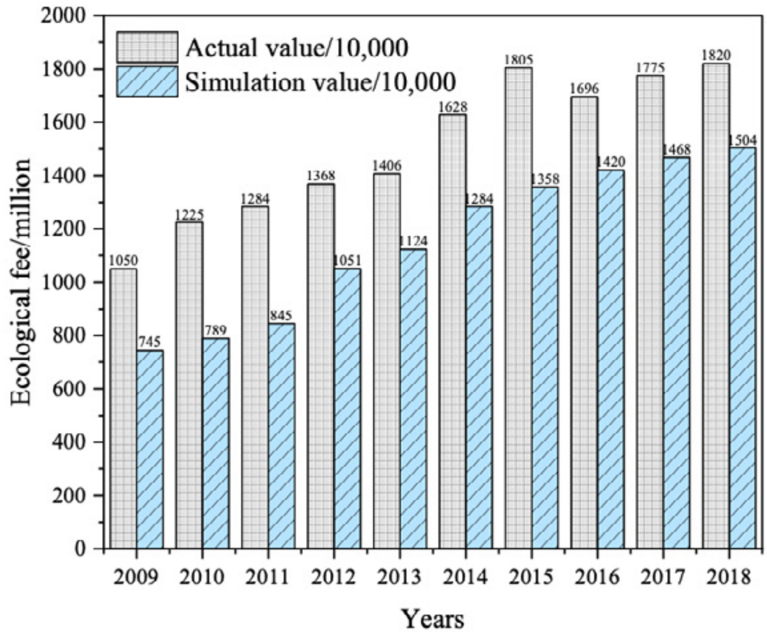


**Figure 2.** Comparison between simulation value and the actual cost of ecological cost in the forest region

It can be seen from Figure 2 that the ecological cost after optimization is less than the actual cost, especially in 2015, the difference is 4.47 million, and in 2013, the difference is at least 2.82 million. Be able to know the cost reduction after optimization, thus reducing tax collection. Through calculation, the overall optimization rate is 0.77, which proves that the optimization effect is good and can well reduce unnecessary costs and resource waste.

## 6. CONCLUSION

In recent years, with the rapid development of the economy, many global ecosystem problems have become increasingly prominent, seriously threatening human existence, such as water depletion, desertification, the greenhouse effect and so on. Based on this, he has a profound understanding and transformation of the ecological system and gradually pays more attention to ecological problems. Therefore, the proposal of ecological civilization construction in China requires the transformation of China's economic construction. The GDP has changed from GDP-only economic growth to the proposal of green GDP, and then to the study of the GEP project. China is practicing ecological civilization construction step by step, using GEP to quantify the value of the ecosystem and green development. It is an urgent way to improve the current ecological environment and boost ecological civilization. The research on GEP accounting will fill in the gap in ecological asset accounting and evaluation in China, and make preparations for integrating with national economic statistics and accounting system and gaining acceptance in the international community. This paper analyzes the advantages of GEP, calculates the data accounting of all aspects of ecology, finds suitable optimization principles, and makes


https://doi.org/10.17993/3cemp.2023.120252.236-255

a balanced and stable collection and management way to maintain the sustainable development of the ecological environment. Through experiments, it is concluded that:

1. through the ecological cost of the actual value compared with the simulation values, to learn that the error is small, the maximum of 8.97%, the minimum value is 1.05, that the budget results are more accurate, can be calculated in advance can reduce the ecological damage, not only reduce tax cost, also can protect the ecological environment, add a beautiful scenery, a balance of energy and economic benefits.

2. After optimization, the ecological cost of the forest region is less than the actual ecological cost, and the tax payment is also reduced, with the overall optimization rate reaching 0.77. It shows that the ecological environment after optimization can be protected, the damage degree is significantly reduced, the awareness of environmental protection is increasing, and the tax collection and management effect is obvious.

The method in this paper can better calculate the cost of the ecosystem, optimize the strategy to reduce the cost, save resources as much as possible, ensure ecological stability, promote economic development, and ensure that national economic interests are not affected, and achieve a good global environment.

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