



Research on the Development Level of Green GDP

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Abstract. Green GDP is the core index of the comprehensive environmental and economic accounting system, which integrates resources and environmental factors on the basis of the current GDP. With the rapid development of the world economy, people pay more and more attention to high quality GDP. In this context, this paper studies the development of green GDP and puts forward conclusions and suggestions based on economics, statistics and other aspects.

Keywords: Green GDP · Developmental Level · Economic Statistics

1 Introduction

The basic idea of green GDP (sustainable income) was proposed by Hicks in his 1946 book. The concept is based on the idea that this path of development is sustainable only if the total capital stock remains constant or increases over time [1]. Sustainable income is defined as the level of income that must be guaranteed without reducing total capital levels. The measurement of sustainable income requires a valuation of the flow of services provided by environmental capital. The amount of sustainable income is equal to the traditional GNP minus the depreciation of man-made, natural, human and social capital. Measuring sustainable income means adjusting the system of national accounts.

In terms of statistical concept, green GDP is the final result of economic activities of a country or region after considering natural resources and environmental factors. It is the total, speed and composition of GDP after deducting environmental costs and resource costs under the current productivity and social development level in accordance with the requirements of sustainable development. Generally speaking, it is the balance after deducting the destructive impact on resources (mainly including land, forests, minerals, water) and environment (including ecological environment, natural environment, human environment, etc.) on the basis of GDP. It is the concept of “net” growth, which can better reflect the sustainable development of national economy. The higher the proportion of green GDP in GDP is, the higher the positive effect of national economic growth is, and the lower the negative effect is, and vice versa. It should be said that green GDP is the complement and improvement of GDP, reflecting the degree of sustainable development of economy and nature.

In the current research and practice of green GDP, there are differences in the expression of green GDP, lacking a unified and standardized definition. In 1993, seea1993

formally proposed the concept of green GDP [2], and sea2003 called the resource consumption reduction of economic aggregate, environmental degradation and adjustment of environmental protection expenditure as green GDP accounting [3]. Ma Le [4] pointed out that green GDP is an accounting method aimed at measuring welfare. The sustainable development research group of the Chinese Academy of Sciences [5] proposed that $\text{green GDP} = \text{traditional GDP} - \text{imaginary number of the natural part} - \text{imaginary number of the cultural part}$. Boyd [6] defined green GDP as accounting for the natural value not included in GDP. Yang miankun [7] pointed out that GDP accounting only reflects positive utility and ignores negative utility, and cannot reflect the national welfare that the whole society really enjoys. He proposed that gross national welfare, that is, the net impact of positive utility and negative utility of economic activities on human material life and spiritual life, and regarded gnw as green GDP in a broad sense. Wang Jinnan [8] believes that green GDP is based on GDP, deducting the loss cost of environmental pollution and ecological damage caused by unreasonable human use. China's Environmental Economic Accounting Research Report 2005–2006 proposes that green GDP is GDP deducting resource consumption and environmental pollution costs. In 2004, the National Bureau of statistics and the State Environmental Protection Administration demonstrated and approved the framework of green national economic accounting system based on the environment and the framework of China's environmental economic accounting system [9], which laid a theoretical foundation for China to implement the green GDP accounting system.

In the context of increasingly severe resource and environmental problems, the inadequacy of GDP as a core economic indicator that does not reflect resource and environmental factors is increasingly prominent. Some international organizations and countries have started the research and practice of green GDP. In recent years, China's ecological and environmental policies have become increasingly strict, and the construction of ecological civilization has achieved remarkable results. The demand for green GDP data from all walks of life is becoming more and more urgent. In 2015, the Ministry of Environmental Protection announced the restart of green GDP research, called green GDP 2.0. Green GDP2.0 requires simultaneous accounting of resource consumption cost, environmental degradation cost and environmental improvement benefit to comprehensively and objectively reflect the environmental cost of economic activities.

With the transformation of economy from high-speed development to high-quality development, green GDP has attracted more and more attention. Based on the current development status of green GDP, this paper comprehensively analyzes its achievements and shortcomings, and puts forward suggestions for future development.

2 Current Situation

As a core indicator to measure the degree of economic development, GDP has been used for many years. However, GDP is also an indicator with great limitations. As resource and environmental problems become more and more serious, GDP is more and more exposed to its shortcomings: GDP accounting only reflects the process and result of economic operation, but does not reflect the cost of consumption of natural resources and environmental pollution caused by economic activities [10]. It can only

reflect the “monetized” part of economic activities, reflecting economic development and prosperity, but does not reflect the negative impact on resources and environment. It includes the wealth generated by various social behaviors in GDP growth, regardless of the negative impact of bad social behaviors on social development. Therefore, in terms of GDP alone, it tends to overestimate the size and growth of the economy, giving an incomplete picture of the social economy [11]. These deficiencies are particularly acute for developing countries and regions that depend on the exploitation of mineral, land, aquatic and forest resources for significant income.

Based on the above background, as a tool to measure sustainable development, green accounting has incomparable advantages in measuring resource consumption and environmental pollution. Despite the controversy, green GDP accounting can be continuously improved in the controversy. At present, the marketization of resources and environmental services is still very limited. Even if there is market transaction, its transaction value is difficult to reflect the actual value of resources and environmental functions. While it brings difficulties to the resource environment accounting, it also provides space for the exploration of accounting from different backgrounds, different angles and different assumptions.

Globally, the development of green GDP varies greatly among countries. Although developed countries have achieved a high level of development, it is often at the cost of large consumption of natural resources and high greenhouse gas emissions. The challenge for these countries is to reduce their ecological footprint per capita without compromising the quality of life. Although developing countries have a smaller ecological footprint per capita, they urgently need to provide higher levels of products and services to their citizens. The challenge for these countries is to achieve these goals without significantly increasing their ecological footprint. In recent years, countries around the world regard green GDP development as an important strategy of economic recovery and transformation, and have introduced measures to help its growth.

First, countries are trying to innovate their governance concepts and use green strategies to guide the development of green GDP. Developed countries are actively exploring well-designed policy frameworks to guide the development of green GDP. Germany, for example, published a strategy paper aimed at modernizing the German economy, emphasizing that eco-industrial policy should be the guiding principle of the German economy. In the strategic report issued by the European Commission, low-carbon economic development is regarded as a major measure to guide the EU out of the economic crisis and promote economic recovery. In addition, the United States has mobilized government departments to set an example in the fields of greenhouse gas reduction, water and energy utilization, pollution prevention and waste reduction, and use the economic recovery as an opportunity to advocate the establishment of a “clean energy economy.”

Secondly, green GDP development involves tasks in multiple fields such as economy and environment, for which countries have set up institutions. In promoting the green growth strategy, South Korea has set up the Green Growth Council directly under the Presidential Office to coordinate related work. It has three sub-committees, namely green Growth and Industries, climate change and energy, and green living and sustainable Development. A green office has been set up to reduce carbon dioxide emissions. At the same time, the Ministry of Finance, the Ministry of Environment and the Ministry

of Knowledge Economy have taken measures to support the development, promotion, application and industrialization of green technology, and work together to build Korea's green competitiveness.

Finally, the use of tax tools to implement both rewards and punishments is also an important link in green GDP development. Tax tools can prioritize government funds into the "green economy" field and encourage the green transformation of the industry [12]. At present, more than 30 developed countries and 17 developing countries have implemented guaranteed tariffs to encourage the development of clean energy. In addition, countries around the world are also promoting green transformation in the form of international environmental agreements.

3 Advantages and Disadvantages

Green GDP can reflect economic development more comprehensively than simple growth, and can better reflect the impact of economic growth quality. It can more fully reflect the progress of society as a whole. In particular, it reflects changes in natural resources and the environment. As an economic indicator, it can clearly reflect the cost of resource consumption and environmental loss caused by economic development, in line with the requirements of the scientific concept of development, it can also more comprehensively reflect the changes in people's living standards, such as medical and health care, environmental protection, public service progress. In addition, the use of green GDP indicators for economic accounting helps improve people's lives in services, ecological conservation, employment security, housing and other aspects.

But at the same time, its defects are reflected in the accounting. At present, it faces many unsolved technical problems, such as difficult to evaluate the resources and environment, unclear resource property rights, and difficult to solve the pricing of resources and environment [13].

It is quite difficult to reform the current national economic accounting system and make green GDP accounting move from theory to practice. First of all, the loss caused by resource depletion and environmental pollution must be quantified and evaluated to find their correct price expression form, which is a very difficult subject [14]. Secondly, GDP and green GDP belong to the category of flow, while resources and environment belong to the category of stock. How to realize the connection between flow and stock also needs us to face seriously. At present, the basic accounting of resources and environment is realized by two means, one is physical accounting, the other is value accounting. Value accounting should be based on real quantity accounting. Many countries are conducting research on real quantity accounting of natural resources and environment in order to prepare for the development of national economic accounting with green GDP as the core. In value volume accounting, theoretically speaking, resources that can be traded on the market are valued by the market price, those that cannot be traded by the future revenue, and pollution is valued by the cost of pollution control. In fact, the price problem is very complicated, involving many departments and varieties, and it is difficult to operate [15]. At present, there is no mature international practice to learn from. In Europe, some scholars advocate physical measurement, such as the amount of carbon dioxide, sulfur dioxide and other pollutants in the air and the loss of mineral resources,

but do not advocate monetization. Due to the lack of unified accounting methods and standards, data sources are weak, and it is difficult to operate in practice. At present, green GDP accounting is still only a research work in the world. Although many academic institutions are measuring green GDP, no government has published green GDP.

4 Conclusion

In terms of policies, in order to promote the development level of green GDP, the government can consider setting up a coordination agency for green development and designate special leaders in each department. The coordination agency will coordinate relevant business departments to discuss and formulate the departmental coordination mechanism and corresponding management measures and organize their implementation. In addition, relevant departments should actively carry out international economic exchanges and environmental cooperation, and participate in the reconstruction of the international economic order and global environmental governance. Strive to seize the opportunity of the new rules of political and economic environment.

In the statistics and accounting of green GDP, it is necessary to further evaluate and price natural capital, define environmental property rights, and value, monetize, commercialize and market national ecosystem and biodiversity resources. Natural capital should be included in China's social and economic accounting indicators in order to use market tools to solve problems arising from green development in the follow-up work.

Finally, although it is still quite difficult to establish a standard, perfect and scientific green GDP accounting system in the short term, it is definitely a long-term development direction to carry out green GDP accounting because of its advantages. We should draw on advanced experience and methods at home and abroad, combine qualitative research with quantitative analysis, and promptly establish and improve relevant monitoring, early warning and assessment systems. No matter it is qualitative or quantitative, accurate or rough, as long as a comparative relationship can be established between social and economic development and corresponding environmental and resource costs as soon as possible, it can further provide beneficial reference for the government, enterprises and citizens to make development, production and consumption decisions.

References

1. Talberth, J., & Bohara, A.K. (2006) Economic openness and green gdp. *Ecological Economics*, 58(4), 743-758.
2. United Nations, (1994). Department of Economic and Social Affairs Statistics Division. *Integrated Environmental and Economic Accounting*. New York: United Nations Publishing.
3. United Nations. (2003). European Commission, International Monetary Fund, Organisation for Economic Co-Operation and Development, World Bank. *Integrated Environmental and Economic Accounting 2003*. New York: United Nations Publishing.
4. Karl-Göran Mäler. (1991). National Accounts and Environmental Resources. *Environmental & Resource Economics*. 1(01):1-15.
5. Sustainable development research group of Chinese Academy of Sciences. (1999). *Report on China's sustainable development strategy*. Beijing: Science Press.

6. James Boyd. (2006). Nonmarket Benefits of Nature: What Should Be Counted in Green GDP. *Ecological Economics*.61(04): 716-723.
7. Yang miankun. (2008). On the concept of welfare under the framework of national welfare accounting. *Statistical research*.25 (06): 72–77.
8. Wang Jinnan, Ma Guoxia, Yu Fang, Peng Fei, Yang Weishan, Zhou Xiafei, Zhou Ying, Zhao Xuetao. (2018). Research on China's economic ecological GDP accounting in 2015. *China's population, resources and environment*. 28 (02): 1-7
9. Research Group on the framework of China's green national economic accounting system. (2004). *Framework of China's environmental economic accounting system (first version)*. Beijing: SEPA, September 2004.
10. Xie, S. (2004) Fair value measurement: an important premise for china to introduce green gdp thought and accounting and auditing for environment. *The Theory and Practice of Finance and Economics*.
11. Xu, L., Bing, Y., & Yue, W. (2010) A method of green gdp accounting based on eco-service and a case study of wuyishan, China. *Procedia Environmental Sciences*, 2(none), 1865–1872.
12. Alfsen, K.H. (2006) International experiences with “green gdp”. *European journal of oncology nursing*.
13. Yang, M. (2001) A preliminary research into the theory of green gdp accounting. *Statistical Research*.
14. Jian, L., & Chen, L. (2005) About the system of green gdp accounting and problems being faced. *North Environment*.
15. Hoff, J.V., & Rasmussen, M. (2021) Barriers and opportunities in developing and implementing a green gdp. *Ecological Economics*, 181.

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