Scholar Publishing Group
Academic Journal of Environmental Biology
https://doi.org/10.38007/AJEB.2021.020406
ISSN 2789-8407 Vol. 2, Issue 4: 44-52

Coordinated Development Path of Environmental Economy Based on Ecological GDP Accounting

Stamp Lisa*

Anadolu University, Turkey

**corresponding author*

Keywords: Ecological GDP Accounting, Environmental Economy, Coordinated Development, Path Research

Abstract: The increasingly serious environmental crisis caused by the global economic has prompted all countries in the world to attach importance to the coordinated development. Today, in the process of human development, the speed of demand for environmentally friendly natural resources has far exceeded the speed of energy self-regeneration, and the rate of generation of environmentally friendly waste has exceeded the degree of ecological self-cleaning. These problems have gone beyond the limitations of the environment and natural resources. The purpose of this paper is to study the coordinated development process of environmental economy based on GDP ecological accounting, based on ecological economy, environmental value theory and sustainable development theory, and guided by the methodology of national economic accounting., Ecological GDP Research Framework. Establish an accounting system. Taking M province as the research object, conduct on-the-spot investigation and data collection on its economic and environmental conditions, and on the basis of in-depth absorption of relevant domestic and foreign theories and special experience, to find a path guarantee and environment suitable for economic development. The results show that the average level of orderly development of the environmental system in M province (0.302) is higher than the level of orderly development of the economic system (0.291).

1. Introduction

Throughout the history of global economic development, the world economy in the post-industrial era has achieved rapid development, with rapid population growth, rapid expansion of production scale, continuous improvement of the economic level of various countries, and a significant increase in national income. However, the rapid economic development will naturally lead to the rapid consumption of ecological and environmental resources. Even in most developed

countries, the phenomenon of social at the expense of the natural environment has an big impact on coordinated development [1]. Mutual threats between socioeconomic and ecological environment development. Under these circumstances, to develop a socialist market economy, it is necessary to fully improve resource efficiency, walk out of the "symbolic" development route, and actively implement technological innovation to pursue maximum benefits and obtain necessary environmental protection countermeasures [2].

Scholars at home and abroad have also conducted a lot of research on the path analysis of the coordinated development of environment and economy. Wesseh PK developed a sustainable model to study the dynamics of carbon dioxide emissions and how the pursuit of environmental policy goals affects production and productivity in other transition countries. Improvements in environmental quality provide opportunities for multifactor production (MFP), but the benefits of such production are negligible to offset the cost of complying with the carbon tax, resulting in low yields. Therefore, to ensure maximum economic dividends from carbon pricing, especially in transition economies, steps must be taken to increase the innovative benefits of carbon taxes to levels that offset the costs of complying with environmental regulations. However, developing countries should be cautious when formulating environmental policies, especially when energy promotion and economic development are the main priorities [3]. The Bora RR compares the environmental and economic performance of two technologies (rapid pyrolysis and gasification) with traditional methods of treating polypropylene (PP) waste. Run high-fidelity process simulations for each technology to obtain critical mass, energy, and economic data for later analysis. Through long-life assessments using IPCC 2013, ReCiPe, and ILCD 2.0 methods, the gas was found to be faster, with fewer overall greenhouse gas emissions and better environmental performance than conventional combustion and land-based combustion methods. The chemical recovery system was also found to be profitable, with combined NPVs of $1.49 million and $0.96 million for rapid fracturing and natural gas, respectively. Discount rate, PP scrap price and material life are the most important factors affecting the economic performance of these two systems [4]. The above research results provide a good theoretical basis for how to protect the natural ecological environment.

Based on the basic understanding of the current situation at home and abroad, this paper conducts a field investigation in M province, grasps the current theoretical basis and the characteristics of the literature, and uses the relevant information and literature to further explore the relationship between the two in the process of discussing the current situation and analyzing the reasons. It explores a path with academic basis and practical significance, which is suitable for the development of economy and protection. In addition, it should be noted that problems such as unbalanced regional economic development and environmental pollution caused by industrial economic development cannot be solved by vigorously developing the county economy through a single measure. By optimizing the construction and system of ecological civilization, we can realize the comprehensive optimization of the main functional areas of county-level regions in my country.

2. Research on the Environmental Economy Based on Ecological GDP Accounting

2.1. Ecological GDP

The calculation method of ecological GDP is to subtract the value of environmental damage and the cost of resource use from the current GDP, including ecological benefits, that is, including ecological benefits, that is, the cost of ecological services. Ecosystem, based on the original green GDP calculation system [5-6]. Incorporate energy, environmental damage and ecological benefits

into the national economic accounting system, adjust the total GDP index, and develop an economic evaluation system with ecological GDP as a general reference to make up for the insufficiency of green GDP accounting [7-8].

2.2. Construction Principles of Ecological GDP Accounting System

(1) Scientific principles

The ecological GDP measurement system should be established on a scientific basis, and can be reflected in the concept of ecological GDP measurement. Reflecting the fairness and justice of GDP is in line with the two major characteristics of economic interests [9-10].

(2) The principle of linking with national economic accounting

As far as possible, the environmental GDP accounting system is basically connected with China's existing national economic accounting, closely related, but relatively independent. The accounting principle of ecological benefits is based on the characteristics and attributes of different ecosystems for the quality and value of ecological service functions, which are consistent with the accounting indicators and accounting methods of the national industry standard system [11-12].

(3) The principle of paying equal attention to resource consumption, environmental damage and ecological benefit accounting

Ecological environmental protection and pollution prevention have become two major tasks of the environmental protection work of governments at all levels. The framework of the ecological GDP accounting system should not only include the accounting, reflecting the damage to the environment and ecological damage caused by economic development, but also include the ecological benefits generated by the natural ecosystem [13-14].

2.3. Economic and Environmental Theory

(1) Environmental Kuznets Theory

The Kuznets curve changes with economic growth and income inequality, i.e. in the early stages of economic growth - wealth. On the other hand, when the economic growth reaches a certain level, the wage gap starts to narrow [15-16].

(2) Sustainable development

Sustainable development is an integrated concept that includes economic, social, cultural, technological and environmental. At the heart of sustainable development is development, which aims to improve the environment, economy and society. The pursuit is not only to meet the needs of many people and fully reward individual abilities [17-18].

(3) "Economy-Environment" System Theory

Institutions are ideas created by people in the long-term practice of developing creative systems and changing social institutions. The system is one, and the characteristics of its components do not affect the overall work independently, but affect each other to complete the work of the system together.

3. Investigation and Research on Coordinated Development Path of Environmental Economy Based on Ecological GDP Accounting

3.1. Data Sources

This paper selects the discharge of wastewater, waste and stationary waste from industrial

industries in M province from 2011 to 2020 as an ecological indicator. This indicator is not an ecological quality indicator, mainly because there is no specific ecological quality indicator that can be comprehensive and effective. Therefore, only the indicators within this time period are selected as the specific and available indicators for evaluating the ecological situation.

3.2. Establishment of Indicator System

According to the basic principles of scientificity, practicability, reliability and other basic principles, the preliminary index selection is carried out, the availability of index data is fully considered in the process of hoof selection, and the indicators are carried out considering the environmental characteristics. Fine-tune, and finally build an indicator system for the coordinated development of environment and economy (as shown in Figure 1).

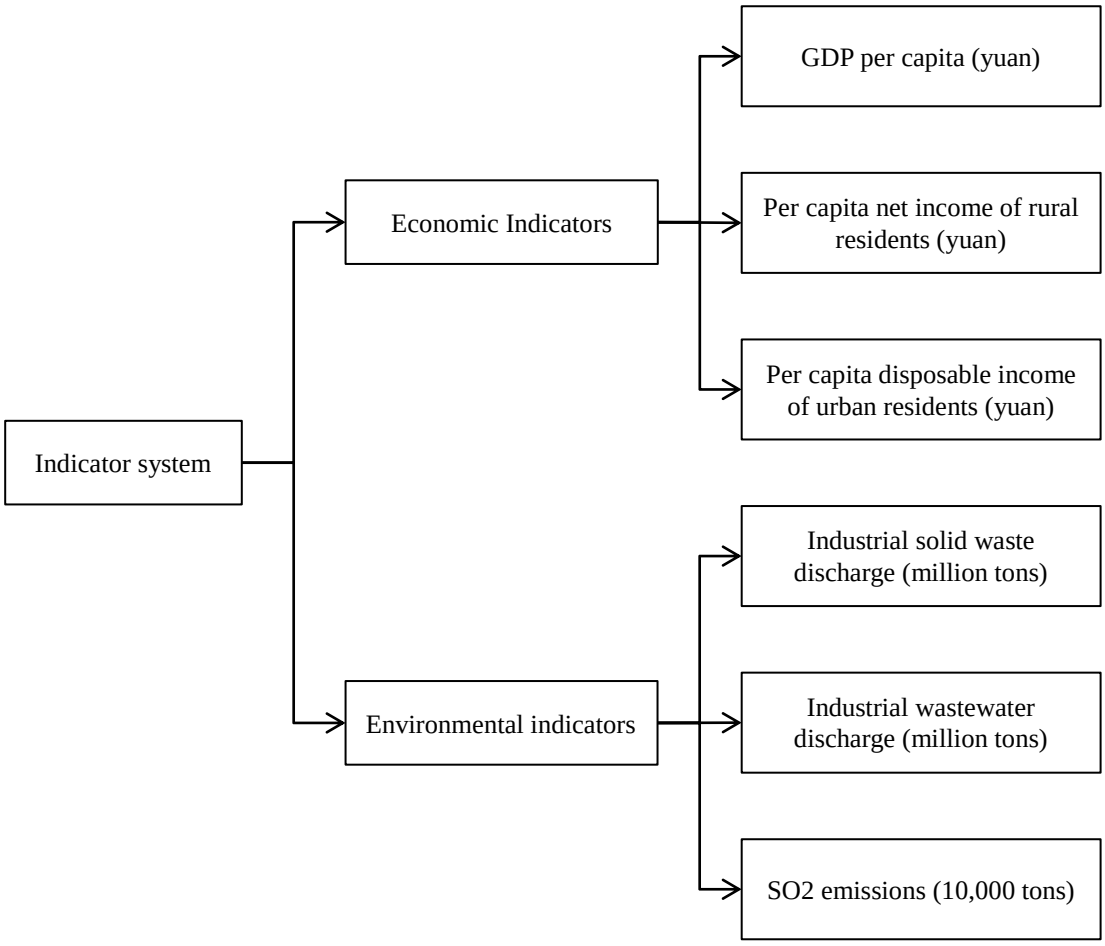

Figure 1. Indicator system

3.3. Discrimination Mode of Coordinated Development of Economy and Environment

According to the discrimination of the above-mentioned coupling mode of economy and environment, it is easy to use the similar discrimination mode to discriminate the coordinated development mode. Let AE(t) represent the comprehensive development index of economic indicators.

$$\Delta E(t) = E(t) - E(t - \Delta t) \quad (1)$$

$$\Delta I(t) = I(t) - I(t - \Delta t) \quad (2)$$

△E(t)≥0, NI(t)≥0: It means that the economy maintains growth and the environmental conditions improve. Obviously, the economic and environmental systems develop in harmony in this region, so the first quadrant is called the coordinated development zone.

△E(t)<0, NI(t)<0: Indicates economic recession and environmental quality decline. Obviously, the environmental economic system is a vicious circle, so the third quadrant is called the recession period or the extremely uncoordinated area.

AE(t)>0, AI(t)<0: (1) When |NI(t)/I(t-At)|≤E (ε is a small quantity determined as a specific condition), the environmental quality is slightly There is a decline, and the coordination system between the economy and the environment tends to be structured; therefore, this area is called the core coordination area; (2) When |NI(t)/I(t-△t)|>E, when the economy grows, when the environment is not good, it is called a conflict zone, which is an area of disunity.

NE(t)<0, NI(t)>0: (1) When |AE(t)/E(t-At)|≤ ε , it means that the environmental quality has improved and the economic growth has declined—death, the overall planning areas related to the economy are also arranged in order, also known as coordination key areas; (2) When |E(t)/E(t-At)|>e, it means that the environmental quality is improved, but the economic development and degradation, a conflict.

4. Analysis and Research on the Coordinated Development Path of Environmental Economy Based on Ecological GDP Accounting

4.1. Economic Indicators

The range of normalized data is between [0,1]. For the determination of the value range of each index of environmental and economic sequence parameters, the lower limit index mainly refers to the corresponding value of each index in 2010. Assignment to the weights of each indicator in the economic order parameters (see Table 1).

Table 1. Value range and weight of economic indicators

Economic Indicators	Upper limit	Lower limit	Weights
GDP per capita (yuan)	39000	1070	0.361
Per capita net income of rural residents (yuan)	8560	523	0.254
Per capita disposable income of urban residents (yuan)	23450	1245	0.124
Per capita fiscal revenue (yuan)	2897.4	1345	0.145
Total retail sales of consumer goods per capita (yuan)	23456	425	0.116

It can be known from Table 1 that the economic indicators with the largest weight are per capita GDP, accounting for 36.1%, with an upper limit of 39,000 yuan and a lower limit of 1,070 yuan; the smallest weight is the per capita retail sales of consumer goods, accounting for 11.6%, with an upper limit of 23,456 yuan, the lower limit is 425 yuan.

4.2. Environmental Indicators

The assignment of the weight of each index in the environmental sequence parameters is

determined by the objective weighting method—the information entropy method (see Table 2).

Table 2. Value range and weight of environmental indicators

Environmental indicators	upper limit	lower limit	Weights
Industrial solid waste discharge (million tons)	78	22	0.269
Industrial wastewater discharge (million tons)	125	105	0.203
SO2 emissions (10,000 tons)	127	46	0.194
Smoke (powder) dust emissions (10,000 tons)	110	35	0.193
Industrial wastewater discharge compliance rate (%)	100%	42%	0.141

It can be seen from Table 2 that the largest weight in the environmental indicators is the discharge of industrial solid waste, accounting for 26.9%, the upper limit is 78 million tons, and the lower limit is 22 million tons; 14.1%, with an upper limit of 100% and a lower limit of 42%.

4.3. Comprehensive Development Level and Evolution Trend of Environmental Economic System

The comprehensive development index of environmental system and economic system in province M is obtained by the weighted summation of the efficacy function values of each system index (see Table 3).

Table 3. Comprehensive development level of environmental and economic systems

Years	2011	2012	2013	2014	2015
Comprehensive environmental development level	0.25	0.33	0.31	0.32	0.28
Comprehensive economic development level	0.12	0.13	0.15	0.20	0.24
Years	2016	2017	2018	2019	2020
Comprehensive environmental development level	0.32	0.28	0.29	0.31	0.33
Comprehensive economic development level	0.29	0.31	0.41	0.44	0.62

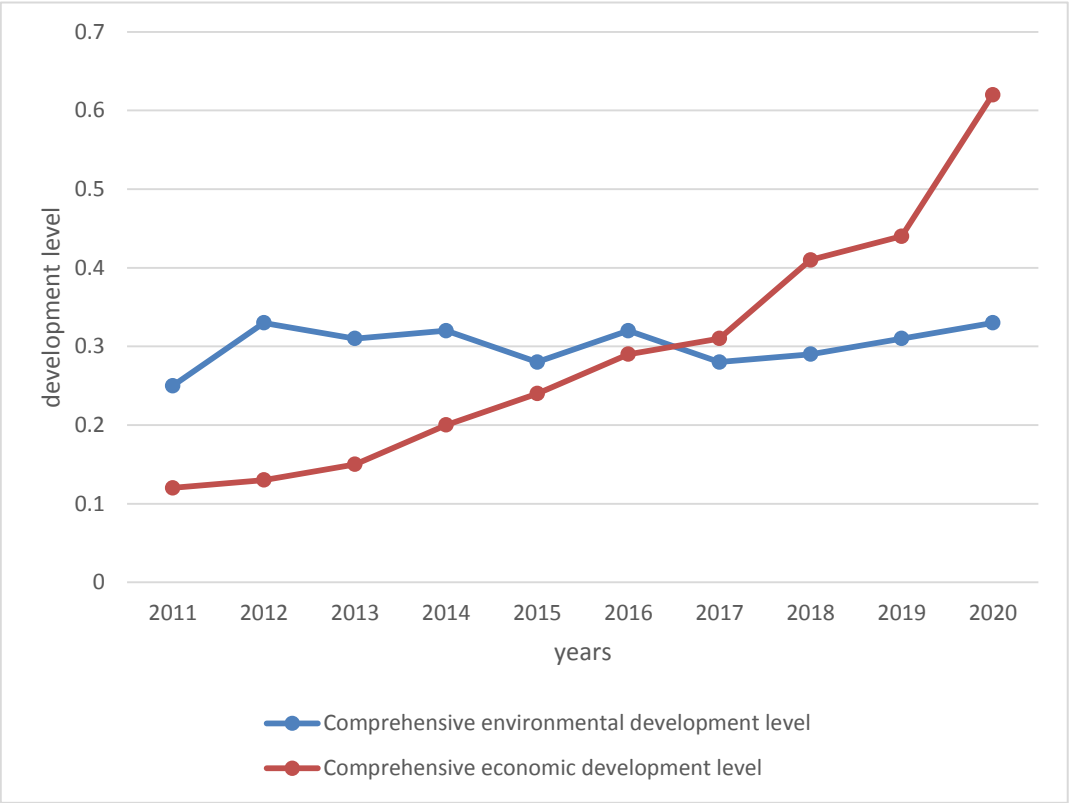

Figure 2. Comprehensive development trend of environmental and economic systems

In general, the average level (0.302) of the orderly development of the environmental system in M province is higher than the orderly development level of the economic system (0.291), but the economic system evolves in an orderly direction faster than the environmental system, especially in the recent two. In 2018, the comprehensive development index of the economic system has increased to 0.62. The overall orderly development degree of the environmental system in M province is lower than 0.5, and it has been in a low-level coordinated development for a long time. From the evolution trend of the environmental system and the economic system, since 2011, the orderly development trend of the environmental system has risen slightly with twists and turns, while the economic system has maintained a steady growth trend. From 2012 to 2015, the development of the environmental system was in a downward trend, while the development of the economic system was strong.

5. Conclusion

From the perspective of ecological economics and environmental value theory, this paper analyzes the mutual influence and restriction between economic growth and environmental resources, as well as mutual dependence and promotion. Based on China's green national economic accounting system, combined with China's national conditions, build the framework of the ecological GDP accounting system, study the significance of the development path of economic development and environmental protection, understand the research status at home and abroad, and collect and sort out the natural geography of Dishui County., the characteristics of economic

development, the existing environmental problems, the theoretical basis involved and other relevant information; based on the dual-optimal development path of economic development and environmental protection, make a summary, actively promote multi-path construction, and design a feasible guiding plan for economic development. To provide reasonable, scientific, developmental and tentative blueprints for reference in rare provinces or counties in the central region.

Funding

This article is not supported by any foundation.

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.

References

[1] Kyriakopoulos G, Ntanos S, Asonitou S. Investigating the environmental behavior of business and accounting university students. International Journal of Sustainability in Higher Education, 2020, 21(4):819-839. https://doi.org/10.1108/IJSHE-11-2019-0338

[2] Schaub S, Buchmann N, Luscher A, et al. Economic benefits from plant species diversity in intensively managed grasslands. Ecological Economics, 2020, 168(Feb.):106488.1-106488.12.

[3] Wesseh P K, Lin B. Does improved environmental quality prevent a growing economy?. Journal of Cleaner Production, 2020, 246(Feb.10):118996.1-118996.10. https://doi.org/10.1016/j.jclepro.2019.118996

[4] Bora R R, Wang R, You F. Waste Polypropylene Plastic Recycling toward Climate Change Mitigation and Circular Economy: Energy, Environmental, and Technoeconomic Perspectives. ACS Sustainable Chemistry And Engineering, 2020, 8(43):16350-16363.

[5] Samah N, Thuneibat M, Alqaraleh M H, et al. An Empirical Analysis of Environmental Cost Accounting in Mining Companies in Jordan. Hunan Daxue Xuebao/Journal of Hunan University Natural Sciences, 2020, 47(11):1-15.

[6] Ryumina E V. Ecologically adjusted human development index. POPULATION, 2020, 23(1):4-12.

[7] Ivleva E S, Shashina N S, Shashina E S. Defining Approaches to the Selection of Management Decisions in the Environmental Sector of the Enterprise Economy. Economics and Management, 2021, 27(4):262-268.

[8] Borlu Y, Glenna L. Erratum to Environmental Concern in a Capitalist Economy: Climate Change Perception Among U.S. Specialty-Crop Producers:. Organization & Environment, 2021, 34(1):171-171. https://doi.org/10.1177/1086026620922331

[9] Sharma S, Basu S, Shetti N P, et al. Waste-to-energy nexus for circular economy and environmental protection: Recent trends in hydrogen energy. The Science of the Total Environment, 2020, 713(Apr.15):136633.1-136633.13.

[10] Kuksova I, Zinoveva I. Rational Structure Of Environmental Management Economy

Management. Actual directions of scientific researches of the XXI century theory and practice, 2021, 9(2):18-27.

[11] Carfi D, Donato A, Schiliro D. Coopetitive solutions of environmental agreements for the global economy after COP21 in Paris. Journal of Environmental Management, 2019, 249(Nov.1):109331.1-109331.8.

[12] Lee D Y, Elgowainy A, Vijayagopal R. Well-to-wheel environmental implications of fuel economy targets for hydrogen fuel cell electric buses in the United States. Energy Policy, 2019, 128(MAY):565-583. https://doi.org/10.1016/j.enpol.2019.01.021

[13] Zofia Wysokińska. A Review of Transnational Regulations in Environmental Protection and the Circular Economy. Comparative Economic Research. Central and Eastern Europe, 2020, 23(4):149-168. https://doi.org/10.18778/1508-2008.23.32

[14] Burgonov O V, Ivleva E S. Environmental Sector of Business Economy: Theoretical Approaches to Assessing the Proportionality of Growth. Economics and Management, 2020, 26(5):487-495.

[15] Jurn K, Lavallee J, King L. Environmental destruction in the new economy: Offshore finance and mangrove forest clearance in Grand Cayman. Geoforum, 2018, 97(DEC.):155-168.

[16] Ushakov D, Vinichenko M, Frolova E. Environmental Capital in National Economy Stimulation: Limitations of Rationality. Journal of Computational and Theoretical Nanoscience, 2018, 24(9):6290-6292. https://doi.org/10.1166/asl.2018.13032

[17] Pea-Vinces J, Solakis K, Guillen J. Environmental knowledge, the collaborative economy and responsible consumption in the context of second-hand perinatal and infant clothes in Spain. Resources Conservation and Recycling, 2020, 159(1):1-11.

[18] Schwarz A E, Ligthart T N, Bizarro D G, et al. Plastic recycling in a circular economy; determining environmental performance through an LCA matrix model approach. Waste Management, 2021, 121(2):331-342. https://doi.org/10.1016/j.wasman.2020.12.020