

Reflection on Digital Economy Promoting the Value Realization of Geological Survey Ecological Products

Xiaolan Lv, Beibei Yang and Yue Sun

Development Research Center of China Geological Survey, Beijing, China

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Abstract: In August 2005, the concept of "green water and green mountains are golden mountains and silver mountains" (hereinafter referred to as "Two Mountains") was put forward. The value realization of ecological product is an important path to open the transformation channel of "Two Mountains", and digital economy constitutes an important engine to drive the transformation of "Two Mountains". This paper introduces the concepts of ecological products, natural resources and natural resources assets, ecological resources and ecological resource assets, geological survey ecological products, and digital economy promoting value realization of ecological product. It analyzes the value realization methods and economic relations of geological survey ecological products. It introduces the basic situation of geological cloud sharing geological survey ecological product data. It analyzes the benefit of geological survey ecological products taking Geopark as an example. Finally, three considerations on how digital economy promotes value realization of geological survey ecological products are obtained: one is to further sort out the geological survey ecological products; the other is to deepen the digital economy to promote the value realization of geological survey ecological products; the third is to explore the value estimation system of geological survey ecological products.

1 INTRODUCTION

On April 26, 2018, at the Symposium on promoting the development of the Yangtze River economic belt, General secretary Xi Jinping stressed that "we should actively explore and promote the path of transforming green water and green mountains into golden mountains and silver mountains, select qualified areas to carry out the pilot of the value realization mechanism of ecological products, and explore the path of government led, enterprise and social participation, market-oriented operation and sustainable value realization of ecological products"¹. On March 12, 2019, in the fourth "Ministerial channel" of the second session of the 13th National People's Congress, Lu Hao, then Minister of natural resources, said "since the establishment of the Ministry of natural resources, many outstanding problems have been solved, but there are also problems such as the value realization mechanism of ecological products that need to be solved"². Lishui is the first pilot city of ecological product value realization mechanism in China. Digital economy permeates the whole process of value realization of ecological product, activates the "sleeping"

ecological resources and promotes the premium of ecological products. The value realization of ecological products feeds back the protection of ecosystems, achieves a good double transformation of gross domestic product (GDP) and gross ecosystem product (GEP), and forms a sustainable high-quality development pattern³.

2 DIGITAL ECONOMY PROMOTES ECOLOGICAL PRODUCTS TO THE HIGH END OF THE VALUE CHAIN

2.1 Concepts of Ecological Products

2.1.1 Ecological Products

There are many understandings and concepts of ecological products at home and abroad, but from the perspective of the United Nations Millennium Ecosystem Assessment Plan and the domestic policy practice in recent years, the mainstream defines them in the category of ecosystem services.

In December 2010, the national main functional area planning issued by the State Council put forward the concept of "ecological products" at the national top-level design level: ecological products refer to the natural elements that maintain ecological security, ensure ecological regulation functions, and provide a good living environment, including fresh air, clean water and pleasant climate. Ecological products refer to the services that the ecosystem provides the ultimate welfare products for mankind through the joint action of biological production and human production, including products with ecological functions produced from the natural system, and products that meet human needs derived from the industrial development and processing of natural ecosystem functional products⁴.

The internationally commonly used concept of "ecosystem service"⁵ can be understood as the material and service products provided by natural ecosystems for human beings without damaging the stability and integrity of ecosystems. In 2005, the United Nations Millennium Ecosystem Assessment proposed four types of ecosystem services: services that directly supply materials, services that regulate natural elements, services that provide spiritual and recreational, and services that maintain the earth's living conditions. Ecological products integrate four types of ecosystem services and can be divided into three categories: material products, regulation service products and cultural service products⁶, as described in Table 1.

Ecological products have public characteristics. According to the difference in the degree of publicity

and the scope of benefits, ecological products can be further divided into pure ecological public goods and quasi ecological public goods. The former refers to non-exclusive and non-competitive products with full significance that are commonly consumed by the society and have a common impact on the national and even the global ecosystem. They are usually provided by the government, such as desertification control, natural reserve setting and other ecological restoration and environmental governance projects. The latter is between pure ecological public products and ecological private products, such as sewage treatment and garbage collection.

2.1.2 Natural Resources and Natural Resources Assets

Natural resources are materials and energy that can be used and naturally generated by human beings. They are the material basis for human survival and development, and have the dual attributes of nature and society. Natural resource assets refer to the scarce material assets that can bring human well-being and exist in the form of natural resources, including land, minerals and ecological resource assets. Natural resource assets refer to the general term of various material wealth elements in nature that are owned or controlled by the state and are expected to bring economic benefits to the country and people and can be measured in currency, including various natural resource wealth and rights⁷⁻⁸.

Table 1: Classification and examples of ecological products.

Category	Product example
Material product	<ul style="list-style-type: none"> • Food, such as: crops, wild food, fruits, fish • Fiber and fuel, such as: wood, wool • Biological chemicals, natural drugs • Genetic resources: genes, genetic information and biotechnology for animal / plant breeding • Ornamental resources, such as: shells, flowers
Regulation service products	<ul style="list-style-type: none"> • Air quality maintenance • Climate regulation, such as: greenhouse gas emissions affect the global ecosystem • Water resources regulation, purification and maintenance • Soil conservation • Protection against natural disasters, such as: flood control and landslides • Bioremediation, such as: removal of pollutants by storage, dilution, transformation and burial • Ecological cycle, such as: atmospheric cycle and water cycle • Provide habitat • Promote crop pollination and maintain biodiversity
Cultural service products	<ul style="list-style-type: none"> • Cultural heritage value • Recreation and Ecotourism • Promote physical and mental health • Traditional cultural and religious values • Aesthetic values • Social relations, such as: fishery associations

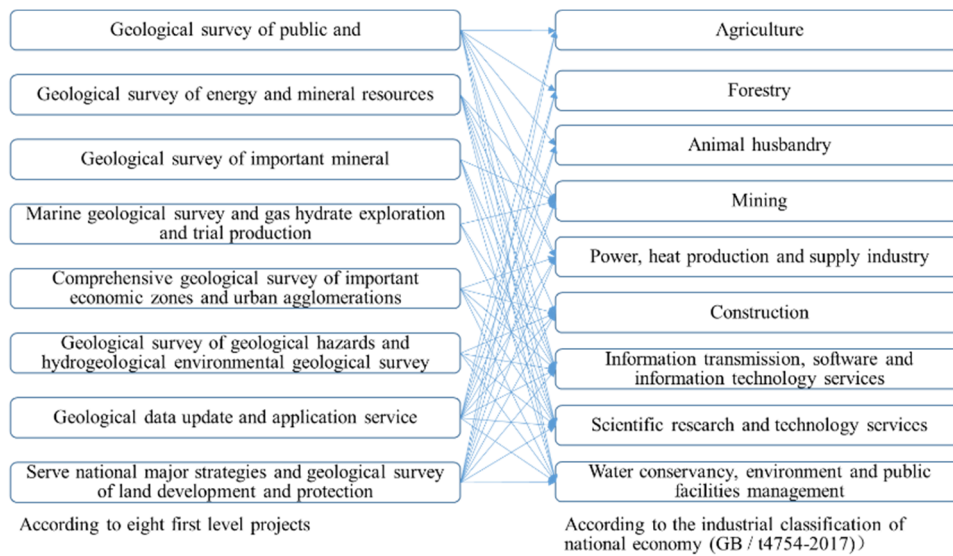


Figure 1: Contact diagram of geological survey providing support for subsequent industries.

2.1.3 Ecological Resources and Ecological Resources Assets

Ecological resources refer to all the materials, energy, information, time and space used by living beings and human beings for their survival, reproduction and development in the human ecosystem. Unlike ecological products, which have the economic attribute of value exchange, ecological resources are the inherent basic resources of the ecosystem. They can be transformed into ecological products only when they are supplied, managed, supported or provided with cultural services. Ecological resource assets refer to natural ecosystems and the ecological products produced by them, including water and soil resources, ecological services and environmental products, which provide mankind with green water, green mountains and beautiful environment. They are the core components of natural resource assets⁹⁻¹¹.

2.1.4 Geological Survey Ecological Products

At present, China Geological Survey has organized and implemented eight first-class projects of the state finance. From the relationship between geological survey and follow-up industries (see Figure 1), it can be clearly seen that the value of geological survey products needs to be realized through "geological survey" + "industry".

Geological survey products are divided into material products, regulation service products and cultural service products. Geological survey has basic, public welfare and strategic characteristics. It is at the forefront of the natural resources industry

chain and provides support for economic and social development. Therefore, not all products are ecological products. Geological survey ecological products only refer to geological survey products that can maintain ecological safety, guarantee ecological regulation function and provide a good living environment.

The geological survey ecological products need to be reflected by the used carriers. For example, resources and environment carrying capacity evaluation products support land spatial planning, hydrogeology, engineering geology and geological disaster investigation products support the construction of ecological civilization, tourism geological investigation products promote the construction of geological cultural villages, geological relics investigation products help to form geological parks, and new energy mineral investigation products help to improve the energy structure and promote the new energy industry.

2.2 Value Realization of Ecological Products

Ideally, the value of ecological products depends on how much welfare they can provide to people. According to the degree of biological production, human production participation and service type, ecological products can be divided into public ecological products and commercial ecological products. The value of ecological products includes value of ecological capital, value of product use, value of increasing employment, value of political performance incentives and value of economic

incentives, which are realized through market exchange and government compensation⁹.

There are two ways to realize the value of ecological products: direct realization and indirect realization. This paper focuses on the direct realization of the value of ecological products, that is, under the premise of protecting the ecological environment, to obtain economic benefits through reasonable development. Various input factors and owners of ecological product production are shown in Table 2.

Table 2: Production factors and owners of ecological products.

Production factors	Owner
Ecological resource assets	Country
Other assets (funds)	Investor
Labor	Worker
Science and Technology (Geological Science and Technology)	Country or patent owner

2.3 Digital Economy Promoting the Value Realization of Ecological Products

The digital economy promotes the value realization of ecological products means that digital technologies such as the Internet, big data and artificial intelligence are embedded in the industrial chain and value chain to promote the breakthrough of the industrial chain nodes of ecological products and the rise to both ends of the value chain. One end is product research and development, and the other end is brand building. The digital economy activates ecological resources, links production factors, and accelerates the optimization and integration of production factors. The digital economy promotes the integrated development of ecological industries, producing economies of scale, economies of scope and business model innovation effects³.

3 VALUE REALIZATION PATH OF GEOLOGICAL SURVEY ECOLOGICAL PRODUCTS

3.1 Way of Value Realization

The most important way to realize the value of geological survey ecological products is to put them into the market for exchange. There are two main ways to realize them.

One is direct implementation. On the premise of protecting the ecological environment, economic benefits can be obtained through reasonable development. The value of material products, regulation service products and cultural service products will be realized through product certification, emission right and energy use right trading, tourism development and other means.

The other is indirect implementation. Under the condition that development activities are prohibited, ecological compensation can be obtained through various forms of transfer payment, including ecological compensation, ecological protection fund, public payment for ecological products, etc.

3.2 Economic Relationship of Value Realization

This paper focuses on the direct value realization of geological survey ecological products. It is necessary to understand the economic relationship in the formation of ecological products.

3.2.1 Economic Subject

The economic subjects involved in the input and output of ecological products include the government, enterprises and individuals.

3.2.2 Value Distribution

Ecological products and services have economic value to society because people get utility from actual or potential use. The distribution of value is governed by the law of surplus value, with the participation of production factors. The value of a material product is relatively easy to determine, and the market value of the product can be evaluated according to the function of the income price and quantity of the material product. However, regulation service products and cultural products often lack market prices, and their value can be determined by the fees paid by people for specific services, that is, the value can be determined from the relevant actual purchase.

4 PRACTICE OF DIGITAL ECONOMY IN REALIZING THE VALUE OF GEOLOGICAL SURVEY ECOLOGICAL PRODUCTS

4.1 Geological Cloud Sharing Data of Geological Survey Ecological Product

Geological cloud is a comprehensive geological information service platform integrating planning resources, data resources and application systems. It is an important measure for China Geological Survey to implement the big data strategy and digital China strategy. The "One Map" big data system of Geosciences has been established, including 98 core databases such as the national Tiankeng professional database, and increasing natural resource data such as mountains, rivers, forests, fields, lakes and grasses. The online working system of geological survey has been preliminarily established to obtain cloud knowledge and intelligent assistance in real time. A number of important professional analysis and evaluation systems have been developed, such as the national geological disaster information system, the resources and environment carrying capacity and the land space development suitability evaluation information system, etc., to accurately serve the land space planning, use control, ecological protection and restoration, and major project construction.

4.2 Benefits of Ecological Products of Geoparks

The value of geological survey ecological products is most easily understood and realized by tourism geological survey products and geological relics survey products. This paper analyzes the benefits of geological survey ecological products from the perspective of geoparks. A geopark is a geographical area. The establishment of a geopark should not only consider the landscape and geology of the area, but also the entire geographical environment of the area, and more importantly, the synergy between geographical diversity, biological diversity and culture. Therefore, geoparks should include ecological, historical, social and cultural values. The economic value is mainly calculated below.

4.2.1 Economic Subject

The main body of establishing the geopark includes the government, investors and managers, local residents, etc.

4.2.2 Building Elements

The establishment elements of the geopark generally include: geological outcrops with geological significance that can be visited, effective management system and implementation plan, government and enterprise direct investment, etc.

4.2.3 Value Distribution

Distributable value of geopark = income + other funds - cost input. Where: the establishment cost can be expressed as A1 (evaluation cost) + A2 (infrastructure cost) + A3 (management cost) + A4 (personnel employment cost) + other cost. The benefit indicators of other geoparks are shown in Table 3.

Table 3: Relevant indicators of ecological product benefits of Geopark.

Cost (A)	Assessment cost (A1) Infrastructure cost (A2) Administrative expenses (A3) Personnel employment expenses (A4) Other
Ecological products (B) (economic benefit index)	Geopark income (B1) Income from extended publications (B2) Driven by related industries (B3) Peripheral economic promotion (B4) Other
Social benefit(C) (social benefit index)	Increase the income of local residents(C1) Attract tourists and increase tourism income(C2) Other
Ecosystem(D) (ecological benefit index)	Protection of geological relics(D1) Regional ecological protection(D2) Ecological restoration(D3) Protection of biodiversity(D4) Other
Incentive mechanism (E)	Government compensation (E1) Tax preference (E2) Other

5 CONCLUSION

First, the concepts of ecological products, ecological resources and ecological resource assets, geological survey ecological products and digital economy promoting value realization of ecological product are introduced. Secondly, the direct and indirect value realization of geological survey ecological products are analyzed. Thirdly, the basic situation of geological cloud sharing geological survey ecological product data are introduced. Finally, the benefit of geological survey ecological products taking Geopark as an example is analyzed.

6 RECOMMEND

6.1 Further Sorting out Geological Survey Ecological Products

First, according to the classification of ecological products, we need to further sort out the classification of geological survey products and clarify the connotation and extension of geological survey ecological products. Secondly, from point to area, we will explore the industrialization of natural resources of geological survey ecological products through practice, such as boosting the construction of geological cultural villages. Third, we will increase the research and development of technologies for the systematic restoration and comprehensive treatment of fragile ecosystems of geological resources, and realize the ecological development of resource industries, such as rocky desertification, desertification, salinization, and land and mine environment management.

6.2 Deepening Digital Economy to Value Realization of Geological Survey Ecological Products

First, the industrial digital space will be deepened. Break through the extension of the industrial chain at both ends of the geological survey ecological product value chain, further strengthen the construction of "big data + industrial cluster", further explore the integration of mobile Internet, artificial intelligence and other digital economic technologies with the service industry, and promote new business forms such as smart tourism. Second, the construction of application scenarios of digital economy will be promoted. In the construction of geoparks and other projects with the theme of geological survey

ecological products, the concept and elements of data economy are embedded to form a new growth point for the value transformation of ecological products.

6.3 Exploring the Value Estimation System of Geological Survey Ecological Products

The value realization of geological survey ecological products needs a scientific and acceptable value measurement and evaluation system. First, it is necessary to carry out comprehensive investigation and evaluation of ecological resources, and find out the quantity, quality, distribution, development and evolution laws of resources. Secondly, based on the output capacity of geological survey ecological products, a value evaluation system is established, and the accounting methods and technical specifications for the value of different types of ecosystem services are studied and formed.

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