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Ecological Capital Operation Mode and Path of Poyang Lake Eco-Economic Zone*



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Abstract. In recent years, ecological capital has begun to draw the attention of the theoretical circle as a concept by which people enhance their understanding of the importance of ecological resources. Through market-oriented means, people strengthen the ecological capital operation to solve the problem of the deteriorating ecological environment, which also gradually get attention from all sectors of society. However, there are still few scholars to carry out in-depth studies on regional ecological capital from the perspective of operation mode and operation path. This study constructs a ecological capital operation mode of Poyang Lake Eco-Economic Zone and explores a mode operation path with Poyang Lake Eco-Economic Zone as specific object of study. Poyang Lake Eco-Economic Zone has abundant ecological

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resources, therefore how to convert these ecological resources into ecological capital is the key to achieve green development in Poyang Lake Eco-Economic Zone, and also an important link in Jiangxi's ecological civilization construction. Based on the description of the current situation of ecological resources in Poyang Lake Eco-Economic Zone, this article points out that the ecological capital operation in Poyang Lake Eco-Economic Zone is a way to achieve eco-economic development in this area, so as to realize the preservation and increment of ecological capital. The main bodies of ecological capital operation in Poyang Lake Eco-Economic Zone (government, enterprises and social organizations) should clarify their respective responsibilities, vigorously develop ecological industry, ecological agriculture and ecological service industry, promote the organic integration of these three industries, construct an ecological capital operation benefit feedback mechanism and experience summary mechanism, convert the ecological resources in Poyang Lake Eco-Economic Zone into ecological capital, promote the regional economic development and change the "beautiful scenery" into "treasure and fortune" through the operation mode of marketization and the selection of a reasonable development and operation path. The purpose of this study is to solve the growing contradiction between the economic development and the resource environment contradictions in Poyang Lake Eco-Economic Zone. It also provides reference for other regions, especially the economically underdeveloped regions, to achieve the harmonious development of ecology and economy. In the future, we will strengthen the identification of the ownership of the ecological resources and the accounting of the ecological capital value at the practical level, so as to enhance the operability of the effective operation of ecological capital.

Key words: Poyang Lake Eco-Economic Zone, ecological capital, operation mode, path selection

I. Introduction

The endowment difference of ecological resources is the basis of operation of ecological capital, and the selection of operation mode of ecological capital is the key to efficient utilization of ecological capital. At present, some areas in China still fail to get rid of the extensive development mode of "GDP", which leads to difficulties in transition to intensive and efficient development mode, thus resulting in waste and losses of ecological resources. How to realize the harmonious development of economy and ecological environment, not only maintaining the "beautiful scenery", but making it become "treasure and fortune", is the key to promote the sustainable economic and social development.

Since the 18th National Congress of the Communist Party of China incorporated the construction of ecological civilization into the overall layout of "Five-in-One", scholars have conducted a lot of studies on issues related to the construction of ecological civilization and ecological capital utilization, mainly the concepts of ecological capital and operation, system of ecological capital operation, the externalities of ecological capital etc. However, there are still few studies on the operation mode of ecological capital. Taking the mode of ecological capital operation as the research perspective, this article analyzes the objective situation of Poyang Lake Eco-Economic Zone, and puts forward a mode and path of ecological capital operation in Poyang Lake Eco-Economic Zone based on the related research results of domestic and foreign scholars.

II. Literature review

1. *Research on the Concept of Ecological Capital*

At present, the use of ecological capital terms by domestic and foreign scholars is mainly based on the concepts of natural capital and environmental capital. Vogt (1948) believed that natural resources were actually the capital of national development, which were called natural capital. In 1987, the World Environment and Development Commission pointed out in the report *Our Common Future* that human's living environment could be recognized and treated as ecological capital. Kerry Smith (1988) believed that it was necessary to treat both natural and environmental resources as valuable assets. In 1990, Pearce and Turner put forward officially the concept of natural capital in academic circles, and their works "Natural Resources and Environmental Economics" had thoroughly elaborated on the concept of natural capital, and divided the capital of the production function in economics into two major categories, namely artificial capital and natural capital. Sarag Eldin (1995) suggested that natural capital or ecological capital referred to all natural resources. De Groot et al. (2003) maintained that the functions of ecosystem mainly included the invisible service function and the cultural function. Costanza (1997) was the first to acknowledge and evaluate the economic value of global ecological capital. Aronsson and Lofgren (1999) analyzed the value composition of the national account, and believed that the ecological environment capital was an important component of the contemporary national capital system, and measuring the losses of ecological capital could reflect the true value of the national financial composition. As can be seen from above, the domestic and foreign scholars mainly define the concept of ecological capital from the

perspective of natural capital, and reach an consensus on the concept of natural capital, i.e. natural capital actually exists in the nature, and can provide the goods or services of natural resources and the availability of environmental stock assets for human current and future development.

In recent years, many domestic scholars have discussed the ecological capital. Liu Sihua (1997) divides ecological capital into two parts, i.e. ecological resources and ecological environment. Huang Xingwen et al. (1999) defines the ecological capital as "the ecological landscape entity over which the owner can exercise the ecological ownership and from which the owner can obtain the economic benefits". Fan Jin et al. (2000) believe that ecological capital is a comprehensive concept. Zhang Junlian et al. (2003) hold that all natural resources, ecological environment and their service function to human beings are ecological capital. Niu Xinguo (2003) maintains that the attributes of ecological capital include the overall growth, long-term profitability, symbiotic competition, open integration, immobility fugacity and social equity. Li Haitao et al. (2005) believe that capital is certain material resources existing in a time node or information variables existing in some form, while ecological capital is resource conditions formed by ecological system and the sum and reserve of its matter, energy and information, and its role is to provide marketized services so that the resource elements can achieve capital quantification, thus promoting the mutual coordination of economic and social development and natural environment protection as a special form of capital. Li Zhongmin (2010) deems that the consumption and production of environmental resources shall be included in the cost of economic development and enterprise production, and

the concept of environmental cost may also be applied in the field of social consumption. Yan Lidong (2010) put forward several key elements of ecological capital, i.e. the use value, property rights, ecological market and ecological technology, and deeply analyzes the conversion form and value realization form of ecological capital. The form of conversion is first defined by the property rights of ecological resources, after that the ecological resources are converted into ecological assets which form the ecological capital through the marketization operation, while the marketization operation of ecological capital inevitably forms ecological products of social demand. In recent years, the academic circles widely recognize the following delimitation: ecological capital refers to ecological resources and ecological environment that can bring economic and social benefits, mainly including quantum of natural resources, environmental quality, self-purification capacity, ecological potential to produce use value for the future, ecological environment quality and the whole use value of ecological system. In this study, the author also agrees with the delimitation.

2. Research on Operation of Ecological Capital

The study on ecological capital operation abroad is still in the initial stage. Epstein and Roy (1997) analyze in detail the impact on the environment capital at the micro level of enterprise growth, believes that the enterprises must take into comprehensive account of investment of environmental capital and enhance the understanding of environmental capital acting force based on processing of financial capital while making investment decisions, so as to improve the efficiency of enterprise operation and management. Terry L. Anderson (2000) put forward the concept of “environmental capital operation” while

exploring the transition from the “passive input” protection to the “active value-added” protection in the environmental protection activities. Thamnapillai and Thangavelu (2004) study the pricing and accounting of environmental capital, and propose to determine in categories different prices of different ecological and environmental capital. Azqueta and Sotelsek (2007) discuss the value attributes and evaluation methods of natural environmental resources from a methodological point of view, and propose that the depreciation and devaluation of the ecological environment capital and the environmental assessment are two important factors that affected the environmental value. As the environmental problems become more and more serious, more and more people are beginning to realize the value attributes and market function of the ecological capital. Some pioneer investors start to pay attention to and actively promote the conversion and utilization of ecological capital, incorporate the environmental cost and the performance of energy saving in corporate operation into the enterprise financial management while valuing the project and the enterprise, and then take corresponding technical means and environmental protection measures so as to achieve green production and green operation.

Domestic scholars start the studies on ecological capital operation from the beginning of this century. Wang Haibin (2005) believes that the ecological capital operation is a practical means to realize the value of ecological services. Yan Lidong et al. (2011) discuss the significance of ecological capital operation from the perspectives of ecological utility, ecological elements, social culture etc. According to Song Xianping (2011), whether the ecological capital can be fully utilized for ecological economization depends on the fact

that it can be accurately priced to achieve the externalization of its value, but the difficulty is that the ecological capital belongs to natural systems, different from the modes of material and human capital under economic systems. Its value cannot be realized before a unique business model is developed. Chen Guangju (2014) advocates that the ecological capital operation is a process in which enterprises take it as a production element in the ecological capital market to produce ecological products or realize the ecological value maintenance by converting the value of ecological capital through technologies. Chang Longran (2013) conducts empirical studies in combination with the specific areas, redefines the concept of ecological capital, constructs a theoretical system of ecological capital operation, and hopes the harmonious development of regional ecology and economy. According to Zhang Zhujun (2012), ecological capital operation is to obtain corresponding economic returns through the reasonable use of the use value of ecological capital with developing the whole service value of ecological capital as a means, so as to support the regional economic development and ecological environment construction; to promote the accumulation of the ecological capital with the redevelopment of social economy and ecological environment quality, thus forming a virtuous cycle of mutual promotion and development of ecology, economy and society. He Yiqing (2013) constructs an ecological capital operation mode for the Poyang Lake Ecological Zone from a perspective of financial support with this area as object of study by means of system dynamics, and concludes that the best ecological capital operation mode covers at least four modes, i.e. agriculture, industry, tourism and financial support. Zeng Xiangang et al. (2014) maintain that the ecological capital operation is also

tending to marketization, more specifically, to achieve a product supply and demand mode of marketization by converting the value through marketized outsourcing or franchising. Zhang Nairen (2016) analyzes the peculiarity of Poyang Lake Ecological Zone with the water resources in this area as object of study, and concludes that the conversion of ecological capital cannot do without the leadership of government, and an organic system of ecological capital operation is constructed based on the organic transfer of agriculture, industry and tourism. In the opinion of Gao Jixi (2016), the ecological capital operation mainly relates to five modes, i.e. research and development of ecological products, optimization of ecological resources, ownership of ecological property rights, transaction of ecosystem services and operation of ecological industry.

From the above literature review we can see that in recent years, there are many studies on the concept of ecological capital and the theory of ecological capital operation in academic circles, and the perspective of these studies is showing a trend of diversification. However, there are relatively few studies on the mode of ecological capital operation, especially in-depth studies on the mode of ecological capital operation of Poyang Lake Eco-Economic Zone. This article intends to construct the mode of ecological capital operation of Poyang Lake Eco-Economic Zone and to explore the mode operation path with Poyang Lake Eco-Economic Zone as object of study based on the results from previous studies, so as to resolve the increasing contradictions between the economic development and resource environment in Poyang Lake Eco-Economic Zone, and to provide reference for other regions to achieve the harmonious development of ecology and economy, especially the economically underdeveloped regions.

III. Concept and Agent of Ecological Capital Operation in Poyang Lake Eco-Economic Zone

(i) Basic situation of Poyang Lake Ecological Eco-Economic Zone

Poyang Lake Eco-Economic Zone is a special economic zone with Poyang Lake in Jiangxi Province as the core, Poyang Lake urban circle as the basis and protecting the ecology and developing the economy as an important strategic vision, including 9 counties (districts) in Nanchang City: Nanchang County, Jinxian County, Anyi County, Donghu District, Xihu District, Qingyunpu District, Wanli District, Qingshanhu District, and Xinjian County (later renamed as Xinjian District); 12 counties (cities) in Jiujiang City: Xunyang District, Xingzi County (later renamed as Lushan City), De'an County, Lushan District (later renamed as Lianxi District), Yongxiu County, Hukou County, Duchang County, Wuning County, Gongqingcheng City, Jiujiang County, Pengze County and Ruichang City; 4 counties (cities) in Jingdezhen City: Fuliang County, Zhushan District, Changjiang District

and Leping City; 3 counties (cities) in Yingtan City: Yujiang County, Yuehu District and Guixi City; Yushui District in Xinyu City; 2 counties (districts) in Fuzhou City: Linchuan District and Dongxiang County; 3 cities in Yichun City: Fengcheng City, Gao'an City and Zhangshu City; 3 counties in Shangrao City: Yugan County, Poyang County and Wannian County; Xin'gan County in Ji'an City, 38 counties (cities, districts) in total and the whole Poyang Lake (as shown in *Picture 1*) with a land area of 51,200 square kilometers.

As the most developed area in Jiangxi Province, Poyang Lake Eco-Economic Zone has obvious comparative advantages with abundant natural resources and tourism resources, and good ecological protection and industrial base. However, with the vigorous progressing of industrialization, urbanization and agricultural industrialization, the resources and environment of Poyang Lake Eco-Economic Zone are facing great pressure, and some places are caught in the dilemma of "survival or environmental protection". The

Figure 1. Location of Poyang Lake Eco-Economic Zone



theory of ecological capital operation provides a new way of thinking to solve the problem of ecological environment. The goal of ecological capital operation is to realize the preservation and appreciation of ecological capital. Only by giving full play to the natural ecological advantages, carrying out the ecological capital operation and finding the mode and path of ecological capital operation with its own characteristics can Poyang Lake Eco-Economic Zone achieve the sustainable development of Ecology, Economy and Society.

(ii) Concept of ecological capital operation in Poyang Lake Eco-Economic Zone

As mentioned above, many domestic and foreign scholars have defined the concepts of ecological capital and ecological capital operation. The author believes that the ecological capital in Poyang Lake Eco-Economic Zone is the ecological resources and ecological environment within the scope of Poyang Lake Eco-Economic Zone that can bring economic and social benefits, mainly including total amount of natural resources, environment quality, self-purification capacity, ecological potential to produce use value for the future, ecological environment quality and the whole use value of ecological system in this area. The ecological capital operation in Poyang Lake Eco-Economic Zone means, with the ecological resources in the area as the basis, to realize the continuous circulation and accumulation of ecological capital in Poyang Lake Eco-Economic Zone in the process of maintenance and appreciation of ecological resources in the area by means of government promoting and market directing through reasonable use of resource conversion mode, thus achieving the sustainable ecological development. In short, it is to realize the ecological economization in the region.

Conclusion: This article studies the mode and path of ecological capital operation in Poyang Lake ecological economy on the basis of former studies results, and holds that to achieve the coordinated development of ecological economy and green industry as well as complementarities of ecological environment and sustainable development in Poyang Lake Eco-Economical Zone, we need to fully develop the ecological resources in the area, convert the ecological resources in Poyang Lake Eco-Economical Zone into ecological capital by selecting a reasonable development and operation path through the marketized operation mode, thus promoting the regional economic development and making the “beautiful scenery” become “treasure and fortune”. This article has certain theoretical significance as it further broadens the study field of ecological capital operation and deepens the study on the theory of ecological capital; in addition, this article deeply explores the specific mode and realization path of ecological capital operation in Poyang Lake Eco-Economic Zone, which not only has instructive significance to the harmonious development of ecological environment and economy in Poyang Lake Eco-Economic Zone, but also provides reference for other regions to resolve the contradictions between economic development and environment protection, especially the economically underdeveloped regions.

(iii) Motivation of Ecological Capital Operation Mode and Path of Poyang Lake Eco-Economic Zone

1. The good ecological resources and industrial base of Poyang Lake Eco-economic Zone provides practical condition for the ecological capital operation.

Poyang Lake Eco-economic Zone was formally upgraded to national strategy in 2009.

The strategy mainly aims to protect and develop the economy in Poyang Lake and surrounding regions, adopt ecological civilization guiding thought and build the low-carbon demonstration area of ecological economization. The Eco-economic Zone covers land area of 51,200km², 38 county-level organizations and has the function of impoundment, climate regulation and environmental control around the zone. It possesses plentiful natural ecological resources and good industrial base, it's the important hub node connecting the south and north, east and west in the "Belt and Road" initiative and it has important strategic function.

(1) Land resource

Poyang Lake Eco-economic Zone is main agricultural land in the province, possesses plentiful and complicated land resources, and has soil types like red soil, rice soil, dry hand, etc. and mountainous types including hill and downland. Wherein, the core ecological resource is Poyang Lake wetland, occupying above 80% of Poyang Lake area, covering resources like water area, island, beach, internal lake, etc.

(2) Water resource

Poyang Lake Eco-economic Zone boasts plentiful water resources, with water from Ganjiang River, Fuhe River, Xinjiang River, Raohe River and Xiushui River, which belongs to throughput-type lake. The Poyang Lake water system basin has an area of 162,200km², occupying 9.0% of the area of the Yangtze River Basin, and has the annually average runoff volume of about 152.5 million m³, occupying 16.3% of that of the Yangtze River Basin. Meanwhile, it possesses rich underground water resource and some underground water has plentiful mineral water resource.

(3) Animal and plant resource

Poyang Lake possesses diversified and plentiful animal and plant resources, mainly including zooplankter, mollusc, fish, insect, bird and mammalia, totally nearly 1,000 categories. Wherein, there are dozens of national first and second class protection animals, and over 90% white crane in the world inhabit here in winter. The plant category includes sand dune terraced plant communities and lake gleyzation marsh plant association, totally 39 associations, with the characteristics of north-south intersection, east-west integration. In addition, there is Lushan botanical garden.

(4) Industrial foundation

In recent years, Poyang Lake Eco-Economic Zone: firstly, greatly developed eco-tourism industry and realized ecological economization; secondly, made full use of soil and water resources of the region, greatly developed planting and breeding industry, primarily formed the large-scale ecological agriculture and became main rice and oil and grain deep processing base in China; thirdly, gave full play to the industrial comparative advantage industry and greatly developed medicine, precision manufacturing, electronic information industry. The good industrial foundation provides practical condition for the ecological capital operation. 2. The ecological capital operation is required for realizing the harmonious development of Poyang Lake Eco-Economic Zone

The ecological capital operation of Poyang Lake Eco-Economic Zone aims to realize the ecology economization and realize the preservation and appreciation of ecological capital. The price maintenance is the premise of operation and the appreciation is the upgrade and objective of operation. The appreciation of

ecological capital can realize monetary return and improve the economic development level of Poyang Lake Eco-Economic Zone. On this basis, further increase the ecological resource protection input force of Poyang Lake Eco-Economic Zone, and promote the good cycle of “preservation of ecological environment – ecological economy development – appreciation of ecological environment”.

With the great promotion of industrialization, urbanization and agricultural industrialization, Poyang Lake Eco-Economic Zone is facing great pressure in resources and environment and some place has the selection dilemma of “adequate or ample food and clothing or environment”. Although Poyang Lake Eco-Economic Zone enhanced the protection of ecological environment in the region, there are still many problems. For example, the water basin of Poyang Lake is not optimistic, even the water quality of Poyang Lake is deteriorated. Some ships steal sand and snails, tourists drop litter and some enterprises privately discharge sewage to the lake, which appear repeatedly. For example, the economic operation of Poyang Lake Eco-Economic Zone is still the extensive development, which consumes much ecological resource. If no reasonable operation is made, the resource may be exhausted. Therefore, the ecological capital operation of Poyang Lake Eco-Economic Zone is extremely urgent, which is the urgent need for the economic development, and the key for solving resource structure imbalance and restoring the ecological environment.

(iv) Subject and Function of Ecological Capital Operation Mode and Path of Poyang Lake Eco-Economic Zone

1. Government

The ecological resource of Poyang Lake Eco-Economic Zone is public product and belongs to the country or collective, corporate

and individual possessing use right, operation right and profit distribution right. Therefore, from the economic perspective, it must be guided and regulated by the government; otherwise, the “tragedy of the commons” will appear. The ownership property decides that the government is the first responsible person and investor of ecological capital operation of Poyang Lake Eco-Economic Zone and the first guarantee body promoting the ecological capital operation of the region.

2. Enterprise

The government ability is limited, so all the subjects shall orderly operate under the market economy to maximize the benefits of interest subject on the premise of preservation and appreciation of ecological environment. The enterprise is the specific operation subject as well as consumption subject for ecological capital operation of Poyang Lake Eco-economic Zone. On one hand, the enterprise can obtain the operation right of ecological capital of Poyang Lake Eco-Economic Zone by various means, perform transformation and operation of ecological capital under the supervision of government, constantly research and develop ecological products with high added value by technological innovation and realize transformation and upgrade of “ecological resource-ecological capital-ecological value”. The enterprise can obtain benefits and further promote the development. On the other hand, the enterprise also purchases ecological resource or ecological products and service from the government and other enterprises, and the purchasing should be done under the marketization. Therefore, the enterprise is indispensable to the ecological capital operation.

3. Other social organizations and individuals

The government and enterprise represent the guarantee and operation subject of

ecological capital operation of Poyang Lake Eco-Economic Zone and other relevant social organizations and individuals exercise the responsibility of social supervision and consumer subject of ecological capital operation of Poyang Lake Eco-Economic Zone. On one hand, under the market economy, the government supervision is limited; other third party shall exercise the supervision responsibility to supervise the whole process of ecological capital transformation and restrict possible right seeking, ecological resource and environment damage behaviors in the process. On the other hand, many individuals are main consumers of ecological products and service. Improve the green consumption awareness to lead the enterprise's supply behavior, so as to improve the operation ability of ecological capital in Poyang Lake Eco-Economic Zone.

IV. Building the Ecological Capital Operation Mode of Poyang Lake Eco-Economic Zone

(I) Laying a foundation for the construction of ecological capital operation mode

The system is the “cage” of economic development. The complete system and policy system is the premise of ecological capital operation and the key for development. Be sure to clarify the rights of ecological capital of Poyang Lake Eco-Economic Zone, divide the responsibilities of government and market, and form the healthy mechanism of market in reasonable operation under the guide of the government.

1. Completing the operation system of ecological capital marketization

The ecological capital operation needs the support of non-government organizations. The transformation and upgrade of ecological resources can be realized effectively only if the government, organization and other social organizations and individuals participate in the

marketization platform. Ecological resources belong to public products, with characteristics of large capital investment but slow effect. The government shall launch relevant incentive measures to make the private capital rapidly and bravely enter the market and give full play to the function of private capital.

2. Clarify the ownership of ecological resources and the allocation of rights of each subject

The definition of ownership of ecological resources is the key to avoid “tragedy of the commons”. In China, as the responsibility, right and benefit in the ecological resource property right arrangement is non-symmetrical, on one hand, it causes the contending for power and profit and buck passing between local places, departments and local government and department, which is one of important reasons of ecological environment deterioration in China. Poyang Lake Eco-Economic Zone also may have dispute among interest bodies caused by unclear property right of ecological resources, which may influence the smooth transformation and upgrade of ecological resources. Therefore, build the natural resource property right, land development, ecological compensation, environment governance reward and punishment, ecological market operation, ecological performance appraisal and responsibility investigation and other mechanisms of Poyang Lake Eco-Economic Zone as quickly as possible and enhance the system construction of Poyang Lake Eco-Economic Zone.

(II) Specifying main content of ecological capital operation mode

Build proper ecological capital operation mode for the ecological capital operation. As per the actual condition of Poyang Lake Eco-Economic Zone, the author regards that the ecological capital operation mode should be built in following aspects:

1. Ecological environment protection system. The environmental protection is the foundation for ecological development, the ecological environment is rare, so it is required to reasonably make use of it. The government should launch relevant policy, take strict punishment measures, eliminate and punish unreasonable, uncivilized and unhealthy behavior.

2. Eco-product system with high added value. Relying on the ecological resource conditions in Poyang Lake Eco-economic Zone, such as water resource and land resource, reasonably plan the breeding and planting base, develop the ecological resource deep processing enterprise, develop high quality green industry and produce green agricultural products.

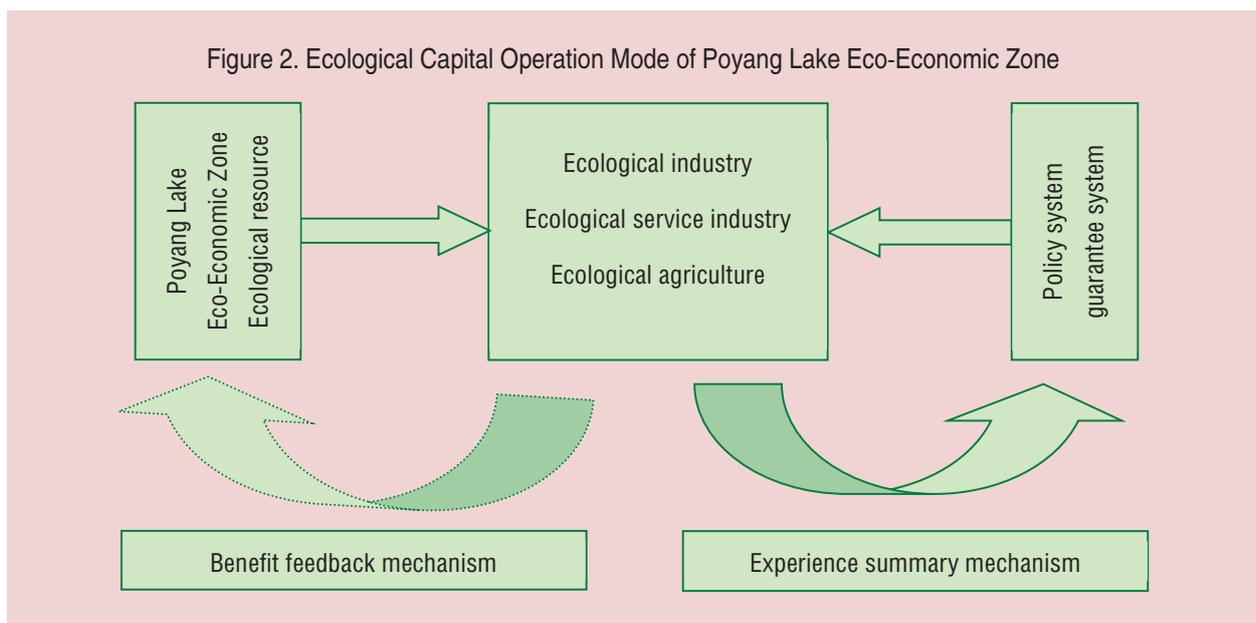
3. Ecological service system with high added value. Poyang Lake Eco-Economic Zone possesses natural ecological tourism conditions, reasonably plans the eco-tourism route and organically combines the promotion of ecological agricultural products with the development of eco-tourism.

4. High-efficient supporting system. The ecological capital operation needs the support

from the government and society, such as policy support, fund support, public ecological consciousness improvement. It's required to build the high efficient supporting system, especially complete finance, fiscal tax and subsidy policy to promote the smooth progress of ecological capital operation.

(III) Building the frame of ecological capital operation mode

The building of ecological capital operation mode of Poyang Lake Eco-Economic Zone shall consider the common features of the zone, including plentiful ecological resources and purpose of realizing preservation and appreciation of ecological resource and capital; and consider the characteristics of Poyang Lake Eco-Economic Zone, including economic development condition, fund investment force of Jiangxi Province and natural resource feature of Poyang Lake, etc. As per the basis and content of ecological capital operation mode of Poyang Lake Eco-Economic Zone, this paper builds the following ecological capital operation mode of Poyang Lake Eco-Economic Zone (shown in the figure 2).



(IV) Promoting the implementation of ecological capital operation mode

1. Punish the behavior damaging the ecological environment

Everybody is responsible for protecting the ecological environment of Poyang Lake Eco-Economic Zone. Formulate strict punishment measures to effectively hinder the uncivilized behavior. Poyang Lake Eco-Economic Zone is an important constituent part of creating “Jiangxi Model” of Beautiful China. Therefore, be sure to enhance the ecological environment protection force, strictly punish the uncivilized behavior and eliminate the “willful” damage of Poyang Lake ecological environment.

2. Greatly develop green agriculture

In recent years, Poyang Lake Eco-Economic Zone has achieved certain results in the ecological agricultural product production, has diversified promotion and publicity modes, such as exhibition, “Internet +”, intelligent agriculture “123+N” platforms to widely promote the products. However, under the influence of scale benefit, price of agricultural product and ecological environment, the production and operation mode and industrial structure of green agriculture should be adjusted. Poyang Lake Eco-Economic Zone shall actively promote the green agriculture demonstration park project, build the green agricultural product production base, enhance the technical support, introduce new categories and complete the agricultural service system.

3. Greatly develop green industry

Poyang Lake Eco-Economic Zone shall grasp the opportunity of strategic transformation, greatly develop high-tech and energy-saving and environmental protection industry and avoid the old path of development and then governance. On one hand, led by leading enterprises in the zone, with critical technology as the breakthrough, expand the advantageous industries like bio-medicine,

photovoltaic, aviation and green products deep processing, etc.; on the other hand, accelerate the transformation and upgrade of traditional industries like iron & steel, petrochemical, textile, etc., renovate the overstock industry, close down outdated production facilities and promote the industrial optimization and upgrade.

4. Accelerating the development of ecological service industry

As per the development conditions and current situation of service industry in Poyang Lake Eco-Economic Zone, mainly accelerate the ecological service industry from four aspects: eco-tourism, finance industry, leisure, endowment and e-commerce. The eco-tourism is one of specialty industries, so it shall be reasonably arranged. Develop a batch of featured tourism products in Poyang Lake Eco-Economic Zone and set reasonable route to meet the mental requirement and purchasing requirement of tourists. The tourism development needs the support of the financial service industry. It's required to accelerate the building of financial service area and industrial park of Poyang Lake Eco-Economic Zone, complete the financing system of enterprise, lower the enterprise financing cost, and build the e-commerce platform to promote the communication between industry and various organizations.

5. Building the benefit feedback mechanism and experience summary mechanism

It's not only to build the ecological capital operation mode of Poyang Lake Eco-Economic Zone, but also to summarize and think the problem in the operation. The mode operation mainly reflects the adjustment and integration process of primary, secondary and tertiary structure, which involves policy execution, capital condition and implementation of relevant reward and punishment. Therefore, in the capital operation process, draw inferences

about other cases from one instance, feed back the benefits from three industries to new mode operation, and rectify the lessons of previous mode operation. In this way, form the positive cycle of “preservation of ecological environment-development of ecological economy-appreciation of ecological environment”.

V. Path Selection of Ecological Capital Operation Mode and Path of Poyang Lake Eco-Economic Zone

(I) Development and operation path of ecological project

Reasonable projects suitable for local conditions can effectively promote the classification and integration of ecological resources of Poyang Lake Eco-Economic Zone. The path takes the project-driving as the guiding thought, adopts scientific and reasonable planning, innovatively promote the marketized operation of featured project and realize the preservation and appreciation of ecological resources in Poyang Lake Eco-Economic Zone. The essence of operation path is to use resource property to replace the capital operation and it generally adopts means like investment attraction, contracting operation, displacement of property right, etc. Much early planning and demonstration are required for this mode to effectively balance the overall transformation and upgrade of resources in the eco-economic zone and promote the building and development of industrial cluster in the whole eco-economic zone.

(II) Ecological product development operation path

The key of the operation path is to develop ecological products and its essence is to develop featured products in Poyang Lake Eco-Economic Zone to realize the resource transformation and capital operation. The path is relatively simple, direct, with short cycle, fast effect, targeted and better reflects

the local features. However, large amount of fund and complete market environment are required in the early stage. In addition, the mode mainly takes the market rate of return as the judgment standard of resource preservation and appreciation, it's limited to current using price and it's hard to take the ecology as the judgment standard. If the government guidance and intervention are not in place, it may easily get lost in the mode of pursuing maximum benefits, which may cause waste of ecological resources in Poyang Lake Eco-Economic Zone. The mode is applicable to the region with relative complete market environment and obvious industry features.

(III) Local traditional customs development and operation path

Greatly developing ecological civilization construction is not to abandon the traditional customs culture, but organically combine the traditional customs culture and ecological civilization construction and develop the “ecological customs culture” in the innovative manner. The operation path takes the traditional custom culture in Poyang Lake Eco-Economic Zone as the core, publicizes the traditional custom culture, combines featured ecological industry of the zone and combines the culture and economy to realize transformation and upgrade of ecological resources. The advantage of the path is to properly integrate regional resources, systematically improve the resource return in the ecological zone, which can effectively publicize local traditional custom culture, and bring great social and economic benefits.

(IV) PPP development operation path

PPP operation mode is the common mode, i.e. government and social capital cooperation development. In 2015, the water environment comprehensive treatment Phase I project of Poyang Lake Basin was included in PPP project library of China. It's to realize development

and transformation of ecological resources of Poyang Lake by social funds. The path selection meets the local economic development requirement and it's widely applied to the development of many tourism projects. The advantage is to greatly improve the development efficiency, save the government fund and ensure the stability and planning of project. However, pay attention to issues as big capital pressure, mutual restraint, flexibility shortage, and market monopoly caused by franchise, etc. in the operation. Therefore, PPP development and operation mode is the "double-edged sword". The key to properly use the mode is to clarify the ecological capital stock in Poyang Lake Eco-Economic Zone, find proper cooperation path and promote the win-win situation of cooperation parties.

Conclusion

On the basis of the previous research results, this study studies the mode and path of ecological economic capital operation in Poyang Lake. In general, to keep coordinated development of eco-economy and green industry and supplement of ecological

environment and sustainable development, Poyang Lake Eco-Economic Zone should fully develop the ecological resources in the region, select reasonable development and operation path by the marketized operation mode, transform the ecological resources of Poyang Lake Eco-Economic Zone into ecological capital, promote the economic development of the area and really realize "green hills and clear waters" as "mountains of gold and silver". This study further widens the research field of ecological capital operation, and deepens the research of ecological capital theory, which has certain theoretical significance. Furthermore, This study explores the specific mode and implementation path of ecological capital operation in Poyang Lake eco economic zone, and has a strong practical guiding significance for promoting the harmonious development of ecological environment and economy in Poyang Lake eco economic zone. Meanwhile, it also provides useful experience for other areas, especially in less developed areas, to solve the contradiction between economic development and environmental protection.

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