

SETTING SAIL FOR A GREENER HORIZON: SOCIAL CAPITAL'S INFLUENCE ON MARINE ECOLOGICAL COMPENSATION

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Abstract: The construction of the marine ecological environment is a crucial facet of broader ecological initiatives. Given the fluidity and cross-regional nature of seawater, marine environmental pollution tends to exhibit a higher degree of impact compared to land-based pollution. Additionally, its propagation effect is more pronounced, underscoring the imperative for effective and targeted environmental safeguarding measures. Ecological compensation stands as a foundational pillar in our country's ecological development. As the ecological environment continues to face escalating challenges, there is a discernible upswing in the support dynamics for ecological compensation in our nation. Marine ecological compensation represents a comprehensive institutional framework that internalizes the externalities arising from marine ecological preservation. It optimizes the interest distribution paradigm between marine ecological reserves and areas benefiting from marine ecology, employing a blend of public policy tools and market mechanisms. The primary objective is the realization of ecological environmental protection and the advancement of ecological civilization construction. Ensuring and augmenting the funding sources for environmental safeguarding measures constitutes the bedrock of marine ecological compensation.

Keywords: Marine ecological environment, environmental protection, ecological compensation, marine environmental pollution, ecological civilization construction.

1. Introduction

Marine ecological environment construction is an important part of the construction of ecological environment. Due to the fluidity and trans-regional of sea water in Marine environment, the damage degree of Marine environmental pollution is more than that of land pollution, and the diffusion effect is more serious at the same time, which makes it necessary to take effective means and measures for environmental protection. Ecological compensation is an important bottom of ecological construction in our country, along with the ecological environment's gradual deterioration, our country's support dynamics in the field of ecological compensation is strengthening gradually. Marine ecological compensation refers to a comprehensive institutional arrangement that internalizes the externalities generated by Marine ecological protection and optimizes the pattern of interest distribution between Marine ecological reserves and Marine ecological beneficial areas by means of public policy means and market mechanism, aiming at realizing ecological environmental protection and ecological civilization construction^[1]. To guarantee and enrich the fund source of environmental protection measures is the basis of Marine ecological compensation.

At present, the funds needed for Marine ecological compensation mainly come from the government financial allocation, and part of the compensation comes from the Marine ecological environment damage, which is easy to cause problems such as the single structure of Marine ecological compensation funds, weak resistance to risks, lack of sustainability and government financial pressure. On the one hand, due to the lack of stable export of ecological products, it is difficult to form an internal driving force with economic benefits as the core; on the other hand, due to the obvious intention of "free riders" of relevant beneficiaries and their reluctance to pay compensation funds, and the tendency of social capital to seek benefits and avoid harm, they are reluctant to invest in Marine ecological compensation projects with obvious public welfare, resulting in weak external financial support^[2]. Therefore, it is more necessary to expand the fund source channels of Marine ecological compensation, break through the barriers between government funds and social capital, and enrich the fund structure of Marine ecological compensation. At present, the most common methods for raising and using Marine ecological compensation funds are to emphasize market operation, use a variety of financing methods, and pay attention to multiple payment subjects, so as to build the corresponding social capital intervention pattern.

Therefore, it is urgent to focus on the fund structure of Marine ecological compensation, take social capital intervention as the key, establish social capital intervention pattern of Marine ecological compensation, attract direct beneficiaries and social capital participation, and solve the problem of fund raising.

2. Framework of social capital intervention pattern for Marine ecological compensation

Public-Private Partnership (PPP) is a kind of cooperation between government departments and private enterprises based on specific projects^[3]. In the field of public services and products, by taking public needs as the starting point and commercial interests as the link, this partnership pattern of operation can effectively make up for the lack of government funds for infrastructure construction, so as to form a long-term cooperative relationship dominated and supervised by the government and involving social capital in construction. The investment pattern of PPP fund refers to the investment in PPP projects in the form of industrial funds, which directly or indirectly invests in PPP projects. Generally, it invests in local governments' project companies under the PPP framework by means of equity, debt or joint equity and debt. The project companies are responsible for the design, construction and operation of specific projects. The government signs an agreement with the Special Purpose Vehicle and grants the franchise right for a certain period of time. When the term of the fund expires, the withdrawal of fund investment can be realized by means of repurchase agreement, share transfer or realization in the capital market^[4].

2.1 Fund establishment

PPP fund establishment refers to the process of launching PPP fund and raising funds through the fund. Fund initiation refers to the selection of sponsors and custodians according to the conditions of fund initiation of relevant departments, the establishment of a corresponding fund management

company to manage the fund, and the raising of funds from investors in accordance with the prospectus after examination by the competent authorities.

First, fund initiation. Based on the nature of public goods in Marine ecological compensation, the resulting public nature and unclear property rights, the construction of Marine ecological compensation needs to be led by the government. Therefore, the PPP fund for Marine ecological compensation should be involved and led by the government, and a corresponding fund management company should be established. The public credibility of the government can provide a guarantee for the funding source of the PPP fund, and attract more social capital to intervene in the field of Marine ecological compensation.

Second, the form of organization. As for Marine ecological compensation projects, they are characterized by large scale, large capital operation volume and long investment recovery cycle, thus causing the problem of large investment risk of Marine ecological compensation projects. Social capital is more inclined to choose investment projects with high returns and low risks, so it is more necessary to form a relatively stable fund investment structure in the selection of organizational forms. By adopting the form of limited partnership, which is jointly established by limited partners and general partners, and the partners assume the responsibility of capital contribution and operation and management accordingly, the limited liability and limited investment income can be guaranteed. Moreover, the reasonable design of funds can balance the investment risk and investment income of the fund, and then reduce the investment risk while ensuring the social capital income.

Third, the way of establishment. The PPP fund for Marine ecological compensation needs to adopt a closed way of establishment. The total capital amount and issuance share of the fund should be clearly defined before the fund is issued, and it is not allowed to withdraw within a certain period of time. By adopting a closed setting method, the fund source of Marine ecological compensation projects can be ensured to be sufficient and stable during the construction and operation period.

Fourth, raising object and structure. Marine ecological compensation PPP fund is mainly raised by the government, social investors, management companies, financial institutions, etc., with government funds as the backstop, financial institutions as the priority target, and government credit as the guarantee for fund credit enhancement, so as to attract more social capital.

Fifth, investment targets. The PPP fund for Marine ecological compensation mainly focuses on a certain sea area and invests in the construction and operation of Marine ecological compensation within the sea area. It not only invests in a single project, but invests in a project package, which is formed by the aggregation of multiple industries, so as to form mutual influence and connection between the industrial chain. Through the design of interconnected industrial chain, the medium and low profit Marine ecological compensation projects can improve the investment return of the project package and reduce the investment risk, so as to attract social capital to the medium and low profit Marine ecological compensation projects. At the same time, a sub-parent fund is established, which takes the form of the parent fund investing in the sub-fund and the sub-fund investing in other funds or project companies. The parent fund can only invest in various sub-funds, and different sub-funds can invest in each other according to the needs and actual conditions of the project, so as to diversify the investment risks of the

parent fund. At the same time, a multi-layer fund structure can be created, and each layer can introduce social capital. Thus, it can leverage more social capital into Marine ecological compensation, thus strengthening the stability of industrial investment chain and fund chain.

2.2 Project operation

PPP fund project operation mainly emphasizes three parts, which are project screening, special purpose vehicle (SPV) establishment and operation, and project operation. PPP fund is a combination of industrial investment fund and PPP model, taking into account the characteristics of typical PPP model and regional industrial investment fund. Based on the project, with contract as the core and franchise transfer as the means, it integrates project financing, construction and operation. PPP projects are extended with PPP funds, and then a Special Purpose Vehicle composed of social capital, PPP funds and the government is established around the PPP projects. Relying on its own assets, the franchise rights granted by the government and the investment and financing of the early, middle and late stage projects, it can obtain future earnings through project operation.

First, project screening. Centering on the PPP mother fund platform for Marine ecological compensation, relying on the investment experience and expertise of professional fund managers of fund management companies, the specific Marine ecological compensation projects and their social capital parties are screened and identified according to different sub-fund classifications, so as to give play to the risk identification and prevention role of PPP funds. In addition, the feasibility evaluation of the Marine ecological compensation project in the direction of technology, market and operation is carried out to reduce investment risks and guarantee the returns of fund investors.

Second, the construction and operation of the Special Purpose Vehicle (SPV). Due to the public welfare nature of Marine ecological compensation PPP projects, they are more likely to be initiated by government departments. After the PPP projects have been reviewed by relevant government departments and screened by the PPP mother fund platform, social investors can be selected for the implementation of the Marine ecological compensation PPP projects through the preparation of the implementation plan, project bidding and other ways. Marine ecological compensation PPP fund management company forms a consortium with social capital and negotiates and negotiates with government departments on PPP project bidding, including the total amount of investment, the way of investment, the way of participation in operation and management, the profit distribution mechanism, the exit way, risk management and other aspects. Through negotiation, a "risk-sharing and revenue-sharing" mode is formed between the two parties, and the project company is established according to the negotiation results, and the franchise rights granted by the government are used for project construction and operation.

At the same time, project financing is also an indispensable part of the construction and operation of the SPV. The PPP fund invests in Marine ecological compensation projects in various ways and has its own characteristics. According to the different needs of the Marine ecological compensation projects at different stages, the fund investment mode also needs to be adjusted accordingly. In the early stage of the project, one-time investment of project subsidy can be used as the main way to provide free financial support for the Marine ecological compensation projects that are difficult to finance in order to guide

and support ecological construction, and help the implementation of Marine ecological compensation projects. In the construction stage of the SPV, equity investment can be adopted as the main way, direct investment funds as the project capital, become the shareholders or partners of the Marine ecological compensation project, according to the profit distribution in the future operation period of the project to obtain income. In the financing stage of the SPV, creditor's investment and financing guarantee can be adopted as the main ways. PPP fund provides financial support for the Marine ecological compensation project in the form of creditor's capital. The rights and obligations of both parties are defined through the agreement, and the Marine ecological compensation project pays principal and interest to the investors regularly according to the specific content of the agreement. At the same time, PPP fund, as a guarantor in the financing process of Marine ecological compensation projects, can improve the follow-up financing ability of Marine ecological compensation projects by injecting funds or credit into the Marine ecological compensation projects, and help the Marine ecological compensation projects successfully obtain financing funds.

Third, project operation. PPP project operation is the key to generate project benefits and realize capital appreciation. Due to the particularity and public welfare of Marine ecological compensation, it is more necessary to explore the economic benefits of the project, so as to ensure the attraction of social capital. According to the different PPP projects in operation, they can be divided into the following three categories: operational project, quasi-operational project and non-operational project (See table 1).

Table 1: Item classification table

Form	industrialization	Semi-ecological industrialization	ecologicalization
Connotation	Operational project	quasi-operational project	non-operational project
Content	Marine pasture Marine testing ground Marine tourism resources development Recreational fishery	Enterprise sewage treatment Blue carbon industry	Marine survey site Marine biodiversity construction Marine ecological environment construction
Benefit evaluation	Economic benefit > social and ecological benefit	Economic benefits ≈ social and ecological benefits	Economic benefit < social and ecological benefit

User - paid is the main source of operating project income. At present, the operational projects include Marine ranching, Marine testing ground, recreational fishery, Marine tourism resources development, etc., which tend to form the output of products or services and can be accepted by the market. The business activities around the enterprise itself are the key to support the operation of the enterprise. However, due to market uncertainty, seasonality, policy and other factors, there are some errors in the calculation of future income, which will lead to the increase of investment risk. Operational projects can adopt the creditor's investment mode, giving priority to the repayment of principal and interest to creditors when the project income is distributed, which not only enables the fund to obtain relatively

stable investment income, but also enables the investors to withdraw from the project flexibly through the creditor's way to reduce the investment risk.

At present, quasi-operational projects include the direct discharge of waste water into the sea and the treatment of blue carbon industry. Although such projects can generate a certain amount of profits, their income is significantly lower than the cost to some extent, and the social and ecological benefits of the projects are obvious, so the government needs to provide corresponding financial subsidies. For quasi-operating projects, on the one hand, they will charge certain service fees to their service providers after completion, and on the other hand, they will make up for the gap by relying on enterprise operation subsidies given by the government. With policy subsidies as the backstop, investment risks are relatively small compared with operational projects. Therefore, equity investment and debt investment can be combined to enable investors to have certain control and decision-making power over projects, so as to participate in operation management and improve their investment returns.

Non-operational projects are pure public welfare projects due to the lack of clear marketized income and centering on the government financial allocation as a return mechanism. Currently, non-operational projects include Marine survey sites, Marine biodiversity construction, Marine ecological environment construction, etc. Such projects take ecological and social benefits as the fundamental starting point, and emphasize the optimization of Marine ecological environment and resources. Since government financial funds are used as start-up and operation funds, this project has a stable funding source and less investment risk. Equity investment can be adopted to ensure long-term holding of the project, so as to ensure smooth construction and operation of the project.

2.3 Fund withdrawal and project transfer

The purpose of PPP fund for Marine ecological compensation is not to possess or control the invested project company, but to promote industrial development and guarantee fund investors to obtain certain investment income. Therefore, the smooth withdrawal of PPP fund is the key to realize the circulation of funds, and also the premise of realizing the intervention of social capital. A good withdrawal mechanism can enable the PPP fund for Marine ecological compensation to realize benefits and develop. Therefore, when the project task or phased investment task is completed, the PPP fund for Marine ecological compensation can choose an appropriate withdrawal way at an appropriate time point to realize the withdrawal of the project (See table 2).

Table 2: Exit mode table

Serial number	Exit mode	Main content
1	Project liquidation	After the contract period of the project or the franchise period expires, the project company shall transfer the management right and ownership of the project to the government department or its designated agency in accordance with the contract, and carry out liquidation of the project company.
2	Enterprise listing	Taking the project company as the main body, the project company offers shares to the public, issues shares to the public market through the overall listing to raise funds, and makes excess profits through the operation of the capital

		market. However, the conditions for the listing of enterprises are harsh, and the general project company is difficult to achieve.
3	Asset securitization	Based on the cash flow generated by the underlying assets in the future, personal credit enhancement is carried out through the structural design scheme, so as to issue asset securities, that is, transform the materialized assets into securitization assets, and issue and sell securities based on the real assets.
4	Equity transfer	Equity transfer is a relatively common way of capital withdrawal. Social capital or PPP fund can transfer the equity held on the basis of the expiration of the transfer period, including internal transfer and external transfer. In other words, the flexible withdrawal method is adopted to increase the ability of social capital to resist risks and give social capital free choice.

3. Social capital intervention pattern guarantee measures for Marine ecological compensation

In order to better connect the actual implementation of Marine ecological compensation with the application of PPP funds, and promote the expansion of the scope of social capital involvement in Marine ecological compensation, the construction of PPP fund investment model is the key, and the corresponding measures are taken to ensure the standardization of institutional guarantee, the inclination of fiscal policy, the establishment of management system, the implementation of risk sharing and the cultivation of the spirit of contract.

3.1 System guarantee standard

At present, the regulations and systems formulated in the field of Marine ecological compensation are more focused on the regulation of government behavior, while the scope of the introduction of social capital is less involved. Moreover, in the actual implementation process of PPP projects for Marine ecological compensation, not only the participation of financial and ecological environment offices, but also the participation of social subjects, such as enterprises, social organizations and individuals, which involve a wide range of subjects. However, due to the lack of certain policy guarantees, social subjects will keep a wait-and-see attitude even if sufficient funds or technologies are prepared and even if the government has strong credibility. Therefore, it is more necessary for departments involved in Marine ecological compensation to further strengthen cooperation and form policy synergy, so as to reduce the uncertainty and risk of social subjects in the process of participation, improve the support mechanism, clarify the implementation rules and specific contents of Marine ecological compensation PPP projects, and release them in the form of local regulations or joint publication by departments. At the same time, the publicity and promotion of the policy should be strengthened, and its transparency should be increased to improve the understanding of relevant social subjects on the PPP project of Marine

ecological compensation, so that more subjects can participate in the construction of Marine ecological compensation PPP project.

3.2 Fiscal policy tilt

At present, the compensation fund in the field of Marine ecological compensation mainly comes from the government financial support. After the introduction of the concept of social capital, it does not mean that the financial policy does not need to help, but it needs to determine its proportion according to the actual project situation. For quasi-operational and non-operational projects, the social and ecological benefits generated by Marine ecological compensation are equal to or stronger than the economic benefits, so it is more necessary to do a good job of financial tilt for such projects. PPP projects for Marine ecological compensation are divided into three stages: direct allocation, operational performance and achievement assessment. Necessary establishment funds are provided in the early stage of the project to ensure that the PPP projects for Marine ecological compensation enter the operation period. During the operation process of the project company, According to their actual participation in Marine ecological compensation and the amount of investment in proportion to a certain amount of performance reward, finally, when the project is due, the whole range of results assessment, actual construction, actual ecological or economic benefits output as assessment indicators, the project to meet the requirements of the fund award.

3.3 Management system establishment

The cross-domain characteristics are the difficulties and pain points in the development of Marine ecological compensation, which will lead to the overlapping jurisdiction and control of different provincial and municipal governments, and hinder the development of related projects, and prone to multiple management. Therefore, it is necessary to take specific sea areas as the basic unit, take sea-level cities as the main participants, and take the lead of provinces to establish a unified management organization for Marine ecological compensation projects around the PPP fund for Marine ecological compensation, and track the whole process of the collection, calculation, release and supervision of Marine ecological compensation funds. Moreover, an open, transparent and unified information platform shall be established to provide information for social subjects and other government departments, and investment investment platforms shall be established in many places and multiple points to provide support for the contracting of PPP projects for Marine ecological compensation, so as to realize the reasonable transfer of compensation funds between the protectors and the beneficiaries, and promote the internalization of the externalities of Marine ecological compensation.

3.4 Implementation of risk sharing

Due to the long periodicity of Marine ecological compensation projects, they are more likely to face many risks in the market, such as credit risk, economic risk and operational risk. Therefore, it is urgent to identify the risk tolerance range and type of participants in different types of Marine ecological compensation PPP projects based on the characteristics of Marine ecological compensation, and share corresponding risks reasonably. For government departments, it is necessary to deal with political and credit risks and create a relatively stable policy environment for the implementation of Marine ecological compensation PPP projects. For social investors, it is necessary to deal with operational risks,

ensure that the Marine ecological compensation project can reach the agreed results during the franchise period, analyze and evaluate the social needs, and improve the profitability. For both parties, focus on finance, investment, force majeure risks, specify the scope of both parties to bear in the form of detailed rules or contracts, and adjust in time with the change of regional and social environment, so as to achieve the balance of interests of all parties in the PPP project of Marine ecological compensation.

3.5 Cultivation of contract spirit

The Marine ecological compensation PPP project is a contract signing and cooperation among the government, social capital and PPP fund under the principle of equality and mutual benefit. Therefore, the three parties need to uphold the spirit of contract, strictly implement the content of the contract, and ensure the successful completion of the project. For the government, it is necessary to provide subsidies to the PPP projects of Marine ecological compensation according to the actual amount and conforming circumstances stipulated in the contract, and in accordance with the agreed period. At the same time, it should do a good job in the supervision of the PPP projects to achieve special funds, and do a good job in purchasing the actual products or services of the PPP projects of Marine ecological compensation. For social capital, it is necessary to strengthen its own construction around the project construction, operation and other cycles, improve the output capacity of products or services, and pay attention to the social and ecological benefits of the project while charging reasonable fees. For the PPP fund, it is necessary to guarantee the cash flow of the Marine ecological compensation PPP project and ensure the effective operation of the project in accordance with the term agreed in the contract.

4. Conclusion and prospect

The construction of Marine ecological compensation through PPP projects is a key step to promote market-oriented reform in the field of ecological compensation and a necessary move to implement the national ecological strategy. Through the organic combination of Marine ecological compensation and PPP projects, the funds needed for Marine ecological environment restoration can be satisfied to a certain extent, and the excess funds in the society can be absorbed and activated, which is conducive to a win-win situation for both. It still needs to be made clear that although PPP projects for Marine ecological compensation can enrich the diversity of compensation funds and promote the marketization of compensation process, their essence is still a financing mode for Marine ecological compensation and a tool to promote the smooth progress of Marine ecological compensation, focusing more on the construction process of Marine ecological compensation projects. However, the government still needs to guide the subjective aspects such as the enhancement of residents' environmental awareness and the strengthening of enterprises' willingness to participate actively.

As the application of PPP projects in the field of Marine ecological compensation is still in the theoretical stage, there are still many blocking points in the practical operation that need to be improved. On the one hand, social capital participation needs to increase. PPP projects can attract some social capital to participate in Marine ecological compensation under market operation, but the participation of social capital is positively correlated with the public's awareness of Marine ecological environmental protection. How to improve the public's awareness of environmental protection and correctly understand the relationship between economic development and ecological protection will be

the key to improve the spontaneous participation of social capital. At the same time, for the access threshold of social capital, too high will easily lead to increased financing difficulty, while too low will lead to increased capital risk. Therefore, how to reasonably delimit the access threshold of social capital needs reasonable analysis and judgment by government departments in the practice process. On the other hand, the implementation rate of Marine ecological compensation PPP projects needs to be improved. On the basis of improving the policy system structure of Marine ecological compensation PPP projects, focus on the process of project implementation, optimize the relevant processes such as departmental collaboration, approval and filing, improve the profitability of Marine ecological compensation PPP projects and speed up the implementation of Marine ecological compensation PPP projects by means of preferential policies and model innovation. The Marine ecological environment should be improved while the interests of all parties should be balanced, so as to promote the construction of ecological civilization.

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