

Research on the Whole Process Management Mechanism of Mangrove Carbon Sink Trading in Zhanjiang, Guangdong Province under the Background of Carbon Neutrality

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Abstract: Zhanjiang Mangrove National Nature Reserve is the largest and most diverse mangrove reserve in China. Mangroves have a strong carbon sequestration capacity, and the study of the whole process management mechanism of carbon sink trading in Zhanjiang mangroves is a positive response to the dual carbon strategy proposed by General Secretary Xi Jinping. This paper first analyses the current situation of mangrove protection in Zhanjiang, based on which it proposes the trading principles and organisational structure of the mangrove carbon sink market, and finally proposes three major management mechanisms: accounting, regulation and safeguard mechanisms. Zhanjiang should make full use of the blue carbon economy contained in the mangrove forests to seek the path of green development and ecological development, and contribute to the achievement of the national goal of carbon peaking and carbon neutrality.

Keywords: Carbon Neutrality; Zhanjiang Mangrove Forest; Carbon Sink Trading; Management Mechanism

1. Introduction

The report of the 20th Party Congress clearly proposes to actively and steadily promote the carbon peaking and carbon neutral strategy, which is a major decision and deployment made by the Party Central Committee with Comrade Xi Jinping at its core to co-ordinate the two major situations at home and abroad. Mangroves are an important part of the blue carbon ecosystem and play an important role in carbon sequestration and storage, coping with climate change and maintaining biodiversity. Guangdong Zhanjiang Mangrove National Nature Reserve is the largest mangrove reserve in China, and studying the management mechanism of carbon sink trading in Zhanjiang mangrove is of great significance in promoting the development of blue carbon economy and helping to achieve the double carbon goal, which is an effective measure to implement Xi Jinping's thought on ecological civilization. Based on the analysis of the current situation of mangrove protection in Zhanjiang, this paper studies the role and value of mangrove and other coastal wetland blue carbon in increasing sinks and reducing emissions, studies the whole process management mechanism of carbon sink trading, realizes the value of blue carbon and blue carbon ecosystem through market mechanism, and realizes the goal of constructing the whole process management mechanism of mangrove carbon sink trading in Zhanjiang.

2. Status of mangrove conservation in Zhanjiang

In the past, due to large-scale reclamation of sea land, aquaculture in ponds, rapid urbanization and overfishing, mangrove vegetation area was reduced, community degradation and natural ecological balance was destroyed. With the restoration of mangroves in recent years, the ecological restoration of cleared breeding ponds has been carried out, and mangrove artificial afforestation has been vigorously carried out. At present, Zhanjiang has 9960 hectares of mangroves, accounting for 33% of the national mangrove area and 78% of the Guangdong mangrove area. The mangrove national Nature Reserve is the largest mangrove area, the most concentrated

distribution and the most diverse nature reserve in China. It is also a member of Ramsa International Wetland of Importance and China Human and Biosphere Reserve. Afforestation and green restoration have achieved remarkable results.

Now, Zhanjiang has formally proposed to build a "Mangrove City", and has formulated and implemented the "Action Plan for Building a Mangrove City in Zhanjiang (2021-2025)", laying a solid foundation for the construction of "Mangrove City". According to the plan, by 2025, Zhanjiang will construct and restore an area of 4,183 hectares of mangrove forest, vigorously develop the blue carbon economy of mangrove forest, and turn Zhanjiang mangrove forest into "golden forest".

3. Principles for structuring the Zhanjiang mangrove carbon sink market

The establishment of the Zhanjiang mangrove carbon sink trading market should comply with the three principles of sustainable development, standardised access and transparency of trading information. The principle of sustainable development means that the mangrove carbon sink trading model should be built on the premise of protecting the local ecological and environmental system from damage to the greatest extent possible, and achieving the coordinated development of resources, environment and economy through mangrove carbon sink trading. The principle of standardised access means that there should be clear guidelines for access to the trading market in order to ensure orderly trading. The principle of transparency of trading information means that the supply and demand in the market should be positioned in a timely and accurate manner, and various types of information in the trading market should be disclosed to reduce the market trading problems caused by information asymmetry. In addition, the transparency of information can avoid the occurrence of market monopoly, which is conducive to ensuring fair competition among trading participants and achieving the optimal allocation of resources in carbon trading.

4. Organizational structure of the Zhanjiang Mangrove Carbon Exchange

Market

Generally speaking, there are three main players in the carbon sink market: the government, the demanders of carbon sinks and the suppliers of carbon sinks. Among them, the Carbon Exchange and the China Carbon Registry act as the medium of carbon trading, and the main body of the transaction is the "institution or individual". Based on the above-mentioned principles of the carbon sink market, the organisational framework of the Zhanjiang mangrove carbon sink trading market can be summarised as follows: Under the effective supervision of the government, the carbon sink trading is carried out in an orderly manner, giving full play to the role of guidance, control and supervision. The carbon sink suppliers (sellers) provide the carbon trading platform (e.g. exchange) with marine carbon sinks and their related derivatives, and the carbon sink demanders (buyers) buy the products they need from the platform at a fair and competitive price. There are currently two main types of underlying trading products in circulation in China, namely carbon emission allowances (CEAs) and state-certified voluntary emission reductions (CCERs). CEAs and CCERs are also collectively referred to as carbon assets, which can be traded and invested in the carbon market. Of these, carbon emission allowances are the main product traded in the carbon market.

Taking carbon quotas as an example, carbon quotas refer to the determination of the total amount of carbon emissions in a region by relevant institutions or government units through scientific calculations, and the establishment of a total cap on greenhouse gas emissions in a certain industry by institutions or governments at all levels according to certain rules, and then the allocation of carbon emission quotas to each controlled enterprise, and there is a certain limit to the amount of carbon emissions allowed for each enterprise. For example, if company A is allowed to emit 100 tonnes of carbon within a certain period of time, but company A actually emits 110 tonnes, then company A will need to buy 10 tonnes of carbon allowances from companies that have a surplus of carbon emissions to offset the excess emissions. The example shows that each enterprise is both a demander and a supplier of carbon sinks, and that the two parties trade by buying and selling a certain amount of carbon credits. Some enterprises with high carbon emissions (e.g. petrochemicals, iron and steel building materials, etc.) need to ensure that their production is not affected and that their own carbon emissions do not exceed the carbon credits set by the government, so they often need to sell carbon credits to some enterprises that have a surplus of carbon credits. In this case, there are two scenarios: those companies with a surplus of carbon credits can sell their excess carbon credits for financial gain, while those with a shortage of carbon credits can buy the carbon credits of other companies to compensate for their excess greenhouse gas emissions.

The above is the internal behavior of both sides of carbon trading. Externally, mangrove carbon sink trading is a market transaction in which the total amount of carbon dioxide absorbed and stored by mangroves is strictly examined and identified and listed for sale on the carbon exchange. Carbon emitters offset their industrial carbon emissions by purchasing the amount of carbon dioxide sequestration from mangrove carbon sinks. By setting the carbon emission price, the carbon trading market encourages enterprises to strengthen the internal motivation of low-carbon emission reduction by means of interest regulation, and at the same time encourages investors to invest in clean and low-carbon industries, so as to finally achieve the purpose of controlling the total carbon emission.

5. Construction of a whole process management mechanism for carbon sink trading in Zhanjiang mangroves

In order to respond to Zhanjiang's slogan of "Mangrove City" and to promote carbon neutral carbon trading in Zhanjiang, there is an urgent need to build an orderly, fair and efficient management mechanism for mangrove carbon sink trading based in Zhanjiang. The management mechanism is based on the actual situation of the mangroves in Zhanjiang, and is based on the three principles of the Zhanjiang mangrove carbon sink trading market, and gives full play to the organisational structure of the carbon sink trading market, thus facilitating the realisation of marine carbon sink trading. The management mechanism of carbon sink trading in Zhanjiang mangrove forest mainly includes accounting mechanism, supervision mechanism and guarantee mechanism, which interact with each other and influence each other, so as to ensure the orderly transaction of carbon market.

5.1 Accounting mechanisms

Accounting is the primary task of carbon sink trading, accounting for two main aspects: firstly, budgeting, where the government or institutional unit accounts for the total amount of carbon emissions in the region over a certain period of time, with the final amount implemented into each regulated enterprise; secondly, monitoring, where the carbon emissions of the enterprise are accurately measured through relevant technology and regulations. To focus on the mangrove ecosystem of Zhanjiang, choose suitable accounting principles, classification systems, quantification methods, emission factors or parameters, establish technical methods for accounting for mangrove carbon sinks in Zhanjiang based on predictable, monitorable, measurable, reportable and verifiable, innovatively build a scientific, standardised and operable mangrove carbon sink accounting system, and form technical specifications and standards for mangrove carbon sink accounting.

5.2 Regulatory mechanisms

Strengthening the supervision mechanism of the mangrove carbon sink trading market is an important measure to promote the steady and orderly carbon sink trading market, focusing on regulating the trading behavior of the carbon market and ensuring the fairness of the trading. First, strengthen the supervision and enforcement of mangrove carbon sinks. Regulatory measures and legal provisions for accounting shall be formulated to ensure that the process of calculating carbon emissions of each enterprise is scientific and accurate. Certain disciplinary measures will be taken against those who practice fraud in accounting emissions and provide false accounting reports. Second, establish a fair and transparent trading platform. For example, the Zhanjiang Mangrove carbon sink certification and official trading information platform will be established to ensure fair and transparent trading prices, and will be linked to the greenhouse gas emission inventory and ecological environment law enforcement and supervision platform. Third, jointly promote regulatory enforcement. Mangrove carbon sinks should be included in ecological environmental protection supervision and ecological environmental supervision and law enforcement, so as to control the total carbon emissions of each enterprise.

5.3 Safeguard mechanism

The smooth operation of mangrove carbon sink trading must be supported by the establishment of a sound and appropriate guarantee mechanism, mainly including legal guarantee mechanism, financial guarantee mechanism and technical guarantee mechanism. Legally, the relevant government should improve the carbon emissions trading regulations, such as the definition of the property rights of carbon sinks, the rights and obligations between the subjects of carbon sinks and the rights and interests of both sides of carbon sinks, etc. should make clear legal provisions. In terms of funding, a mangrove carbon sink trading fund guarantee

mechanism should be established, with public finance as the mainstay and multi-channel financing as a supplement. Specifically, the government can increase its financial investment, expand the mangrove carbon sink loan model and set up a mangrove carbon sink development fund as a combination of ways to ensure the development of mangrove carbon sink trading funds. Technically, to ensure the smooth development of mangrove carbon sink projects, professional mangrove carbon sink research and management institutions can be set up by relying on universities and research institutes to carry out research on the mechanism of mangrove carbon sequestration, assessment of the effectiveness of sink enhancement techniques and monitoring and verification of carbon sinks, so as to provide a solid technical guarantee for mangrove carbon sink trading.

6. Conclusion

This paper clarifies the trading principles of the mangrove carbon sink market, focuses on the organisational structure of the mangrove carbon sink market, and discusses in detail the whole process management mechanism of China's mangrove carbon sink trading from the aspects of accounting mechanism, regulatory mechanism and guarantee mechanism. The future of mangrove carbon sinks will require accurate accounting methods, strengthened supervision of the market, the formulation of corresponding laws and regulations, the provision of sufficient funds and the development of corresponding technical means to guarantee the trading of carbon sink market and contribute to the realization of China's double carbon goal.

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