

Study on the Implementation Path of Carbon Sink Trading in the Construction of National Park Demonstration Province

Shenzhou Luan¹, Yi Li², Qiubo Su^{1,*}, Wencan Liu¹, Zhiyu Liang¹, Jiai Jiang¹, Yaqing Dai¹, Da Qin¹, Yuanyuan Zhou¹, Xiaojiang Wang¹

¹Qinghai Minzu University, Qinghai, China

²Hanshan Normal University, Guangdong, China

*Corresponding Author.

Abstract:

With the gradual development of the construction of national park demonstration province and national carbon sink trading platform, Qinghai province has incorporated carbon peak and carbon neutrality into the construction of ecological civilization. This paper studies how to combine the national park construction and Qinghai province with carbon sink trading, analyzes the current situation, the consistency of national park and carbon sink market construction goals, study the implementation foundation and the implementation path of carbon sink trading in the construction of national park demonstration province, in order to provide reference for the implementation of carbon sink trading in Qinghai province.

Key words: Carbon sink trading, Carbon sink trading market, Carbon emission, Environment economy, Environmental policy

I. BACKGROUND OF CARBON SINK TRADING

In recent years, with the entry into force of *The Kyoto Protocol* and *The Paris Agreement*, domestic and foreign scholars and governments have paid more and more attention to carbon sink and carbon sink trading. In the international community, *The Kyoto Protocol* and *The Paris Agreement* are important agreements on governing global warming, which provide the legal basis for establishing a market for carbon sink trading and carbon emission trading.

On February 16, 2005, *The Kyoto Protocol* officially came into force. This is the first time in human history that greenhouse gas emissions have been restricted in the form of regulations. To help countries to meet their greenhouse gas reduction targets, *The protocol* proposes "emission trading" for emission quotas, countries that have completed their emission reduction tasks can sell excess quotas to countries that have not completed their emission reduction tasks [1-2]. *The Paris agreement* that entered into force on 12 December 2015 clearly stated that countries should take action to protect and enhance forest carbon reservoir and carbon sink after 2020, continue to encourage developing countries to implement and support

"reducing deforestation and forest degradation and increasing carbon sink action (REDD+),"promote" comprehensive mechanism of forest sustainable management ".

II. CURRENT SITUATION OF THE CARBON SINK TRADING MARKET

At present, the main carbon trading market include the EU carbon trading market, North American carbon trading market and China's carbon emission trading market.

Since the launch of the EU carbon trading system in 2005, the carbon emission quotas has been mainly adopted to allocate on the basis of the principle of historical law and free quota. After 2020, the free quota has been gradually reduced, and Sixty percent of the quota has been issued through auction. The industry adopts the way of gradual participation. The power generation industry is the earliest industry participating in the trading system. Since 2013, there is no free quota in the power generation industry. At present, the effect of carbon emission trading is obvious. After 2021, carbon emissions will show a linear decline trend of 2% per year, and the scale of carbon trading market will continue to expand.

The United States has no plans to establish a national emissions trading system because it withdrew from *The Kyoto Protocol* in 2001 and *The Paris Agreement* in 2017. However, the United States and Canada have set up a small regional emissions trading system. In 2008 more than a dozen northeastern states joined forces with Canadian provinces to implement the Regional Greenhouse Gas Reduction Initiative (RGGI), which established a regional carbon market for CO₂ emissions from the power sector only [3]. Launched in 2012, the Western Climate Initiative (WCI) is made up of seven US states and four Canadian provinces. The goal is to reduce regional carbon emissions by 15 percent from 2005 levels by 2020. So far, only California and Quebec have established carbon markets under the WCI.

Since June 18, 2013, China has established seven pilot carbon emission exchanges: Shenzhen Emission Trading Exchange, Guangzhou Carbon Emission Exchange, Beijing Environmental Exchange, Shanghai Environmental and Energy Exchange, Hubei Carbon Emission Exchange, Tianjin Emission Exchange and Chongqing Carbon Emission Exchange. After 8 years of exploration and practice, the national carbon market was officially launched on July 16, 2021. In the national carbon emission trading market, the "twin cities model" is adopted. The trading center is built in Shanghai, and the carbon quota registration system is located in Wuhan. The first batch of trading entities in the national carbon market were 2,225 power generation enterprises. The launch of the carbon market is prompting the power industry and other industries to accelerate the pace of green and low-carbon transformation. In the future, steel, cement, chemical, electrolytic aluminum, paper and other industries will be included in the carbon trading market coverage.

Throughout the world's carbon emission trading market, the EU market system was established firstly, and the system is relatively perfect. From 2012 to 2020, the EU generated more than EUR 57 billion from auction of carbon quotas in carbon markets, mainly for carbon neutral projects and the green economy. Although the Chinese market started later than the European Union market and the US market, it

developed very rapidly. By March 25, 2022, the national carbon market carbon emission quota (CEA) has accumulated a turnover of 188 million tons, with a cumulative turnover of 8.2 billion Yuan.

III. CONSISTENCY OF THE CONSTRUCTION OBJECTIVES BETWEEN THE NATIONAL PARK DEMONSTRATION PROVINCE AND THE CARBON SINK MARKET

According to The Guidelines on establishing a nature system of protected land with national parks as the main body, which issued by country on June 27, 2019, the type of natural type, divided into national parks, nature reserves and nature parks and other three types of protected areas type by the ecological value and protection intensity [4].

In May 2020, the National Forestry and Grassland Administration and the Qinghai Provincial Government issued *The Three-year Action Plan for Establishing a Demonstration Province of Protected Natural Area System with National Parks as the Main Body (2020-2022)*. According to the plan, Qinghai Province has officially established Sanjiangyuan National Park and Qilian Mountain National Park, establishing the basic framework of protected natural land management system with national parks as the main body, nature reserves as the supplement; the goal is to build a national park demonstration province by 2025 and a model of world protected natural area with international influence by 2035. Gradually realize the organic unity of ecological, economic and social benefits and the goal of "not cutting down trees, but also get rich".

Since the 18th National Congress, China has attached great importance to the construction of carbon sink market and carbon emission trading market. In July 2016, the State Forestry Administration formulated The Provincial Forestry Work Plan for Tackling Climate Change for 2017-2018, which aims to increase the emission reduction by increasing forest carbon sink, stabilizing wetland carbon sink, reducing industrial emissions, and promote the establishment of the national carbon emission trading market.

According to the spirit of *The Three-year Action Plan for the Construction of a Protected Natural Area System with National Parks as the Main Body (2020-2022)*, and *Guiding opinions on establishing a system of protected natural areas with national parks as the main body*, the targets of building the three types of protected land is consistent with the construction objectives of carbon sink market in terms of system objectives, evaluation indicators and evaluation purposes (see TABLE I).

TABLE I. Fit Degree between the Construction Target of the National Park Demonstration Province and the Carbon Sink Market Construction Target

Order Number	National Park Demonstration Province Construction Target	Carbon Sink Market Construction Target	Fit Degree of Target
1	Establish national parks to protect national representative natural ecosystems	The carbon sink of forest and grass is closely connected with land greening, increasing forest planting area, restoration of degraded grassland, and systematic	high
2	Establish Nature reserves to		high

	maintain and restore the population of rare and endangered wild animals and plants and the habitat environment	management of mountains, rivers, forests, farmland, lakes, grass and sand. Developing the ecological benefits of mountains, rivers, forests, farmland, lakes and grasses, continuously improving the solid carbon capacity, and developing more forestry carbon sink products will help to improve the carbon sink trading market	
3	Establish natural parks, including forest parks, geoparks, Marine parks, wetland parks and so on		high

Data Source: According to the national documents collated and obtained.

IV. THE IMPLEMENTATION FOUNDATION OF CARBON SINK TRADING IN THE CONSTRUCTION OF NATIONAL PARK DEMONSTRATION PROVINCE

4.1 Forest Land

The forest land area of Qinghai province is 1.12million hectares. The thick forest area is 569,800 hectares, The thin forest area is 95,900 hectares, and the shrub land is 4.79 million hectares. The forest distribution type of is mainly coniferous forest, accounting for 63.3% of the forest area, broad-leaved forest accounts for 28.2%; coniferous broad-leaved mixed forest accounts for 8.5%. Forests are mainly distributed around the Yellow River region, the Tongtian River region and the Lancang River region. From 2016 to 2021, a total of 22.21 billion Yuan was allocated for natural forest protection, forest ecological benefit compensation and grassland protection and construction, Completing the large-scale land greening of 21.164 million mu, treating 7.12 million mu of black soil beach, Preventing and controlling 15.4946 million mu of forestry pest, and blocking and protecting 8.736 million mu of desertified land [5].

4.2 Grasslands

Qinghai province has 632 million mu of natural grassland, it is the largest terrestrial ecosystem in the province [6]. Qinghai province has complex landforms and diverse natural environment, forming different types of grassland types. The total grassland area is 314,600 square kilometers, which is divided into 9 grassland categories, 7 grassland subcategories, 28 grassland groups and 173 grassland types. The nine grassland categories are divided into alpine dry grassland, mountain dry grassland, alpine desert, mountain desert, Plain desert, alpine meadow, mountain meadow, plain meadow and incidental grassland. In terms of area, alpine meadow has the largest area, followed by alpine dry grassland, and the third is mountain dry grassland. The smallest area is the mountain meadow, alpine meadow and alpine hay, which is totally 25.50 square kilometers.

4.3 Wetland

There are four wetland categories and 17 wetland types in Qinghai Province, with a total area of 8.1436 million hectares. Among them, river wetland is 886,300 hectares, lake wetland is 1470,300 hectares, marsh wetland is 5645400 hectares, constructed wetland is 142,600 hectares.

With the intensifying of ecological and environmental protection in Qinghai Province, the area of forests, grasslands and wetlands is constantly increasing, the implementation basis required by the carbon sink exchange is preliminarily available. If the effective management of existing forests, grasslands and wetlands is strengthened, ecological service function will be significantly improved and enhance the overall solid carbon capacity in Qinghai province and ensure the stability of the ecosystem in Qinghai province.

V. IMPLEMENTATION PATH OF CARBON SINK TRADING IN THE CONSTRUCTION OF NATIONAL PARK DEMONSTRATION PROVINCE

5.1 Adhere to the Determining Ownership of Mountains, Rivers, Forests, Farmland, Lakes and Grass According to Law to Lay the Ownership Foundation for Carbon Sink Trading.

Forestry carbon sink trading, grassland carbon sink trading, wetland carbon sink trading are essentially a kind of property rights of asset trading. Clear property rights is the premise of market trading, the subject of carbon sink trading with clear property rights can enter the trading market, so according to *The Interim Measures for the unified confirmation of rights and registration of natural resources*, Department of Natural Resources, Department of Finance, Department of Ecology and Environment, Department of Water Resources, Forestry and Grassland Bureau should speed up the process of confirming and registering the rights of the water, forest, mountains, grassland, wasteland, tidal flats and proven reserves of mineral resources. The subject of the ownership of mountains, rivers, forests, farmland, lakes and grass should be clearly defined, and draw the ownership line between the national ownership and the collective ownership, draw the ownership line between the national ownership of different levels of government, draw the ownership line between different collective owners, and draw the ownership line between different types of natural resources. Promote the establishment of a natural resource asset property rights system with clear ownership, clear rights and responsibilities, strict protection, smooth circulation and effective supervision, so as to lay an ownership foundation for the realization of soil carbon sink trading in forest, grass and wetlands.

5.2 Establish a Carbon Sink Measurement and Monitoring System

The government should establish a monitoring system, formulate relevant technical standards and build a monitoring network system for the carbon sequestration capacity of mountains, rivers, forests, farmland, lakes and grasslands in natural protected areas, which focus on detecting forest reserves, grassland area, wetland area, forest and grassland fire monitoring, and disease and insect pests detection that can affect the

indicators of carbon fixation efficiency and carbon fixation capacity [7-8]. The government should establish a three-level forest and grass carbon sink monitoring and statistics system, a report preparation system, and a basic database with comprehensive data coverage, efficient functions and easy to use.

5.3 Issuance and Management of Greenhouse Gas Emission Quotas

Enterprises in Qinghai province whose annual greenhouse gas emissions are above 26,000 tons of carbon dioxide equivalent will be included in the list of key greenhouse gas emission units for management, such as power sector, cement, steel, ceramics, petrochemical, textile, non-ferrous metals, plastics, papermaking, transportation, construction and other industries. The government is responsible for determining the scope of enterprises implementing total carbon emission control and quota trading, reporting to the Ministry of Ecology and Environment, and making it public, and issuing greenhouse gas emission quotas in accordance with the law.

5.4 Fully Investigate the Total Carbon Reserves of Various Types of Forest, Grassland, Wetland and Other Vegetation, and Establish the Provincial Carbon Sink Database of Green Vegetation

Research shows that the management measures of raising stable tree price and tree chest diameter can bring greater economic and ecological benefits [9]. The net present value of wood income, under forest economic benefit and carbon sink income generated by the improvement of carbon sink management is much higher than the income of traditional bamboo forest. Therefore, improving the management level of green resources such as forest and grass in Qinghai Province, improving the diameter of trees, and stabilizing the price of green resources will help to promote the rise of carbon sink price, and promote the development of carbon sink trading market.

Fully investigate the area of forest, grassland, wetland, forest reserve, forest age structure, forest type, forest density, grassland density, grassland carbon reserves, wetland density, wetland carbon reserves in Qinghai Province, so as to prepare for the future carbon sink market trading and carbon emission quota allocation standards.

5.5 Establish a Carbon Emission Trading Platform

The government should explore the establishment of a "one-stop" comprehensive carbon trading service platform [10], including carbon emission registration, inquiry, trading, mandatory administration, financing, disclosure of information and training, etc., innovate mechanisms to provide institutional guarantee for carbon trading facilitation, and help to construct a modern market economic system for carbon trading in Qinghai Province. The government should encourage all kinds of social capital to participate in carbon sink emission reduction actions, help key regions, large-scale event organizers, voluntary emission reduction enterprises and the public to achieve carbon neutrality, and gradually improve the mechanism of diversification and market value realization mechanism of forest and grass carbon sink.

5.6 Strengthen the Construction of the Carbon Financial System

Timely development of carbon trust, carbon funds, carbon bonds and other carbon financial products. Encourage qualified non-financial enterprises and institutions to issue green bonds, encourage insurance institutions to develop innovative green insurance products and participate in ecological protection compensation to provide support for the construction of the carbon market. Foster trading consulting on carbon emission rights, carbon asset entrusted management, third-party check and related carbon finance service institutions to promote the development of carbon market service industry.

5.7 Establish a Diversified Fund Guarantee System

The government should coordinate funds at all levels, including central government infrastructure investment to ensure the protection of the construction of carbon sinks such as mountains, rivers, forests, farmland, lakes and grasslands. The government should encourage financial and social capital to set up protected natural areas and carbon sink funds, and provide financing support for the construction of the management projects of mountains, rivers, forests, farmland, lakes and grasslands. The government should establish and improve the compensation system for ecological protection, increase financial transfer payments according to the scale of mountains, rivers, forests, farmland, lakes and grasslands and the effectiveness of management and protection, and increase investment in compensation and support for ecological migrants.

5.8 Strengthen the Building of Management Institutions and Teams

The relevant departments for ecological protection, natural resources asset management bear responsibilities of the franchising, carbon sink trading, social participation and scientific research, the local government in the economic development, social management, public services, disaster prevention and mitigation, market supervision, etc. In accordance with the principle of optimization, coordination and efficiency, formulate the management measures for the establishment of institutions, responsibilities and staffing of carbon sinks in protected natural areas, mountains, rivers, forests, farmland, lakes and grasslands. Explore the management mode of protected natural areas, mountains, rivers, forests, fields, lakes and grasslands. We will appropriately relax the conditions for selecting professional and technical positions in protected natural areas, and build high-quality professional teams and scientific and technological team. Introduce management and technical talents urgently needed for the construction and development of protected natural areas and carbon sinks, mountains, rivers, forests, farmland, lakes and grasslands.

REFERENCES

- [1] Kossoy A, Guigon P. State and Trends of the Carbon Market 2012. Washington: World Bank, 2012:75.
- [2] Massetti E, Tavoni M. A developing Asia Emission Trading Scheme (Asia ETS). *Energy Economics*, 2012, 34 Suppl 3:S436-S443.

- [3] ZHANG Yan, LI Feng, LI Yuan. A Study of the Forestry-Based Carbon Sink Market and the Development of Forestry-Based Carbon Sink Trading in Hainan under the Background of Carbon Neutrality. *Humanities & Social Sciences Journal of Hainan University*.2021.05.
- [4] The General Office of the CPC Central Committee and The State Council issued The Guidelines on Establishing a System of Protected Natural Areas with National Parks as the Main Body, *Xinhua*. 2019-6-26.
- [5] Qinghai: Forest and grass ecological poverty alleviation has increased the income of nearly 2 million farmers and herdsmen, *Economic Daily*, January 22, 2021.
- [6] Song xiaoying, fully implement the forest chief system, *China Green Times*, September 14, 2021.
- [7] Zhou tianyun, Xu ruixiang. The formation and fluctuation characteristics of China's carbon emission trading price--- Based on the data from the Shenzhen Carbon Emission Rights Exchange. *Research on Financial Development*.2016.01.
- [8] George Daskalakis, Dimitris Psychoyios, Raphael N. Markellos. 2009. Modeling CO2 emission allowance prices and derivatives: Evidence from the European trading scheme. *Journal of BANKING & FINANCE*, 33.
- [9] Ji Wei, Gu Lei, Fan Weiqing, Wang Binghua, Zhu Weiqiang. Evaluation and Difference Analysis of bamboo Forest Operation Economic Benefits under carbon sink target. *Forestry economic issues*, 2020, 40(03): 278-284.
- [10] Li xiaosheng, Shi chen, Zhang sisi. Effect assessment of China's carbon emission trading policy-- Empirical study based on the dual difference model. *Journal of Jingchu University of Technology*. 2020. 12.