

Evaluation and Promotion Analysis of Poverty Reduction Benefits of CDM Projects in Rural China

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Abstract. Carbon finance refers to various financial institutional arrangements and financial trading activities aimed at reducing greenhouse gas emissions, and is one of the research hotspots of environmental economics. The Clean Development Mechanism (CDM) refers to the fact that investors from developed countries obtain certified emission reductions from their emission reduction projects in developing countries that are conducive to sustainable development in developing countries. A compliance mechanism adopted by Parties to the Third Conference of the Parties to the Framework Convention on Change, COP3 (Kyoto Conference), to achieve partial emission reduction commitments abroad.

At present, the number of CDM projects registered in China ranks first in the world, with about 1586 projects, accounting for 52% of the global CDM registration projects, and the carbon trading volume reached 530.7 billion tons, which is the largest supply market for CDM in the world. Strengthen the social benefits of CDM projects and promote poverty alleviation in rural China, and this will help improve the rural ecological environment in China and strengthen the construction of rural ecological civilization.

This paper aims to combine the qualitative analysis and quantitative analysis of rural CDM projects, establish an external effect evaluation system, provide a quantifiable model reference for the practice of rural CDM related project effect evaluation, and explore new ideas for poverty alleviation policies to address climate change. The author intends to establish a poverty alleviation effect evaluation mechanism for rural CDM mechanism in China, analyze the poverty reduction effect of CDM mechanism and the internal logic of promotion in poverty-stricken areas, and conduct multi-dimensional effect evaluation indicators from three levels: evaluation method selection, index selection and weight setting, and model rehearsal.

Then carry out the promotion feasibility analysis, and the rural CDM projects that fully consider the needs of the poor have significant poverty-prone effects, ecological benefits and social benefits. Based on the evaluation of the dual indicators of rural CDM projects, they will make suggestions and suggestions to promote poverty alleviation. China's agricultural carbon trading and organic integration of poverty reduction.

1. Introduction

1.1 Background introduction

The CDM (Clean Development Mechanism) is a compliance mechanism adopted by the Parties to the third meeting of the Conference of the Parties to the United Nations Framework Convention on Climate Change, COP3 (Kyoto Conference), to achieve partial emission reduction commitments abroad. The purpose of the CDM is to assist Parties not included in the relevant agreements to achieve sustainable development and contribute to the ultimate goal of the Convention, and to assist listed Parties in achieving their quantified limits and emission reduction commitments under Article 3. The core of the CDM is to allow the transfer and acquisition of project-level emission reduction offsets in developed and developing countries. In other words, the CDM project is to assist in fulfilling the Kyoto Protocol's emission reduction obligations, which connects developing countries with The advantages of developed countries, on the one hand, help developed countries to fulfill the



agreement emission reduction obligations at low cost, and on the other hand provide funds and technology for developing countries, opening up a huge carbon trading market. The promotion of carbon finance will not only develop China's highly promising carbon trading market, but also bring economic benefits and technical support to China. At the same time, it will also help China's current ecological civilization construction.

1.2 Overview of research significance

At present, most domestic scholars' research on the sustainable development of CDM projects is still in the stage of qualitative description, and the number of researches on this part is limited. However, the research on the multi-dimensional evaluation methods of poverty reduction benefits in rural CDM projects is still very scarce in Chinese academic circles, and most of the evaluation methods mentioned in the research do not involve the addition of adaptive and participatory indicators, making the evaluation process The overestimation of the impact of environmental variables. Therefore, this paper has combined the qualitative analysis and quantitative analysis of 31 rural CDM projects in China, and established an external effect evaluation system to provide a quantifiable model reference for the practice evaluation of rural CDM related projects.

2. Evaluation system construction

China's current evaluation system for rural CDM projects on poverty reduction benefits is obviously insufficient. The evaluation system mostly evaluates its sustainable objectives from a single dimension, but lacks multi-dimensional comprehensive poverty alleviation project benefits and sustainable target realization evaluation methods. After visiting a number of CDM projects in western Sichuan, we found that the rural CDM projects in Sichuan have not yet achieved the evaluation of poverty reduction benefits. At present, only Yunnan Province has developed a single dimension of economic benefits in some areas. CDM project poverty reduction benefit evaluation. However, studies have shown that the realization of rural CDM projects in poverty reduction benefits, the poverty reduction benefits of CDM projects in ecological and community environments, ie quality of life, are ignored. Improvement, therefore, in the subsequent evaluation of poverty reduction benefits should be improved, the author believes that the standardization scope of poverty reduction benefits should be expanded, and at the same time, establish new dimension indicators for the specific situation of rural CDM projects in China, and actively promote rural CDM projects. System construction of poor benefit evaluation.

According to the above, after empirical analysis, the rural CDM project lacks an effective poverty alleviation benefit evaluation system to promote the poverty reduction effect in the promotion of poverty alleviation work. Therefore, the author will establish MATA-CDM-China by Ma Xiangzhao et al. (2010). As a method basis. The specific steps include determining the hierarchical structure, establishing the formula, selecting the indicators, standardizing the evaluation indicators, setting the weights, establishing the evaluation set V, and converting the indicators into the relative scores of the aggregated comparisons.

The method is oriented to the target layer. Since sustainable development is often influenced by the three major systems of society, economy and environment, the overall goal is decomposed into three sub-goals of social progress, economic development and environmental protection. As a system layer, the following will focus on society. The goal of poverty reduction under progress is to set the third-level variables for specific factors in the rural environment, and to set reasonable and objective evaluation indicators as the factor layer in light of local conditions.

The formula for the comprehensive evaluation index system is as follows.

$$U(P) = \sum_{i=0}^{n} \omega_i u_i[c_i(P)]$$

Among them, U represents the total utility of the project to the rural poor, P represents the CDM project to be evaluated, ωi represents the weight of the indicator i, ui represents the i utility score of



the indicator, ci represents the poverty dimension i, and "n" represents the evaluation index. number.

Of course, a comprehensive multi-dimensional evaluation system not only relies on various evaluation indicators and their weights. Based on a large number of empirical research data, this paper also adds statistical techniques such as standardized methods, 3-stage sampling methods, and baseline score calculations. The establishment of a poverty alleviation benefit evaluation system for rural CDM projects. At the same time, it has also extended some new CDM projects for reference in the new direction of poverty alleviation work. To a certain extent, it has helped to expand the CDM project type and improve the CDM project development capability.

3. Analysis of empirical results

According to the above-mentioned multi-dimensional effect evaluation index setting and calculation method, the baseline data of 360 farmer CDM projects and the data after project implementation are first calculated, and then the mean data is brought into the formula for standardization, and finally, according to the standardized scores, The total score. The mean values and scores of each indicator are shown in the table below.

	Index	Base Period (before Implementation)		Final Period (after Implementation)		Score	
Dimension		Poor Househ old	Non-poor Households	Poor Household	Non-poor Households	Poor Househ old	Non-poor Households
Economic Benefit (yuan)	Net Income Per Household	7727.7	10085.4	13008	16575.7	64	68
	Pesticide Fertilizer Expenditure	1007.7	1125.8	786	1101.6	22	2
	Fuel Expenditure	888.5	827	820.8	1051.8	100	73
	Subtotal of Score					189	143
Ecological Benefits(%)	Drinking Water Quality Improvement Village Share	61.1	62	90	81	47	31
	Kitchen Air Quality Standards	52.7	51.2	74.3	65.9	41	29
	Human and Animal Manure Improves Village Share	78.9	80	96.7	89.9	23	12
	Subtotal of Score					111	72
Social Benefits (%)	A large Proportion of Household Affair	35.6	36.5	29.10	34.40	18	6
	Cough or Difficulty Breathing in Children under 14 Years Old	18.2	21.2	13.2	21	27	1
	Pick up Firewood Time (hours)	10.7	10.4	7.1	7.6	66	73

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Women's Participation Activities Share	ⁱⁿ 21.1	25.3	40.1	30.4	65	80
Subtotal of					176	160
Score					170	100
Total Score					565	395

Pro-poor growth not only focuses on absolute growth, but also on the relative impact of growth on the poor. International assessments of pro-poor growth are divided into two categories: absolute pro-poor growth and relatively pro-poor growth. This study not only focuses on the relative pro-poor effects of the project, but also on the absolute pro-poor effect. The values of the base period and the final column listed in Table 1 are absolute values, reflecting the absolute pro-poor effect of the project, and the score column value reflects the relative pro-poor effect of the project.

The calculation results show that the scores of poor households are significantly higher than those of non-poor households (the last two columns of Table 1), the average score of poor households is 565 points, and the average score of non-poor households is 395 points, indicating that the relative poverty alleviation effect of the project is very significant. The indicators of economic, ecological and social benefits are all poorer households than non-poor households, and most of the indicators have relatively pro-poor effects. The scores show that China's CDM projects have benefited poor farmers, especially in terms of economic benefits, ecological benefits, and improving the health of poor farmers. Fuel expenditure, quality of drinking water, village share, coughing or breathing difficulties in children under 14 years old Compared with other indicators, poor households benefited significantly after the implementation of the project. The following is a detailed analysis of the effects of various indicators before and after project implementation.

(1) Economic benefits. The poor households in this dimension scored 189 points, and the non-poor households scored 143 points. Among them, non-poor households increased their net income more, and scored 4 points more than poor households. The other two indicators: pesticides, fertilizer expenditures and fuel expenditures, the number of poor households is significantly higher than that of non-poor households. Compared with the base period, the number of poor households decreased by 221.7 yuan compared with the base period, which was 197.5 yuan less than that of non-poor households. The expenditure on fuel for poor households is 293 yuan less than that for non-poor households.

(2) Ecological benefits. The poverty-stricken household scored 111 points and the non-poor households scored 72 points. After the implementation of the project, three indicators in this dimension: improved drinking water quality, kitchen air quality standards, and human and animal manure problems have been improved, and the improvement of poor households is more improved in absolute and relative terms than non-poor households. The proportion of poor drinking water quality improvement in villages, kitchen air quality standards, and human and animal manure problems improved by 90%, 65.9%, and 89.9%, respectively, and the proportion of non-poor households was 81%, 65.9%, and 89.9%, respectively. Therefore, it can be said that after the implementation of the project, the living environment of poor households has been greatly improved.

(3) Social benefits. The implementation of the biogas project of poor households has improved the health status of the main perpetrators and children in poor households. Compared with the base period, the proportion of coughs in the main perpetrators of poor households decreased by 6.5 percentage points in the year before the implementation of the project, which was 4.4 percentage points lower than that of non-poor households. The proportion of coughing or breathing difficulties decreased by 5 percentage points, which was 4.8 percentage points lower than that of non-poor households. Project implementation reduces the time it takes to collect fuelwood. Compared with the base period, the poor households reduced the average monthly firewood time by 3.6 hours, which was 0.8 hours less than the non-poor households.

4. Promotional Analysis

In addition to the establishment of the evaluation index system, the following will take the promotion and typical project of the CDM project of Zigong Petrochemical as an example, carry out its promotion research and analysis, create blood for the poverty reduction work in the new era of China, and develop low-carbon economy according to local conditions. And poverty reduction projects.

PetroChina Zigong Petrochemical Company used the United Nations CDM (Clean Development Mechanism) project to use domestic and foreign advanced technology to treat nitrous oxide, in exchange for 600 million US dollars of emission reduction targets, and reduced 12 million tons of carbon dioxide equivalent greenhouse gases for China. Significant contributions have been made in exploring new ways for energy conservation and emission reduction. In Zigong City, China, under the jurisdiction of the county, according to the requirements of the CDM project, afforestation of 300 hectares, with the formation of 23,800 tons of carbon dioxide carbon sinks, in exchange for Italy's 135,000 US dollars. It not only promotes local ecological construction, but also increases the income of the people.

The author believes that energy conservation, emission reduction and low-carbon economy require not only administrative enforcement, technological innovation and progress, but also the use of market mechanisms and relevant international conventions to promote the formation of carbon sink markets to accelerate China's energy conservation. The process of reducing emissions and the construction of a low-carbon economy. Zigong Petrochemical has two sets of equipment for producing 14,000 tons of adipic acid per year. During the production process, it produces 0.4 million tons of greenhouse gas nitrous oxide per year. The greenhouse effect of nitrous oxide is 31 times that of carbon dioxide, which is equivalent to discharging 1.2 million tons. The equivalent of carbon dioxide.

On November 30, 2007, the CDM project was successfully registered with the United Nations CDM Executive Board (EB). The gas composition of the exhaust port was sampled by on-site sampling, and the decomposition rate of harmful gases such as nitrous oxide reached 99%. As of March 13, 2009, the three monitoring cycles have reduced emissions by 1.3 million tons of carbon dioxide, and have successfully passed the on-site certification of the DOE six carbon indicators of the operating entity designated by the UN CDM Executive Board. The actual revenue from emission reductions is equivalent to RMB 0.6 billion, and the net income of enterprises is more than RMB 0.4 billion. At present, there have been 10 monitoring cycles, reducing emissions of more than 100,000 tons of nitrous oxide (3.3 million tons of carbon dioxide equivalent, and revenue of about 150 million yuan). Zigong Petrochemical's emission reduction accounts for more than 10% of the emission reductions of all approved CDM projects in China, and the economic and social benefits are very significant.

Because this mechanism reduces greenhouse gas emissions and purifies the air, foreigners can benefit from the Chinese environment as long as this emission reduction indicator is used. The increase in revenue is for Chinese companies. The purification of Zigong air is a project to spend money. As a result, the funds and huge social benefits of the sustainable governance environment have been obtained. In fact, the success of this project, Zigong Petrochemical from the leadership, technical staff to workers, especially the professionals involved in the negotiations, has made tremendous efforts and hardships, out of China's new way of using foreign investment in emissions reduction, carbon trading.

5. Conclusions and Recommendations

Low carbon is not only a reduction in emissions, but more importantly, it promotes the reuse of resources and the development of a circular economy. Carbon dioxide is not only a harmful greenhouse gas, but also an essential material for photosynthesis of trees and crops, and an important raw material for many chemical production. Carbon dioxide is not just a reduction in emissions, but also attention to carbon sinks and the collection, storage and utilization of carbon



dioxide. This requires not only administrative measures, legal means, but also market leverage to implement carbon trading.

Based on the above analysis and research, the author proposes the following:

(1) Use the principles of the commodity trade market to promote the formation of a low-carbon economy. Although China is not included in the list of countries that limit emissions and reduce emissions, China's carbon dioxide emissions problems and intensity are among the highest in the world. China plans to increase the proportion of non-fossil energy in primary energy consumption to 15% by 2020; the carbon dioxide emissions per unit of GDP will be 40% to 45% lower than the 2005 level. The task of achieving planning is very arduous. We must not only use administrative, legal, and technical measures and means, but also introduce CDM mechanisms. In China, the establishment of carbon trading transactions between industry and agriculture, the eastern and western regions, and between cities and rural areas, that is, the establishment of such an aid exchange mechanism for the exchange of carbon sinks. This is not only a need for emission reduction, but also a need to help mountain areas, especially in remote and poor areas, to afforest and poverty alleviation. It is also a good way to resolve regional differences, differences between workers and peasants, and urban-rural differences.

(2) Establish carbon trading institutions and formulate corresponding policy measures. First of all, it should be clear that carbon emissions come at a price. Increasing emissions requires paying, increasing carbon sinks to exchange money, carbon sinks to generate revenue, and establishing new carbon trading venues and rules. This requires the establishment of corresponding institutions, including carbon exchanges, intermediaries, corresponding legal counsel, etc., as well as corresponding policies and regulations. Practice has proved that the implementation of the CDM mechanism is a complicated process. With reference to the practice of this mechanism, it is a need of the era to develop similar compensation development mechanisms in China. This involves legal, technical, trade, policy, etc., and is a complex system engineering. At the same time, a carbon trading intermediary was established. In the process of implementing the two units of the CDM project, it can be seen that the establishment of CDM and the achievement of carbon trading, intermediary agencies play a decisive role, regardless of the parties' understanding of supply and demand market information, enforcement of legal procedures, transaction process Intermediaries are indispensable, the number of transactions, and so on.

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