Research on Influencing Factors of Division of Agricultural Carbon Emission Responsibility in China's Provinces

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Abstract: Energy Has Become the Core and Source of Power for the Development of Social Productive Forces and the Main Material Basis for the Sustainable Development of Human Society. At the Same Time, China's Energy Consumption is Rising Steadily and the Environmental Problem is Becoming More and More Serious. Reducing Carbon Dioxide Emissions, Continuously Improving the Efficiency of Agricultural Carbon Emissions and Promoting the Development of Low-Carbon Economy Have Become the Consensus of the International Community. Developing a Low-Carbon Economy Has Become the Consensus of the International Community. Continuous Improvement of Carbon Emission Efficiency Can Effectively Stimulate the Potential of Emission Reduction. the Implementation of Agricultural Carbon Emission Reduction Targets Not Only Reflects China's Responsibility as a Large Carbon Emission Country, But Also Shows China's Determination to Transform Its Economic Development Mode and Take a Sustainable Development Path. This Paper Analyzes the Influencing Factors of the Division of Responsibility for Agricultural Carbon Emissions Across Provinces, and Provides Theoretical Basis for Promoting the Transition of Low-Carbon Economies in Various Regions and Formulating Reasonable and Effective Carbon Emission Reduction Policies.

1. Introduction

Since the Reform and Opening Up, China's Economy Has Achieved Sustained and Rapid Development and Has Become the World's Second Largest Economic System. Energy Has Become the Core and Source of Power for the Development of Social Productive Forces and the Main Material Basis for the Sustainable Development of Human Society [1]. with the Progress of Science and Technology and the Rapid Development of Global Economy, Fossil Energy Has Been Developed and Utilized on a Large Scale. At the Same Time, China's Energy Consumption is Rising Steadily and the Environmental Problem is Becoming More and More Serious. with the Continuous Development of Industrialization and Urbanization, the Rapid Growth of Greenhouse Gases Has Attracted the Common Attention of the World, and All Governments Are Actively Taking Measures to Reduce Carbon Emissions [2]. Reducing Carbon Dioxide Emissions, Continuously Improving the Efficiency of Agricultural Carbon Emissions and Promoting the Development of Low-Carbon Economy Have Become the Consensus of the International Community [3]. Although There Are Still Differences on the Explanation of the Causes of Climate Warming, the View That the Increase of Greenhouse Gases, Especially Co2 Concentration, Leads to Climate Warming Has Become a Global Consensus [4]. China Has Become the Country with the Largest Co2 Emissions, and is in a Period of Rapid Development of Industrialization and Urbanization. the Social and Economic Development Has a Greater Demand for Various Energy Sources, Resulting in an Increase in China's Agricultural Co2 Emissions [5]. the Implementation of Agricultural Carbon Emission Reduction Targets Not Only Reflects China's Responsibility as a Major Carbon Emitter, But Also Shows China's Determination to Transform Its Economic

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Development Mode and Take a Sustainable Development Path [6].

China is a Large Developing Country, with Provinces Having Different Economic Foundations, Industrial Structures, and Energy Consumption Structures. There Are Also Large Differences in Resource Carrying Capacity and Carbon Emission Reduction Potentials, Which Makes China's Carbon Emissions Present Spatial Heterogeneity [7]. Since the Reform and Opening Up, China Has Achieved Remarkable Performance in Economic Development, and At the Same Time, It Has Encountered Problems Such as Resource Consumption and Increased Carbon Emissions [8]. Due to the Flow and Exchange of Information and Resources between Regions, Different Regions Not Only Consider Themselves as Independent Individuals in Implementing Emission Reduction Policies, But Also Take into Account Spillover Effects between Regions. National Governments Need to Consider Not Only Regional Differences in Carbon Emissions When They Decompose Emissions Reduction Tasks Across Provinces. Moreover, It is Necessary to Analyze in Depth the Characteristics of Its Spatial Effects, and Whether the Spatial Spillover Phenomenon Has an Impact on the Intensity of Carbon Emissions in Adjacent Areas [9]. Since China's Reform and Opening Up, China Has Achieved the Strategic Goal of Quadrupling Its Gross Domestic Product. Its Comprehensive National Strength Has Advanced by Leaps and Bounds, and Its Foreign Trade Has Developed Rapidly. Facing the Huge Pressure of Carbon Emission Reduction, the Chinese Government Has Also Integrated the Development of a Low-Carbon Economy into the National Long-Term Development Strategy [11]. This Paper Analyzes the Influencing Factors of the Division of Responsibility for Agricultural Carbon Emissions Across Provinces, and Provides Theoretical Basis for Promoting the Transition of Low-Carbon Economies in Various Regions and Formulating Reasonable and Effective Carbon Emission Reduction Policies.

2. Calculation and Significance of Provincial Carbon Emissions in China

We strongly encourage authors to use this document for the preparation of the camera-ready. China's provinces have different agglomeration effects on carbon emissions in space, and the spatial correlation between regions makes carbon emissions significantly spatially dependent. Price can affect people's energy consumption, thus indirectly affecting carbon emissions. For energy, the demand for energy has a negative correlation with the price of energy when other conditions remain unchanged, that is, the demand for energy decreases as the price of energy increases and increases as the price of energy decreases. When the energy consumption is constant, the more economic benefits will be generated, the higher the energy utilization efficiency will be. Or when the economic output remains unchanged, the less energy consumed, the higher the efficiency of energy utilization. The emission of fossil fuel combustion can be calculated by multiplying the total amount of fuel combustion in each province and city in a certain year by the recommended carbon emission coefficient to obtain the carbon emission in the corresponding year. Spatial correlation refers to the spatial interaction of certain attribute values between regions in adjacent geographic locations, which can be divided into spatial dependence and spatial heterogeneity. Many optimization problems have constraints, and the algorithm does not consider the feasibility of individuals when performing mutation and crossover operations. Therefore, the generated probe progeny population is probably not in the feasible region. In the optimization process, feasibility analysis and constraint treatment should be carried out on the probe progeny population, so that individuals can search in the feasible region as far as possible to improve the global optimization ability. The specific process is shown in Figure 1.

When there are multiple targets, there are usually a lot of solutions that cannot be simply compared with each other. This kind of solution is usually called non-dominated solution or optimal solution. The set of all optimal solutions is called the optimal solution set of multi-objective optimization problems. Unlike other particles, the globally optimal particle has no better particle as the target, so new power is needed to push it toward the potential optimal solution [12]. In order to reflect the impact of wind speed fluctuation on the operating cost of agricultural carbon emission system, the penalty function of the objective function is formed by combining the standard difference of the prediction results of carbon emission influencing factors with the conditional risk

value. A short-term scheduling model of agricultural carbon emission system based on multi-random variable risk constraints with carbon emission influencing factors field is established. The influence of penetration power on rotary standby is not considered in the scheduling model. The penetration power of the carbon emission influencing factor field has an effect on the rotary reserve. The higher the penetration power of the carbon emission influencing factor field, the higher the required rotary reserve will be.

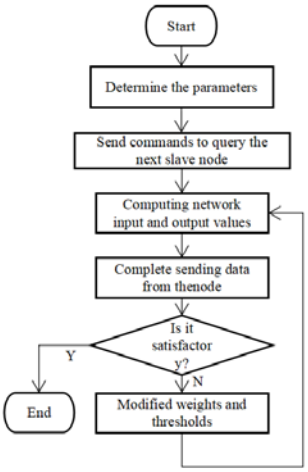

Fig.1 Algorithm Operation Flow

3. Factor Model of China's Provincial Carbon Emissions

3.1 Setting of Spatial Metrology Model

China's carbon emission problem is not only reflected in the growth of total amount, but also in the spatial pattern of carbon emission. Due to China's vast territory and uneven economic development among regions, there is a large gap in consumption level. At the same time, due to the influence of natural geography and social and economic development characteristics, there is also a large gap between per capita carbon emissions and various influencing factors. Due to the spatial correlation, the model no longer obeys the basic assumptions of the common panel data model. If the research method of the common panel data model is adopted, the tested statistics will be distorted horizontally. When the penetration level of the carbon emission influencing factors in the power grid is relatively high or when the carbon emission influencing factors are connected to the weak current network, the connection of the carbon emission influencing factors changes the original power flow distribution of the power grid, the transmission power of the line and the inertia of the whole system, thus affecting the transient stability of the power grid.

China's energy-rich regions are far away from the load center, so large-scale carbon emission factors cannot be absorbed locally and need to be transported to the load center through the power transmission network. Under the condition of not considering the operation cost of carbon emission influencing factors, the expression of the optimization target is:

$$F\left(x\right)=\frac{1}{1+e^{-ax}} \tag{1}$$

Power balance constraints:

$$k_i = A_i \exp\left(-\Delta E_i / RT\right) \tag{2}$$

In the information sharing strategy, use the formula to update the speed of the particles:

$$\mathrm{d}S_{ae} = \frac{4Px^2}{\pi d^2 E_a {L_a}^2}dx \tag{3}$$

System active balance constraint:

$$S_{ae} = \int_0^{L_a} \frac{4Px^2}{\pi d^2 E_a L_a^2} dx = \frac{4PL_a}{3\pi d^2 E_a} \quad (4)$$

3.2 Calculation of Regional Carbon Emission Intensity

The inefficiency of carbon emissions is affected by factors such as economic development level, economic structure, trade openness, foreign direct investment, energy structure and energy policy. In order to ensure the economic, safe and reliable operation of the agricultural carbon emission system in the field of carbon emission influencing factors. In the economic dispatch problem, corresponding measures need to be taken to deal with the impact of random fluctuation and intermittence of carbon emission influencing factors on the system. Rotating standby is one of the effective measures to deal with this kind of influence. Under the condition of a certain grid-connected scale of the carbon emission influencing factor field, when the predicted output value of the carbon emission influencing factor is larger than the actual available output value, the conventional unit can immediately increase the output power to make up for the power missing from the change of the carbon emission influencing factor and maintain the balance between supply and demand of the system. On the whole, China's carbon emissions show a decreasing trend from the eastern developed region to the western region, that is, the eastern carbon emissions are higher than the western carbon emissions. In order to maintain the balance of active power in the system, the more limited the space for the output of carbon emission influencing factors to rise in this case, i.e. the smaller the amount of output of carbon emission influencing factors can be increased, the smaller the output of other units that need to be lowered, and the lower the requirement for negative rotation backup of the system. With the continuous improvement of residents' consumption level, the impact of consumption on carbon emissions will become stronger and stronger. We should guide residents' consumption concept, advocate moderate consumption, advocate low-carbon consumption and green consumption, guide residents to use clean energy and improve energy consumption structure.

4. Conclusion

The realization of the energy intensity target promotes the realization of the carbon intensity target, and the energy intensity target restriction policy is conducive to the improvement of carbon emission efficiency. Due to the restrictions of natural resources endowments, capital and technology, it is difficult for China to change the energy consumption structure dominated by coal in a short period of time. Countries and provinces should formulate differentiated scientific and reasonable carbon emission reduction targets according to the actual situation, pay attention to the interaction between regions, and give full play to the demonstration and leading role of the pilot provinces and cities. For some high energy consuming industries, it is necessary to introduce advanced new energy technologies, update new energy production equipment, improve the management of energy mining, transportation and utilization, improve the energy utilization rate of high energy consuming industries, and reduce the intensity of energy consumption. In order to achieve the win-win goal of reverse changes in China's economic development level and carbon emissions, we should accelerate the upgrading of industrial structure, develop high-tech industries, tertiary industries and industries with relatively low carbon content in the future. The implementation of the energy policy depends on the government's incentive measures, and local governments are more familiar with local enterprises. Through institutional arrangements, local governments are urged to actively design and implement carbon emission reduction policies, which is more helpful to the improvement of local carbon emission efficiency.

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