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Rural Natural Environment Protection Based on Green Low-carbon Concept

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Abstract: Socialism with Chinese characteristics has entered a new era, environmental governance has entered a new process of modernization, and people's demand for a better environment has gradually increased. The countryside is a geographical complex with natural, social and regional economic characteristics in a natural area at the same time, and the purpose of this paper is to study the research countermeasures of rural natural environmental protection based on the green low-carbon concept. It introduces the countermeasures to promote green and low-carbon development in the countryside and the path of ecological environment management in the countryside. Through the investigation and analysis of resource use, low-carbon practices and residents' participation in the suburban rural areas of M, the results show that low-carbon publicity activities should be actively carried out in the countryside so that all resident households and their members can realize the importance of a low-carbon lifestyle.

1. Introduction

Low carbon, as a sustainable development concept, needs to run through the whole process of rural production and development. The development of low-carbon countryside is not just about reducing carbon emissions in rural areas; it is based on the premise of following the laws of nature and the environmental carrying capacity of rural areas, and vigorously develops eco-friendly agriculture, low-carbon and efficient industry and low-carbon tourism [1, 2]. Through the optimization and adjustment of the rural industrial structure, improvement of energy use technology and institutionalization of management and other measures to build a high-yield, low-carbon and high-efficiency production system, the sustainable development of rural areas is achieved [3, 4].

Water pollution is the most prominent environmental pollution problem in rural areas.Shane A. Carnohan focuses on the importance of rural water environmental protection and management, analyzes the causes of rural water pollution, and proposes effective solutions for rural water

environment management [5].Nektarios Moraitis first quantitatively analyzed the original landscape pattern of green areas and to find out the unreasonable aspects of the landscape layout of green areas. Secondly, based on the quantitative analysis, an optimization model of green landscape pattern was constructed. The four key techniques for establishing the optimization model are analyzed and the model optimization process is briefly introduced. The optimization of the green landscape pattern is realized, which makes up for the deficiencies of the original natural green landscape pattern. The results show that the suitability and aggregation of the optimized landscape pattern of natural green space are increased by 15.40% and 8.40%, respectively, compared with the original green space. The absorption of carbon dioxide increased by 23.5%, which basically achieved the purpose of this study, which proved the effectiveness of the model optimization method [6]. Therefore, it is of practical significance to study the natural environmental protection of the countryside based on the green low-carbon concept.

Based on the theoretical basis of green low-carbon concept, circular economy theory and synergy theory, this paper explores the countermeasure system of rural ecological protection that is compatible with the construction of beautiful countryside and rural reality, and provides some useful reference and inspiration for the construction of countermeasure system of rural ecological environmental protection oriented to the construction of beautiful countryside. In this way, we can explore the theory and model of low-carbon rural construction in China in the context of global climate warming in the new era.

2. Research on Rural Natural Environment Protection Based on Green Low-carbon Concept

2.1. Countermeasures to Promote Green and Low-carbon Development in the Countryside

(1) Carry out water-saving agricultural science and technology actions

Develop scientific, efficient and feasible water transfer programs to realize water resources allocation between neighboring regions and different regions, such as China's South-to-North Water Transfer Project; at the same time, efficient water transfer science and technology and equipment should also be developed to provide guarantees for the implementation of water transfer programs, and each region should also develop suitable agricultural water use programs according to the characteristics of inter-regional water resources [7]. Accelerate the development of dry farming technology, and increase the cultivation technology of drought-tolerant crops, no-till technology, rain-collection technology, water retention technology, etc., for the large dry farming areas in China, to establish a set of efficient dry farming technology systems [8, 9].

(2) Enhancement of livestock breeding and manure treatment technologies

To reasonably control the scale of breeding and scientifically breed livestock, which requires farmers to have relevant professional breeding technology, integrate geographical and human conditions, and scientifically establish breeding bases and breeding scale with a view to meeting the green breeding market. Explore the way of technology promotion, promote green livestock breeding technology, promote scientific feed use technology, veterinary medicine use technology, and nutrition rationing technology to each breeding base, and guide farmers and farmers to master these technical knowledge and apply them in practice [10, 11].

(3) Reasonable and effective treatment of rural household waste

Strengthen the green environmental protection propaganda and scientific treatment of domestic waste, improve villagers' environmental protection awareness and environmental protection ability, so as to guide villagers to develop waste classification and treatment, civilized and healthy living habits, so that effective waste classification and treatment become the villagers' independent and conscious action; according to different classifications of waste, different treatment methods can be used, such as food waste or manure, etc. can be converted into biogas fermentation and other

methods. For example, food waste or manure can be converted into energy by biogas fermentation and returned to fields and gardens; solid waste that can be recycled should be set up at least one paid recycling station in each village; construction waste should be filled in place and paved or disposed of; non-recyclable waste should be reasonably landfilled or effectively disposed of by waste disposal sites; toxic and hazardous waste should be scientifically disposed of according to relevant regulations [12, 13].

2.2. Exploring the Path of Rural Ecological Environment Governance

(1) Enhance rural residents' awareness of environmental protection

Strengthening propaganda is an important way to deepen the awareness of rural eco-environmental governance among country people. Ideological education can play a leading role, but a single, rigid way of propaganda can not attract the masses, or even reduce the effect of propaganda, to enrich the form of propaganda and increase the diversity of activities. The traditional forms such as hanging banners, distributing publicity materials and holding public welfare activities are still indispensable. But the content of rural eco-environmental governance education can be not only limited to this, but also can be publicized in a more enjoyable form for villagers, through movies to show more global environmental issues with visual impact, which can more easily stimulate crisis awareness [14]. At the same time, new media resources can be used to broaden the form and content of activities through cell phone terminals and social software such as WeChat public numbers or small programs to achieve a combination of online and offline, and also to popularize the policies and systems of rural ecological and environmental governance by uploading original songs and documentaries online. Introduce the network platform into the rural grassroots governance system, build a rural ecological environment governance cloud platform, establish an APP that enables timely interaction between individuals and organizations, and facilitate the establishment of fair and transparent channels for villagers to participate in rural ecological environment governance by creating message boxes, bulletin boards and other interfaces in the platform.

(2) Facilitate the construction of rural ecological infrastructure

By increasing investment in science and technology, promoting scientific research products for agricultural resource utilization while taking into account the reduction of waste emissions, it is also necessary to develop an agricultural recycling economy and develop high-quality green agricultural products. Through the cooperation mode of the government and enterprises, we will gather excellent scientific and technological achievements in various aspects, focus on the development of advanced technologies, and further give policy support and financial incentives to the excellent achievements of universities or enterprises with development potential, so as to further promote the implementation of the excellent achievements into the specific rural ecological and ecological environment management. The technologies for reducing agricultural waste and pollution should be updated in time and adapted to the different characteristics of each place. For example, the government should promulgate policies on the development of agricultural recycling economy, strongly support and promote various agricultural breeding technologies and straw recycling and degradation technologies, build excellent agricultural recycling economy projects, and develop new models of agricultural recycling that can adapt to the characteristics of each region in a targeted manner. Enterprises build various technical bases to attract the scientific research achievements of universities to be landed in time and further promote the development of scientific research achievements to industrialization.

3. Investigation and Research on Rural Natural Environment Protection Based on Green Low Carbon Concept

3.1. Study Area

In recent years, the suburban rural areas of M city have formed industrial development of flowers and seedlings, farming and vegetables, and rural tourism through continuous industrial restructuring, gradually transforming the industrial structure of traditional agriculture, but there are some problems in terms of production and development facilities. The development of rural tourism in the suburban area is mainly located in the foot of the Jianfeng Mountains, with the development of rural tourism in the area, attracting a large number of urban residents to come on vacation to bring a certain income to the local villagers, but due to the simple service facilities, open-air operation, poor health environment, the generation of domestic waste can not be well handled, looks dirty and disorderly affect the overall environment.

3.2. Survey Content

The survey process mainly used field survey, questionnaire and interview methods. We went to the relevant administrative departments of villages and towns to collect information on the planning and construction of villages and towns, social and economic development information, etc., and conducted communication interviews with relevant administrative personnel to have a macroscopic understanding of the construction and development of villages and towns. We also made on-site observations and took photos in the villages and towns to visualize the construction of villages and towns. The focus of the survey was on the residents' household survey and in-depth communication with the residents of the villages and towns. The main contents of the survey were: information related to residents' household carbon emissions, residents' residential construction and usage status, and residents' low-carbon awareness. Questionnaires were distributed to each village and town on average, 57 questionnaires were distributed to the village and town government staff, 51 valid questionnaires were collected, with an efficiency rate of 89.5%; 765 questionnaires were distributed to the village and town residents, 753 valid questionnaires were collected, with an efficiency rate of 98.4%. A detailed understanding of the information of each carbon source factor in the villages and towns, to provide basic information to support the exploration of low carbon planning and construction in villages and towns. This paper uses SPSS 22.0 software to count and analyze the questionnaire results, and the t-test formula used in this paper is shown as follows.

$$t = \frac{\overline{X} - \mu}{\frac{\sigma X}{\sqrt{n}}} \tag{1}$$

$$t = \frac{\overline{X_1} - \overline{X_2}}{\sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \tag{2}$$

where s is the sample standard deviation and n is the number of samples.

4. Analysis and Research of Rural Natural Environment Protection Based on Green Low-carbon Concept

4.1. The Current Situation of Residents' Domestic Waste and Sewage Treatment

Improper disposal of residential waste and sewage will create excess carbon emissions, causing a certain degree of damage to the ecological environment, reducing the carbon sink capacity of the land, and also destroying the landscape environment of the living space to reduce the satisfaction of residents. 0.82kg/person-d-1, of which food waste accounts for 48% and inorganic waste accounts for 39%, basically no harmful waste is generated, and the residents themselves have no recycling measures for the domestic waste and wastewater produced.

There is no systematic sewage network and no sewage treatment facilities in the surveyed villages and towns, and the sewage is directly discharged into the rivers near the villages and towns or evaporated and seeped in the surface runoff, which pollutes and damages the surface water and groundwater bodies in the villages and towns. Due to living habits, residents of villages and towns often go to the riverside to wash clothes, agricultural implements, etc. Detergents and dirt are directly discharged into natural water bodies, causing a certain degree of pollution to the water environment, as shown in Figure 1, which in turn destroys and weakens the carbon sink capacity of the ecological environment.

Figure 1. River beach water environment

4.2. Rural Residents' Energy Use Status

At present, the main energy sources used by households in suburban rural areas are solar energy, gas, electricity and fuel wood, and biogas biomass is less. The original cooking is using fuel wood, then with the improvement of economic conditions and the construction of new countryside, the structure of energy use has changed, as shown in Table 1.

Table 1. Household energy consumption structure of village residents (multiple choice)

Energy type	Fuelwood	coal	coal gas	natural gas	methane	electric	solar energy
Main energy for cooking and heating at home	24%	35%	15%	6%	3%	58%	12%
Which energy sources are more economical and convenient	31%	1%	15%	11%	39%	10%	56%

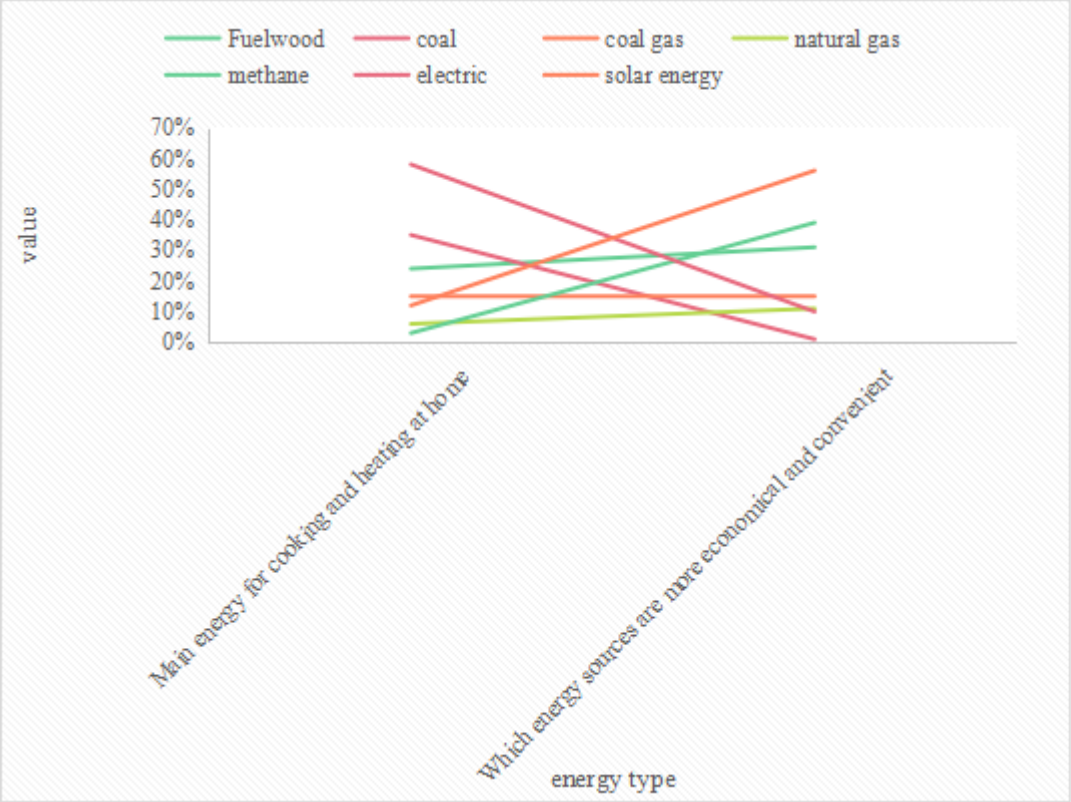

Figure 2. Household energy consumption structure of rural residents

In general, the energy structure of the countryside in the region is mainly based on coal, fuel wood and electricity, with a smaller proportion of gas, natural gas and biogas, as shown in Figure 2. The use of clean energy is less, and the energy structure is not very reasonable. It is necessary to guide the current situation of energy use of countryside residents, advocate the use of clean energy and advocate low-carbon life.

4.3. Residents' Willingness to participate in the Construction of Low-carbon Villages

In the questionnaires and interviews, we found that only 11% of the residents know the information about low-carbon rural construction and know the content, 30% have only heard of low-carbon information, and more than 50% have not heard of low-carbon related information and expressed indifference to it. When asked about the new rural construction, 66% of the residents think that they need national policy and financial support for energy-saving renovation of housing, while only 12% have taken the initiative to renovate themselves and 22% have other attitudes; as shown in Table 2. In terms of participation in the implementation of the new countryside, more than half of the residents thought that the implementation was not in accordance with the original plan, on the one hand, because the village cadres did not take the lead, and on the other hand, because of the shortage of funds in the village, the project could not be implemented; for the construction of biogas projects in the village, it was found that only 5% of the surveyed villages had built and used biogas, 65% of the farmers said that they needed government funding support, and 5% of the farming families held Other attitudes. It can be seen that the participation of rural residents in low carbon construction is not high.

Table 2. Residents' willingness to participate in low-carbon rural construction

Attitude	Housing energy-saving transformation (%)	Biogas engineering construction (%)
Need the support of national policies and funds	66	65
Active transformation	12	5
Other attitudes	22	30

Figure 3. Residents' attitude towards housing energy saving reconstruction and biogas engineering construction

5. Conclusion

The countryside has multiple functions such as production, residents' life, ecological environment and regional culture, which is an important goal of rural revitalization and an important foundation and guarantee for a rich country and a strong people. With the development of social economy, the demand of rural residents has changed from "expecting food and clothing" to "expecting environmental protection", and the demand for a better living environment is gradually increasing. In this paper, we conduct an empirical analysis to collect data through field research and analyze the suggestions for optimizing the path of villagers' participation in environmental governance. There are still many shortcomings in this paper, the research villages and towns selected in this paper do not cover all types of regional villages and towns, there are limitations. At the same time, the calculation of some carbon emission content lacks data support, but only makes qualitative statements, and the carbon footprint of villages and towns is not statistically understood due to the limitation of survey time, which should be improved in future study work.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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