Analysis of Affecting Factors and Construction of Index System of Rural Domestic Pollution in Guangxi Province

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Abstract. This paper systematically analysed the influential factors of rural domestic pollution in Guangxi and the current situation and evaluation index of rural domestic pollution, constructed moisture contents indexes system, which included two kinds of indicators in three levels, in a total of 19 indicators of rural domestic pollution. According to the moisture contents indexes system, a combination of quantitative and qualitative methods were adopted to make regionalization of rural domestic pollution in Guangxi more reasonable and provided scientific support for the prevention and control of rural domestic pollution in Guangxi Province.

1. Introduction

Guangxi has a vast territory with complex topography and varied climates. The social and economic development level in rural areas varies greatly and the population distribution was extremely uneven. Under the different natural resource endowments and historical and cultural backgrounds, the production and living styles of rural areas in different regions are very different. The problems of rural living pollution resulting from this vary from place to place and have obvious geographical differentiation [1]. Therefore, we searched for the main causes and influencing factors of rural domestic pollution correctly, assessed the status quo of rural domestic pollution objectively, build a reasonable and applicable rural domestic pollution moisture contents indexes system, carried out rural domestic pollution division management and prevention and control according to local conditions. Based on the investigation and evaluation of the current situation of rural domestic pollution, this study started with the analysis of the influencing factors of rural domestic pollution, and then extracts the applicable evaluation index to form the index system of rural domestic pollution division, so as to provide support for the division of different rural domestic pollution areas.

2. Analysis of the influential factors of rural domestic pollution

There are many influencing factors of rural domestic pollution, which can be summed up into two major types: natural factors and social factors. The factors are interrelated and influence each other. At the same time, the weight of influencing factors of rural domestic pollution in different regions is different, and varies with the spatial scale of research. Therefore, it is necessary to make a detailed analysis on the influencing factors of rural domestic pollution.
2.1. Natural Factors
Natural factors include climate, topography, soil and water resources. The impact of natural factors on rural domestic pollution is mainly reflected through the influence on the type of agricultural industry, population distribution density and residents' production and life style. Generally, it should be fully considered when studying in a large area, which corresponding to the national, Provincial usually.

Climatic factors. The climate factors are mainly the key factors that need to be considered in the research at the Provincial level. The factors such as the temperature, annual sunshine hours and precipitation in different regions have a great impact on the type and structure of agricultural industry, the production and living style of residents, thus affecting the types of domestic pollution sources and pollution, the intensity and the annual variance of the discharge and whether the pollutant can be recycled or not. In general, climatic conditions also affect soil and water conditions, which together have a direct or indirect impact on rural domestic pollution.

The topographic and geomorphological factors. The impact of topography and landform on rural domestic pollution is mainly reflected in two aspects: First, the distribution of population, the types of agricultural industries and the production and life style of residents are directly affected in rural domestic pollution in areas with large changes in topography and obvious changes in temperature with altitude. Second, the impact of landform types are more obvious in the region which with change in topography is not enough to cause significant temperature changes. Generally, the distribution of population in the hilly areas is relatively scattered, and the population in the plain areas is more distributed densely.

Soil Factors. Soil, as the product of bedrock weathering, is controlled by the regional rock types, climate and topography. The soil types vary greatly in different regions. The impact of soil on rural domestic pollution is mainly reflected in the fact that soil is the basis for agricultural development. Different types of soils determine different types and structures of agricultural industry models. Different agricultural industries constitute agricultural production systems which have their own unique characteristics, affect the breadth and depth of material circulation between systems with rural life.

Water Resources Factors. The conditions of water resources have an important influence on the type of agricultural industry in the region and determine the population distribution directly. An important aspect of rural domestic pollution is the pollution of domestic sewage. However, the size of regional water resources and water resources determines the self-purification capacity and pollution carrying capacity of regional water pollution, which has a significant impact on the self-purification and digestion of rural domestic pollution.

2.2. Social factors
Social factors are evolving on the basis of natural factors with the different historical stages of human development, especially under the influence of the development of productive forces. Social factors include the level of socio-economic development, types and structure of agricultural industries, population distribution and education level, pollution control policies and implementation status.

The level of social and economic development. The level of socio-economic development in rural areas has a tremendous impact on rural domestic pollution, which not only affects the type and structure of agricultural industry in the region, but also affects the lifestyle and education levels of residents, pollution control technologies and facilities and other issues directly related to rural domestic pollution many factors. There are obvious differences in regional development in Guangxi Province, and there are significant differences in the living conditions of rural residents in different regions. From the view of current stage, due to the sudden changes in lifestyles, environmental protection measures are not in place and cause serious pollution of rural life in areas where socio-economic development is generally good. In contrast, the rural domestic pollution of relatively backward areas is not prominent. Of course, this phenomenon is a product of a specific stage of social development and will change constantly with the development of society and economy.

Type and structure of agricultural industry. On the one hand, the type of agricultural industry is limited by the natural environmental conditions in the region, and on the other hand, it is limited by the level of socio-economic development. The type and structure of agricultural industries have affected the
exchange and circulation of material, energy and information within agricultural production systems and with rural living systems. Generally speaking, the agricultural industry has a single type, a simple structure and a high production efficiency. However, the recycling efficiency is low and cannot even be recycled, which may easily lead to serious resource and environmental problems. The structure of various types of agricultural industry is complex. The production efficiency is low relatively, but the recycling is of higher efficiency which cause the corresponding environmental pollution problems less.

Population Distribution and Education Level. Compared with cities, the rural population is more scattered, and the size of villages and towns is much smaller than that of cities. However, in the vast rural areas, due to the multiple influences of natural environment factors and socio-economic factors, the rural population distribution is relatively concentrated and dispersed. In general, the population is relatively concentrated in areas with suitable climate, flat terrain and abundant land and water resources; In contrast, the population is relatively dispersed. The density of population distribution, on the one hand determines the size of the total amount of domestic pollution, on the other hand have a significant impact on pollution prevention and control measures. The problem of rural domestic pollution is a human issue essentially. The environmental awareness and knowledge of rural residents affect the prevention and control of domestic pollution directly.

Status of Pollution Prevention and Control Policy and Implementation. From the view of rural environmental management point, Guangxi's rural environmental protection work started late with a low starting point and the management foundation was weak. Rural environmental protection laws, regulations and standards system was not perfect. Rural environmental regulatory system was not perfect and lack of policy and financial support for environmental pollution control. The market mechanism was difficult to establish. After the Ministry of Environmental Protection formulated and promulgated the "Technical Policy on Prevention and Control of Domestic Living Pollution" in February 2010, relevant policies and measures on prevention and control of rural domestic pollution had been continued to emerge. The prevention and control of rural domestic pollution prevention and control policies had a direct impact on the implementation of its effectiveness.

3. The moisture contents indexes system of rural domestic pollution
Rural domestic pollution moisture contents indexes system is a prerequisite for scientific prevention and control of rural domestic pollution. The standard of rural living pollution indexes, that is, the construction of moisture contents indexes system, is the core and cornerstone of division work. Regional pollution in rural areas should not only consider the status quo of pollution, but also consider the factors that cause the status quo, which may aggravate or create new potential pollution.

3.1. The analysis of rural domestic pollution impact indicators
There is an inherent causal relationship between the various factors that affect rural domestic pollution. The impact of natural factors on rural domestic pollution is mainly indirectly affected by social factors. Social factors are the result of natural factors. This makes it possible to choose representative and easily accessible evaluation indicators. Among the influencing factors, climate characteristics, topography, soil types and water resources status were selected as natural factors. Annual per capita disposable income, agricultural dominant industry, agricultural industrial structure, resident population density, residents' education, residents' Lifestyle, pollution prevention and control policies and facilities were selected as indicators of social factors.

3.2. The analysis of rural domestic pollution status assessment index
The domestic pollution in rural areas was mainly domestic sewage and household garbage. Many scholars had done a lot of research on this [2]. Based on the principle of simplicity, representativeness and accessibility, the evaluation indexes that could better reflect the pollution degree of rural life were selected, including the COD discharge of domestic sewage, the discharge intensity of domestic sewage, the treatment rate of domestic sewage, the discharge of domestic waste, the garbage discharge intensity and garbage disposal rate. The air pollution in rural domestic pollution was relatively light, mainly due
to burning of fossil fuels SO₂ with a low emission concentrations and intensity in winter only. Taking into account the expected socio-economic development, SO₂ emissions were selected as the evaluation indicators of air pollution in rural domestic pollution. After an overall consideration, the construction of the index system of rural domestic pollution moisture contents indexes was shown in Figure 1.

4. The application of rural domestic pollution moisture contents indexes system

Rural domestic pollution demarcation index system aim to evaluate the extent of rural domestic pollution, analysis of rural domestic pollution impact factors, and targeted to determine the basis of rural domestic pollution prevention policies and measures. In practical work, the index system can be applied flexibly. Under normal circumstances, the division of pollution in rural life could be divided into two key steps: the first step, divided by the index of influencing factors, which was similar to the natural and human integrated geographic division with a single goal, and for rural domestic pollution problems only. The second step, in each district and then based on the status quo indicators to set the level of pollution division according to the index of influential factors after the division. In the practice of rural domestic pollution division practice, a combination of qualitative and quantitative methods could be used, such as

Analytic hierarchy process [3]. The weight values of indicators at different levels were partitioned by quantitative calculation through the on-site investigation and expert judgment. At the same time, we had make full use of modern spatial data processing technology — geographic information system technology [4] to space vectorise each index value and to form spatial visualization data, and realized spatial division of rural living space through spatial averaging technology.

5. Conclusion

The increasing pollution of rural life had caused many concerns of the government and society. For Guangxi Province, the rural area is vast, the situation varies greatly across the province, and the pollution
in rural areas varies in severity. The prevention and cure of rural domestic pollution should be carried out according to the actual situation in different places. The division of rural pollution could be taken as the first step of prevention and control work. Therefore, the establishment of rural living pollution index and the choice of methods become important technical basis. It was also a prerequisite for scientific prevention and control of rural domestic pollution. The index system of rural domestic pollution established in this paper should be further improved according to the actual situation in the application process.

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