A Research on Water Environment Pollution Status and Water Ecological Governance Measures: The Case of Ningbo City

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Abstract. Water environmental protection and governance is the main content of my country's ecological civilization construction, the main means of building a clean and beautiful modern ecological city, and an important measure to improve Chinese overall water ecology. Although the importance of water environmental protection and governance in various parts of China continues to increase, the problem of water environment pollution is still very serious. Therefore, we need to increase our in-depth research on its protection and governance strategies. This article briefly analyzes the causes of water pollution in Ningbo City, and proposes corresponding treatment measures in response to the problems, aiming to improve the governance effectiveness of water environment protection in Ningbo City.

1. Introduction

Environmental issues have always been the focus of general concern in countries all over the world. Global warming, lack of energy, air pollution, population expansion and species extinction threaten the living environment of human beings. As the largest developing country in the world, my country's environmental pollution problem is also a major practical problem that needs to be solved urgently. Therefore, my country has proposed a strategic layout for the construction of ecological civilization and is committed to the overall sustainable development of ecology, economy and society. Insufficient water resources and water pollution is one of the serious ecological and environmental problems facing my country. This article takes Ningbo City, which is located in the eastern coastal area of Zhejiang Province, as a research object, to discuss the causes of water environment pollution and specific strategies for water pollution treatment(Fig. 1).
Fig. 1 Statistical chart of percentages of water quality in 80 city-controlled surface water detection stations in Ningbo (unit %)
(Source: Ningbo City Environmental Status Bulletin, 2019)

2. Analysis of the reasons for the current status of water pollution in Ningbo
The main sources of water pollution in Ningbo are industrial source pollution, agricultural and aquaculture non-point source pollution, and domestic pollution sources.

2.1 Analysis of industrial pollution sources
Part of Ningbo economic development model is still the traditional one. Most enterprises are built along the river, and the layout of enterprises is characterized by “small aggregation and large dispersion”. The ten key water pollution industries in Ningbo are electroplating, printing and dyeing, papermaking, chemical recycling of non-ferrous metal smelting, forging agricultural and sideline products processing, plastic waste plastic processing, metal surface acidification and chemical fiber, etc. The chemical oxygen demand and nitrogen emissions in six fields, such as by-product processing, accounted for 65% and 64.5% of the city’s industrial emissions, respectively. The discharge of heavy metals in waste water mainly comes from electroplating solution and stainless steel pickling solution, which account for more than 95% of the city’s total discharge.

2.2. Agricultural and aquaculture non-point source pollution sources
The sources of water pollution in agriculture and aquaculture mainly include livestock manure, pesticides, and fertilizers. In order to achieve high output and high benefits of agriculture, pesticides, hormones, ripening agents and other large-scale uses. These nitrogen fertilizers and phosphate fertilizers enter groundwater through farmland drainage and surface runoff, which in turn causes water Eutrophication, through the flow of water, seriously affects the river water quality in urban areas. In addition, animal husbandry and fish farming are also important sources of pollution. Excreta and flushing sewage produced by farming are improperly discharged, which seriously affects the quality of river water in the city.

2.3 Sources of domestic pollution
The source of domestic pollution mainly comes from the discharge of various detergents and catering sewage used in Ningbo city, domestic wastewater garbage, residents' feces, etc. Most of these pollutants are non-toxic inorganic salts, but because the sewage treatment measures are not in place, the sewage Without effective treatment, at the same time, domestic sewage contains more nitrogen, phosphorus, and sulfur, many of which are pathogenic bacteria, which pose a potential threat to residents' health and safety. Some water pollutants directly flow into the water area, which causes great pollution pressure on the water body ecology.
2.4 The residents’ environmental awareness is weak

Weak environmental awareness is also one of the reasons for water pollution. People's environmental awareness has an important role in environmental governance. The correct ecological environment awareness can guide people's green ecological behavior. Only by strengthening people's awareness of water resources protection can environmental pollution problems be effectively solved, and then the current status of water pollution can be improved.

3. Specific measures for water ecological management in Ningbo

Water ecological governance has always been the focus of Ningbo’s environmental governance. To this end, the government has adopted active governance measures and programs, and the governance has achieved certain results. The governance measures are also constantly innovating.

3.1 Giving priority to the development of ecological agriculture

We should promote the cultivation of green inorganic fertilizers and cultivate green, pollution-free agricultural products. We are supposed to encourage less use of pesticides for insecticides and weeding, promote manual weeding, and at the same time speed up the development of high-yield and insect-resistant crops and reduce the use of pesticides and herbicides. According to the characteristics of crops, suitable fruit trees can be planted. For example, in the ridges or in dry land, fruit trees like blueberries and cherries can be planted together, which can increase economic income and enrich people’s life experience. We are to develop innovative models for farming fish and raise poultry and animals to collect manure from these animals as fertilizer.

3.2 Innovating “five water governance” strategy

The “Five Waters Common Treatment” proposal proposed by Zhejiang Province is a major strategic solution to solve the problems of water resources and water pollution. Five Waters Common Treatment refers to the treatment of sewage, flood control, drainage water, water supply protection, water conservation, and coordination of the five aspects. Treat water pollution and other issues. Ningbo actively implements the plan in water resources governance, adheres to the concept of “co-governance”, and plans for the treatment of both the symptoms and root causes of water resources governance, the co-governance of waterfronts, and the combination of urban and rural governance.

3.3 Strengthening corporate sewage treatment

Fig. 2 demonstrates Ningbo city conducts strict inspections of high-pollution and high-energy-consuming enterprises in the urban area, and adopts original site environmental remediation activities for some industries and enterprises with serious water pollution. Relocating sites away from water sources and eliminating backward production capacity and discharge-non-standard enterprises, Comprehensively rectify and improve the water pollution problem of enterprises. In the process of water resources management, it is proposed to implement strict penalties for companies that discharge sewage in violation of regulations, and guide enterprises to transition to green and ecological.
3.4 Establishing of perfect urban water pollution governance facilities

We are supposed to take the government as the lead and accelerate the construction of complete urban sewage treatment facilities. With government investment as the mainstay and supplemented by private funds, we will accelerate the configuration of sewage treatment facilities and the construction of waste water treatment plants, and continuously improve the urban sewage collection rate and treatment rate. Based on the division of urban areas in Ningbo, speed up the construction of sewage treatment facilities and supporting pipe network construction in each district, continuously improve the reuse capacity of recycled water, and achieve the established goals of urban sewage treatment and utilization.

3.5 Strengthening water resources protection education

We should implement national environmental education and strengthen the cultivation of environmental awareness among urban residents, publicize the important role of water resources for urban development, and increase the residents’ sense of responsibility for participating in water pollution prevention, such as setting up warning signs along the river to protect water resources and calling for the protection of water quality. We are supposed to use news media and other communication channels to continue to expand education to protect the ecological environment. We also should encourage residents to participate in the supervision of urban water pollution sources, mobilize the enthusiasm and enthusiasm of the people to protect the water environment, and jointly supervise and perform the duties of water resources protection.

3.6 Constructing reasonable water resources governance mechanism

Ningbo is a typical water-scarce city. Therefore, it is necessary to continuously improve the recycling of recycled water, improve the level of effective use, and do a good job of the ecological water replenishment and water recycling mechanism. Insufficient water resources are also an important factor affecting water quality. Ningbo should strengthen the research on water source allocation and regard how to save water source and protect water environment as an important research topic. A batch of sewage treatment plants shall be constructed in the whole urban area, and the recycling of reused water shall be continuously strengthened. The urban water pollution treatment plant and the water pipeline shall be planned and designed at the same time, so that the treated clean water can flow into the river smoothly. Both save water resources and protect the water environment.
4. Conclusion
Water pollution control is a systematic project, which requires coordinated management from the aspects of industry, agriculture, government, people and facilities construction to achieve effective results. The six measures proposed in this article have certain practicability, but there are also certain deficiencies. For example, how to promote the public awareness of water resources protection into the practical actions of the people requires more guidance strategies and social mechanism constraints. In future research, the problem as to how to strengthen coordination and cooperation in water governance between coastal areas may be taken into consideration.

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