



Analysis on Water Environment Management Problems in Multi-industry Towns

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ABSTRACT

Along with the accelerated urbanization process in China, small towns are developing rapidly and forming a multi-industry feature. While water quality of multi-industry towns is getting worse and worse at the same time. Based on the analysis of the existing problems in multi-industry towns from the perspective of water environment management, we proposed suggestions from four respects: strengthening legislation work, reconstructing management system, expanding financial resources of management and enhancing participating consciousness of resident. Our purposes were to improve water management quality in multi-industry towns and realize a coordinated and sustained development of environment and economy.

Keywords: Multi-industry towns; Water environment; Management system

In China, small towns are generally referred to locations of government with a certain population, industry and economy scale. They are the political, economic and cultural center of local rural areas and communities (Hang, 2004). Small towns are developing rapidly in recent years and by the end of 2009, town population has reached 0.62 billions, accounting for 46.6% of all population (Lei and Yang, 2009). According to estimation, urbanization rate will reach 52% in 2015 and 65% in 2030. As small towns have developed rapidly and their population increased, the problem of water pollution has intensified significantly. Solving water pollution problem in towns has been one of the most urgent tasks which ought to be carried out at present.

1. WATER ENVIRONMENT CURRENT SITUATION IN MULTI-INDUSTRY TOWNS

Multi-industry towns can be defined as towns not only have primary industry but also have secondary industry (food processing industry, printing dyeing industry, livestock and poultry raising, plating industry) and tertiary industry (catering services industry). The rapid development of multi-industry towns contributed to economic development and improvement in living standard, but it also increased the amount of wastewater, which accounts for more than 50% of the total wastewater amount of the entire nation (NBS, 2010). Nevertheless, because the relatively low coverage rate of drainpipe networks in small towns, there is only 10% of the sewage is collected and treated (Qi and Wu, 2007). As a result, 78% rivers in small towns were not suitable for drinking and up to 90% water bodies were polluted (Qi and Liu, 2009). Serious water pollution situation not only affects health of local residents, but also impact economic development.

Lacking of water environment management is one of the causes of severe environment pollution in multi-industry towns. It plays an important part to enhance management strength and improve water environment quality for multi-industry towns in achieving objectives of the 12th Five-Year plan period and all-round well-off society in China.

2. ANALYSIS OF MANAGEMENT PROBLEMS

2.1 Management Laws, Rules and Discharge Standards System

Since 1973, relevant departments have formulated a series of laws, rules and standards such as provisions of protecting and improving environment from Constitution, The Basic Law of Environment Protection, The Law of Protection of Environmental Resources, Environment Administration laws, department rules, environment protection standards. They propose a comprehensive management theory system (Qi, 2008). However, environment protection law system in our country has many inappropriate aspects: conducting dispersive management of environment and resource protection, laying too much stress on pollution control and point-source pollution while ignoring reasonable environment resource arrangement and efficient utilization. In addition, there is no special provision on environmental protection and discharge standards for small towns and rural areas (Song and Feng, 2009), leading to the fact that most small towns have to adjust to "Cities Sewage Treatment Plant Pollutant Discharged Standard" (GB 18918-2002). This is unfavorable for small towns' wastewater treatment. On the one hand, small towns can't afford the cost of meeting city sewage discharged standards and on the other hand, cities discharged standards haven't taken envi-

ronment condition in small towns into consideration which is harmful for utilization of regional water resources and water cycle in small towns.

2.2 Management System

2.2.1 Imperfect administrative set-up

According to law in China, environmental administration in county is the lowest level, so there is no professional administration and administrator in most small towns as usual (Zhang, 2006). Some existing unprofessional administrator are trained for a short period of time, but it is not enough for management work of complex water environment in multi-industry towns, leading to extensive management and slack of supervision in small towns.

2.2.2 Overlapping function of administrative office

In China, environment management exercises a system of unified administration in association with administration at various levels and by various departments. The unified departments are Environmental Protection Administration of State Council and local governments at or above the county level. Other management institutions are administration departments responsible for a certain kind resource protection or pollution prevention (Zhang, 2010). Consequently, the problem of divorce between powers and responsibilities is serious, especially for management of river environment covering several administrative regions.

2.2.3 Dual leadership of administrative office

Recently, water environment managements in small towns are subordinated to dual leader-

ship of upper environmental protection administrations and local governments. The local governments have a high authority (controlling the finances, removal and disciplining of officials), but they are responsible not only for environment quality but also for economic development. As a consequence, when facing conflicts between economic development and environment protection, many government officials choose to pursue economic interests and abandon environment benefits by allowing many enterprises creating heavy pollution and worsening water environment. Furthermore, many government officials turn a blind eye to illegal discharge so as to gain much economic benefits.

2.3 Administration Expenditure

Multi-industry towns are lack of effective means of financing. Firstly, since China began to reform the "revenue-sharing-scheme" financial management system, expenditure of local governments accounts for 70% of total expenditure but revenue only accounts for 50% (Zhang and Shi, 2008), they can't afford environment administrative fee. Secondly, large amount of enterprises in multi-industry towns have the features such as small scale, old technological level, less economic benefits, so they can't afford the administrative expenditure as well. Thirdly, the income level and standard of environmental awareness of residents in small towns are relatively low, they are unable and unwilling to pay much for environment management.

Besides, the construction of infrastructural facilities in multi-industry is inadequate, leading to low wastewater collection and treatment rate and intensified the underfunded states.

2.3 Participating Consciousness of Residents

According to research of resident education level in Qingdao, those with junior middle school education make up 51.5%; those with primary school education, 32.7%; those with senior middle school education, 9.8%; those with college degree or above, 1.2%; and illiterates, 4.8%. Because of their relatively low education level and little chance learning environmental protection knowledge, most residents in towns are unaware of the significance of environmental protection. In addition, some heads of enterprises ignore the importance of pollution control and discharge sewage into water bodies directly in order to save treatment cost. This may cause serious harm for water quality in multi-industry towns.

3. IMPROVEMENT COUNTER-MEASURES

3.1 Reinforcing Management Laws and Regulations Construction

Based on current law systems and international experience, legislative institutes of national, regional and local levels should reinforce the constructions of management laws and regulations adaptable to new water pollution situation. In the process of legislation, they should take full aware of the overall concept of environment and highlight the association between water environment protection and comprehensive utilization of water resource. When controlling point source pollution, they need to pay more attention to non-point source pollution control and enact relevant laws. Local government and environmental administrative department should formulate discharge standard of sewage based on detailed investigations on water environment situation of their own restrict and restrictions and each restriction implements standard respectively. By this mean we can reduce environment pollution load and save

treatment cost as well.

3.2 Reconstructing Management System

Administrative office can use exciting experience as reference and take measures such as establishing environmental protection offices in villages and towns, providing 2 or 3 environment supervisors in charge of superior management office, establishing supervisory authority in areas many enterprises are located in charge of sewage disposal of enterprises timely (Zhu, 2006), dividing up the responsibilities of management to each individual and organ to stop shirking responsibility and shifting the blame onto others. All administrative personnel that needed must be trained by superior management office and promoted through open and fair competition. Besides, more administrative funds are needed in multi-industry towns to allocate supervising equipment and improve administrative ability. Governments should well define the legal status and responsibility of water environmental administrative through relevant laws, regulations and policy systems in order to enhance their management capability. Besides, governments also need to improve the supervision of promotion and recruitment of officials, to reform the system and methods for assessing officials' performance by taking green GDP into consideration. In addition,

officials should be educated to improve their awareness of environmental protection and pay more attention to sustainable development.

3.3 Solving Problem of Expenditure Shortage

Because the shortage of management expenditure in multi-industry towns, the necessary monitoring and management methods are not enough, leading to ineffective control and supervision of water management. In order to settle this problem, we should firstly expand the sources of funds, secondly reduce the management cost. Environmental administration office in multi-industry towns should follow the principle of "those who created pollution to clearing it up" to establish diversified mechanisms of gaining capital. Enterprises can apply for environmental protection loan and gain help from "local water environment administration fund" established by local government. Besides, local government and administration can also raise funds for improving the construction and operation situation of rural sewage treatment infrastructure by market oriented public-private cooperative approaches. Some of their ownerships, financing methods and operating characteristics are listed in Table 1.

Table 1 Ownerships, financing methods and operating characteristics of public-private cooperative approaches

Public-private relation	Ownership	Financing methods	Operating characteristics
Service contract	Public	Public	Public and of some private
Management contract	Public	Public	Private
Lease contract	Public	Public	Private
Franchise contract	Public	Private	Private
BOT	Public	Private	Private
BOO	Private	Private	Private
BOOT	From private to public	Private	Private
Joint ventures	Private and public	Public and private	Private
Trade	From public to private	Private	Private

When it comes to reducing management cost, on the one hand, administration offices should avoid overstaffing and low efficiency, on the other hand, distributed wastewater disposal station in towns should apply suitable treatment technology in the light of local financial conditions. A suitable treatment system should have characters such as low construction investment and operating cost, convenient management, high utilization ratio of land and energy.

3.4 Enhance Participating Consciousness of Resident

There are large amount of enterprises and decentralized pollution sources in multi-industry towns, but the situation in multi-industry towns of lacking management offices and administrative personnel makes it difficult to supervise water environment efficiently just depend on administrative staff. We should take advantage of the participating of resident to promote administrative efficiency and reduce cost. Firstly, villagers committees should give full scope to primary organization, formulate corresponding rules, make use of broadcast, blackboard newspapers to conduct environmental education in rural area; secondly, invite full-time administration personnel to deliver speeches to help residents realize the environmental protection is on their immediate or vital interests; thirdly, hold symposium, evidentiary hearing and pollution-control lecture among resident, enterprises and government, offering a chance for residents to query and advice to environment management; fourthly, formulate a rewarded reporting system to enhance management and supervision awareness.

In addition, managers and staff in multi-industry towns' enterprises should be educated of the significance of pollution controlling and establish awareness of sustainable development. Local government and adminis-

trative office also need to set up policies to give reward to enterprises performed well in water environmental protection.

CONCLUSIONS

Along with the process of urbanization in our country, water environment protection is becoming more and more important for sustainable development in multi-industry towns. The significant problem we are facing is how to reach harmonious development of environment and economy. To solve this problem, it is meaningful to analysis current situation of water environment management in multi-industry towns and to improve the management system using existing experience for reference. Future work should concentrate on continuing perfection of management system during its execution time to find out and solve problems under new situation in multi-industry towns' development.

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