

Water Pollution Prevention and Control: Successful Cases in China

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Case One: Water Pollution Control in Taihu Lake Basin

The Taihu Lake has the multifunction of floodwater storage, irrigation, navigation, water supply, aquaculture, and tourism. It is the main drinking water source for areas such as Wuxi and Suzhou. The Taihu Lake basin has an area of 36500 km², located in three provinces and one city. The percentage in Jiangsu, Zhejiang, Anhui provinces and Shanghai is 52%, 33.4%, 13.5% and 0.1% respectively. The water area in the lake basin accounts for 17.5% of the entire lake area. The urbanization level of the lake basin ranks the first in the entire country. With the development of industry and agriculture and improvement of people's life in recent several decades, the water pollution of the water in Taihu Lake is worsening. The eutrophication of the lake water has become an environmental issue attracting broad attention in the world.

In order to protect the water environment of Taihu Lake, the central government takes the water pollution prevention in Taihu Lake as a top prioritized work in the 9th and 10th Five Year Plans. In the 9th Five Year Plan period, the central government and the local authorities made an investment of 10 billion yuan for the treatment of Taihu Lake. The State Council approved the 9th Five Year Plan and 2010 Program of Water Pollution Prevention in Taihu Lake, and the 10th Five Year Plan of Water Pollution Prevention in Taihu Lake. In 2001, the State Council approved the 10th Five Year Plan of Water Pollution Prevention in Taihu Lake (hereinafter referred to as the Plan). The major targets for water quality improvement set for the year of 2003 had been achieved, and over half of either the investment, pollution treatment engineering projects or pollutant reduction identified by the Plan have been achieved. 41.7% of the centralized water source areas in the lake basin, 57.1% of the cross-sections in and out of the lake and 28% of the sections in border areas have attained the water quality target identified in the Plan for 2005. The investment of pollution treatment in Taihu Lake is 13.22 billion Yuan, accounting for 60.2% of the total investment of the Plan. Of the 255 projects in the Plan, 136 of them have been completed, accounting for 53.65%. The average reduction of the total discharge of the major pollutants in the lake basin is 50.7%.

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Although significant achievements have been made in the water pollution prevention in Taihu Lake basin, the water pollution situation in the lake basin remains rather tough, with certain gap to some sub-targets and arduous tasks as follows: the nitrogen

pollutant indicator remains fairly high, not easy to reduce and hard to fulfill the task in the Plan. There is sometimes eutrophication in certain water areas. The cause of the eutrophication in the lake and effective control measures, as well as attainment management of the water quality in border areas remain the outstanding issues to be solved in the water pollution prevention in China.

The main experiences of water pollution prevention in Taihu Lake basin is summarized as follows:

1. To make use of the opportunity of setting up national model cities of environmental protection and integrate water pollution prevention into the overall program of model cities;
2. To focus on innovative concepts, mechanism and explore new paths of the treatment of the lake basin. In order to fit in with the demand of the market economic development in China, Jiangsu Province took the lead in putting forth the concept of “manage the environment with commercial mechanism”, taking the comprehensive treatment of the water environment in Wuli Lake as the important component of the urban development of Wuxi. It is expected the added-value of the urban benefit from environmental improvement will be 5 billion Yuan (much higher than the cost of 2.6 billion Yuan for the treatment). The private funds are encouraged to enter into the sector of municipal service facilities. Market mechanism is applied in setting up share-holding company of sewage treatment, various forms of construction and operation such as BOT and TOT have been adopted. Preferential and incentive policies have been formulated. A new path of multi-channel investment suitable to socialization and marketization has been blazed.
3. To enhance the management of water quality in sensitive bordering areas. The local governments in the Taihu Lake basin have set up and improved the working mechanism of water quality target-fulfillment assessment, information release of the water quality at borders, joint efforts of pollution prevention in upper and lower reaches and pollution warning. The tasks of the Plan are split and allocated by stages to the local governments and departments, with the stipulation that the governments at various levels should be responsible for the water quality in the area. The monthly information release of the information of the water quality in border areas is carried out on full scale. The people’s governments of Jiaxing and Suzhou have also set up the mechanisms of joint meeting on pollution prevention and early-warning of pollution.

Since the 9th Five Year Plan, the achievements of water pollution prevention in Taihu Lake basin indicate that the water pollution prevention in lake basin is an arduous long-term work; the treatment of lake basin should be combined with win-win solution of economic growth and environmental improvement, with the establishment of national model cities of environmental protection, ecological provinces and

ecological demonstration zones, with the promotion of market mechanism, and with the system building and supervision improvement. The scientific development approach and correct assessment of governmental achievement should be promoted so that the economic growth quality will be improved, and the comprehensive, coordinated and sustainable development of the regional economy, society and environment will be promoted. The mechanism should be set up with the government taking the leadership, relevant departments taking the responsibilities, environmental departments carrying out supervision and management, enterprises conducting treatment, and the public supervising and participating so that the pollution treatment effects will last for long term. The industrial restructuring and cleaner production should be promoted, and a new industrialization path should be taken. The eco-agriculture should be promoted. The demonstration sites of non-source agriculture and poultry and animal breeding should be established and improved so that the non-point agriculture source pollution will follow an ecological and market-oriented path that turns the wastes into resources. The pollution treatment should be carried out in a scientific way. The environmental industry and advanced water pollution prevention technologies should be promoted. With these measures taken, the water pollution prevention will be successful.

Case Two: Water Environmental Protection in Dianchi Lake

The Dianchi Lake is located in Yunnan Province, with an area of 300 km² and an average depth of 4.4 m. It is the largest lake in southwest China. Dianchi Lake basin includes Wuhua and Panlong districts of Kunming and 41 towns and villages of Guandu, Xishan, Jinning, Chenggong and Songming counties. It is referred to as the Pearl of the Plateau. However, by 1999, the water quality in the lake had seriously degraded, with the water quality in Cao Hai and Wai Hai worse than Grade V.

In accordance with the water environmental situation in China, Dianchi Lake water pollution treatment was identified as one of the important treatment projects of “Three Rivers and Three Lakes Programme”. In 1997, the State Council approved the 9th Five Year Plan and 2010 Program of Water Pollution Prevention in Dianchi Lake Basin (hereinafter referred to as the Program). According to the requirements of the Programme, twelve projects of pollution treatment concerning point sources, internal sources, non-point sources, and scientific researches have been finalized, with an investment of 2.53 billion Yuan. After the comprehensive treatment in the 9th Five Year Plan period, the industrial pollution sources in the lake basin are under effective control. The capacity of urban sewage is 365,000 tons/day, and the amount of polluted sludge cleaned-up is 4.3 million tons. The forest coverage in the lake basin is 48.9%. On March 12, 2003, the State Council approved the 10th Five-year Plan of Water Pollution Prevention in Dianchi Lake (hereinafter referred to as the Plan) which further clarifies the measures and tasks of “Pollution Control, Ecological Rehabilitation, Resources Allocation, Supervision Management and Science and Technology Demonstration”.

In the past three years since the implementation of the 10th Five Year Plan, fifteen projects in the Plan have been carried out, accounting for 57.7%, with an investment of 1.07 billion Yuan. The capacity of urban sewage treatment is 585,000 tons/day. The polluted sludge cleaned-up in Cao Hai is 2.1 million m³. The treatment of river courses entering into the lake such as Panlong River, Dagan River and Cailian River, as well as the engineering project of two landfill sites in east and west Kunming have been completed. An area of 3.3 km² of ponds has been turned back to lake. Balanced fertilizing has been promoted in 559000 mu of lands, with a reduction of over 6000 tons of chemical fertilizer. Afforestation of 170000 mu has been completed. The land retirement and reforestation area is 10300 mu. Mountains of 67000 mu have been fenced off for forest cultivation. The forest coverage in Dianchi Lake basin is 50.6%.

Achievements have been made in the pollution prevention in Dianchi Lake. The transparency of the water in Caohai and Waihai of Dianchi has increased. The nutrient state index of Caohai reduced from 83.2 in 2000 to 76.2. The nutrient state in Waihai has reduced from 66.4 in 2000 to 62.4. Compared with the situation in 2002, the total nitrogen concentration of the water quality in Waihai, Dianchi Lake remained stable in 2003, the concentration of total phosphorus reduced by 44.1%, and the permanganate index reduced by 19.2%. The overall water quality was better than that in 2000 and 2001, and remained the same as that in 2002. The concentration of total nitrogen and total phosphorus remained same. The permanganate index reduced by 43.25. Compared with 2000-2002, the overall water quality situation was improved. The monitoring results indicate that in the context of economic growth, population increase and more pollution load in the Dianchi Lake basin, the trend of rapid water pollution degradation is under control, with the overall water quality remaining stable and key pollutants remaining stable and reducing.

However, the treatment task of Dianchi Lake remains arduous. The main indicator of the water in Dianchi Lake is at or over standards of Grade V water. It is still a lake with serious pollution. With the further development of Kunming, the economy keeps growing rapidly, the city keeps expanding and the population keeps increasing, which has brought about lots of new problems for the treatment and protection of Dianchi Lake. The marketized mechanism of pollution treatment facilities has not yet come into being, which has influenced the fund-raising via multi-channels and the role of the completed facilities.

Since the 9th Five-year Plan period, fruitful experiences have been obtained in the water pollution prevention of Dianchi Lake. We have come to recognize that the treatment of Dianchi Lake is a long-term task. Only with unremitting efforts, shall we be able to make fundamental changes. At present, China is formulating the 11th Five Year Plan. Based on the experiences and lessons in the 10th Five Year Plan period, we will continue to focus on the pollution prevention and total pollutants discharge reduction, devote great efforts to reducing the urban pollution sources and non-point agriculture pollution, actively carry out the control of internal sources, ecological remedy and resources allocation so as to further reduce the pollutants entering into the

Lake and control the total pollutant discharge. By 2010, it is expected that the water quality in Caohai and Waihai will be improved significantly, laying the foundation for the target that by 2030, the water quality of Caohai basically attains Grade IV, that of Waihai basically meets Grade III so that the overall target of water protection and benign ecological cycle in Dianchi Lake could be attained.