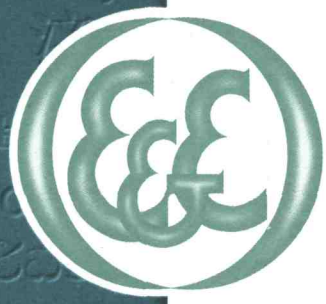

ECONOMY AND ENVIRONMENT PROGRAM
FOR SOUTHEAST ASIA

POLICY BRIEF

PRICING WASTEWATER TREATMENT IN CHINA

One of the most pressing environmental problems facing Asia's cities is a lack of effective wastewater treatment. In particular, urban areas in China, which have experienced very rapid industrialization, are facing a pollution crisis as water-borne wastes pour relatively unchecked into rivers and lakes.

To find solutions to this problem, Fan Zhang, a researcher from the China Center for Economic Research, recently investigated water collection and treatment in Wuxi City, Jiangsu province.

He found that the waste management scheme currently under construction in the city represents a cost-effective response to the province's problems. However, his research also revealed that current water charges seriously under-represent the true costs of water treatment and supply. His main recommendation: that phased-in increases in water tariffs will be needed to support the development and maintenance of an effective treatment plant.

With support from EEPSEA, Zhang carried out a detailed economic analysis of the costs and benefits of different water treatment options in Wuxi and reviewed the current wastewater tariff system. He chose Wuxi since it is representative of many industrialized cities in China's eastern coastal area. Moreover, Jiangsu is one of the most rapidly developing of China's 31 provinces areas, leading the way in terms of the total volume of wastewater and industrial wastewater produced.

Zhang found that the main pollutants entering the rivers and lakes around Wuxi (which include Lake Tai, a favorite tourist destination) are municipal waste water, industrial waste water and agricultural fertilizers and pesticides. Because of these high inflows of pollution, water quality in the lakes and rivers around Wuxi has declined in the past thirty years. In the 1960s, water in the city canals was suitable for swimming, washing and fishing; today it is septic and malodorous, a situation common in China's cities.

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To deal with the problem, the Wuxi municipal government has embarked on a three- stage wastewater disposal plan, involving the phased introduction of primary, secondary and tertiary (nutrient elimination) treatment. To help implement this system, household potable water charges have been increased to from 0.6 yuan to 0.75 per ton. The program, which is scheduled for completion after the year 2000 is now about two-thirds complete - although benefits to water quality are yet to be fully realized.

To investigate the economic implications of this decision, Zhang undertook a cost-benefit analysis of the plans. He found that the main economic impact of wastewater pollution is an increase in the cost of extracting drinking water from Lake Tai. The Wuxi Environmental Protection Bureau (WEPB) has estimated that the new wastewater treatment project will improve water quality by one class (compared to 1992) - according to Zhang's calculations this should reduce water processing costs by between 4-6 percent. Other savings due to the wastewater treatment program will include savings to drainage companies, and fisheries along with benefits to agriculture, residents and tourists.

On the cost side, Zhang found that the capital costs of the waste water treatment project - which include land acquisitions, construction work and equipment - are considerable. For example the implementation of physicochemical treatment facilities alone will cost well over $32 million.

All in all he found that the net benefits from wastewater disposal and treatment are positive. However, he cautions that the value of the net benefit is not large and that it could turn negative if costs are not effectively controlled.

In light of these findings, Zhang designed a potable water charge regime to support the implementation of the three-phase waste water treatment scheme. He used this approach since it was not technically feasible to collect pollution charges from each household in Wuxi - so water collection and treatment costs are most easily added to the potable water price.

Zhang calculated the price which should be charged to water users to guarantee that water resources are best allocated and water pollution minimized. To arrive at this optimum charge Zhang employed the principle of "marginal opportunity cost" (MOC). This incorporates production, depletion and environmental costs into the total consumer charge for a product or utility. (For a fuller discussion of MOC pricing, see EEPSEA Special Paper "*Marginal Opportunity Cost Pricing for Municipal Water Supply*" by Jeremy Warford, 1994.)

Zhang's findings supported the widely- held belief that the main problem of China's water charge system is that the charge is too small to induce polluters to reduce emissions. He calculated that the full economic cost price paid by users should be 1.94 yuan per ton - considerably more than the current level.

According to Zhang, the best way to implement such a pricing regime - and so guarantee the successful completion of water treatment plans in Wuxi - is to phase in a schedule of increased pollution charge tariffs by class of water user. Under this schedule - designed to address the different needs of households, small factories and large factories - the water tariff for both households and companies would reach the optimum price by 2010.

Zhang's research is timely since the Chinese State Planning Committee is currently designing a water charge system which will include water fee and wastewater discharge fees. The system is likely to be put into practice soon. Zhang's assessment of the situation in Wuxi should provide useful guidelines for municipal governments elsewhere to deal with wastewater disposal.

Note: 8.28 CNY (yuan) = 1 USD

The full text of this study is available as an EEPSEA Research Report:
Marginal Opportunity Cost Pricing for Wastewater Disposal - A Case Study of Wuxi, China - Fan Zhang

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