

## CHINA

### GREENING THE MOTHER RIVER IN TAIYUAN

*Years of neglect and open discharge of effluents into the Fen River turned Taiyuan into one of the most heavily polluted cities in the world. But a process inspired by Local Agenda 21 (LA 21), which saw the involvement of tens of thousands of citizens, has resulted in the environmental remediation of the urban stretch of the river and the creation of a large ecological park along its banks, which has given the city its 'new lungs'.*



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Taiyuan is a city of 3.1 million inhabitants located in the arid Northern Chinese Province of Shanxi. During China's rapid industrialisation in the 1950s and 60s, many nationally important factories were established in the city, leading to rapid economic development and population growth, but also to serious chemical pollution. The River Fen, which runs through the city, became one of the most heavily polluted rivers in China, with around 500,000 m<sup>3</sup> of wastewater and industrial effluent discharged into urban stretches of the river each day. It was largely silted by the late 1970s, resulting alternately in flash floods and drought, and became a major source of health and environmental hazards.

In 1997, with the adoption of a national urban development and environmental protection policy, a Taiyuan LA 21 process was initiated by the Municipal Government. Citizens, with experts and other stakeholders, participated in the formulation of a plan of action for pollution management, water storage and urban greening. In September 1999, the Municipal Government invited multi-disciplinary experts from national government agencies, leading universities and research institutions, local authorities, businesses and non-governmental organisations to hold con-

sultations and discussions on the plan. By December 1999, the plan for the remediation and management of the River Fen was adopted after a referendum involving over 40,000 citizens.

The resulting project turned the 6 km long and 500 m wide natural river course of the urban section of the River Fen into multiple river channels. On one bank, a wide clear-water channel is partitioned by 4 rubber dams into a three-tier storage lake. On the other bank, a turbid water channel is used to drain off upstream rain and wastewater. On both river embankments there is now a wide stretch of parks and gardens, and five natural wetlands in the river course that have been restored. Wastewater, previously discharged directly into the river, is now transported through an 18 km covered conduit to a wastewater treatment plant located downstream. The purified water is transported back through a pipeline to the water storage ponds used for irrigating the parks and gardens as well as to maintain a constant level of water in the river.

Funding was the primary constraint for the development of the project, which required an overall investment of US\$67.7 million, a huge amount for the city. While most of the funding came from government allocations and financial support from state-owned and private sector enterprises, a substantial amount was raised by donations from the general public.

Local fund-raising efforts (under the banner "Greening the Mother River, Making Common Efforts to Building a Beautiful Home") mobilised US\$345,000 in individual donations. In addition, project costs were lowered because, thanks to media coverage of

the project, many citizens participated actively in the implementation of the project. Approximately 700,000 soldiers and volunteers took part in excavation and earth works, de-silting of river courses, planting of trees and removal of weeds along the river courses. Women's organisations, youth organisations and schools mobilised their members and pupils in a city-wide campaign to remove waste, and water trees, shrubs and flowerbeds. This voluntary

contribution resulted in savings of US\$3.44 million for the project between October 1997 and August 2000.

The environmental impacts of the project have been remarkable. It has been calculated that, by increasing green space by 1.5 m<sup>2</sup> per person, the project is generating 1,678 tons of oxygen and absorbing of 2,480 tons of CO<sub>2</sub> everyday. Furthermore, the combined effect of de-silting the river, creating river channels and water storage capacity has reduced the flood risk to once in one hundred years. The four downstream sewerage treatment plants treat 50% of previously untreated domestic and industrial effluent, thus improving the immediate environment of the city, avoiding downstream pollution in the most important tributary of the Yellow River, and helping restore the ecological balance of the river to a sound habitat for wildlife including plants, birds and aquatic animals. The treated water is led through a pipeline back to the storage ponds to be used for irrigating the banks of the river and the parks and gardens, creating a sustainable cycle of water use and re-use.

The project has also been socially beneficial in a variety of ways: the environmental awareness created through the project has boosted the civic engagement of citizens, and the creation of accessible parks and gardens in the city centre, now popularly known as the "New Lungs of the City", has also contributed to the revival of traditional pastimes of the city including strolling along the banks of the river, tai chi and horticulture.

One issue that the project should have paid more attention to, by its planners' own admission, is the preservation of the natural banks of the river (at the expense of some of the flood prevention measures). This would have allowed more direct contact between the earth of the riverbanks and the water and to enable a more natural and rapid regeneration cycle for aquatic organisms and microbes to take place. Still, the lessons learned from the project in the mobilization of public, private and community resources, and the application of appropriate technologies for river water management are highly relevant to many other arid areas in the world, where the flow of rivers often alternates between floods and drought.



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For a similar case see:  
"Fu and Nan Comprehensive  
Revitalisation Plan in  
Chengdu", in *Wakely P.*  
*Op.cit.*, case no.83, p. 191



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