

Global Environment Facility Project Concept for Pipeline Entry

Country:	China
Project:	Guangdong Pearl River Delta Urban Environment
GEF Focal Area:	International Waters
Operational Program:	OP 10 Contaminant-Based Program
Project Cost:	About \$425 million
Financing Plan:	IBRD \$200mn, Guangdong \$215 mn, GEF \$10 mn
Requesting Agency:	World Bank
Executing Agency:	Guangdong Province

The PRD Area

The Pearl River Delta (PRD) is home to over 40 million people who live in 25 administratively-defined cities and three counties in Guangdong Province, and in two Special Administrative Regions (Hong Kong and Macau). In Guangdong Province there are 534 towns, townships and sub-municipal districts which, after more than 15 years of rapid decentralization, have significant functional responsibilities for the delivery of public services. Economic growth in the PRD area has averaged 14.7% per annum during 1990-2000, mostly due to large inflows of direct foreign investment, initially in low value-added manufacturing, and more recently in higher value-added manufacturing and services. Much of the growth has been powered by large inflows of low-cost migrant workers from peripheral areas in Guangdong and from poor provinces.

The Delta is also complex geographically. There are three major branches of the Pearl River (Zhu Jiang) which join at the city of Guangzhou, the political, economic and cultural hub of the PRD. The Pearl River is China's third longest river, and is second only to the Yangtze in terms of annual average flow. It discharges into the South China Sea through eight principal tributaries.

The PRD's Environmental Problems

The PRD's rapid economic growth has come at a heavy environmental cost. Investment in environmental protection has not kept pace with the area's rapid economic advance, as is evident in the serious deterioration in river water quality. Today, many of the reaches of the Pearl River, especially in the vicinity of Guangzhou, are at Class V or worse, and therefore unfit as a drinking water source. Except for wastewater collection and simple landfills for solid wastes, most cities in the PRD have limited facilities for waste management and little experience with planning, designing, financing, managing, and operating wastewater and solid waste treatment facilities.

Domestic and industrial wastewater discharges, urban storm water runoff, and non-point source pollution from agricultural and livestock farm run-off are the main pollution sources within the PRD. Municipal wastewater is discharged to the river systems without treatment, except in the larger municipalities of Guangzhou, Shenzhen and Zhuhai, where a portion of the wastewater is treated. Environmentally safe disposal of sludge from wastewater treatment plants is only just beginning in the PRD, with a first plant under construction to serve Guangzhou city. Treatment of sludge from the expanded wastewater treatment plant capacity now being installed is a major challenge to the PRD cities. This deteriorating environmental situation poses a serious threat to drinking water sources, including the drinking water supply to Hong Kong. It also renders the river system unsuitable for irrigation, aquaculture, and potential recreational uses. And it is seriously polluting the South China Sea.

Municipal solid waste collection is well-organized on a neighborhood basis. However, the capacity to treat and dispose of solid waste is not well developed, except in a few of the larger urban centers. The city of Guangzhou has a well-organized landfill operation; however, recycling and waste minimization are not practiced at all, except at the informal level. The resulting large and growing volumes of environmentally-damaging and hazardous wastes present considerable risks to health, surface and ground water sources.

The recent SARS epidemic is believed to have originated in Guangdong Province where intense concentrations of people and livestock and inadequate waste management systems provide an optimum climate for the production and transmission of viruses, e.g. Hong Kong flu of 1996.

Key Weaknesses of the Policy Framework

Pricing and service provision. Lack of demand management and under-pricing of urban services are over-burdening existing waste management facilities, overwhelming maintenance capacity and draining municipal resources and hence development funds. For example, charges for water supply and wastewater treatment are a fraction of the true cost of these services. And, aside from a charge for transporting wastes from households to collection points and a recently-introduced waste disposal fee in Guangzhou, there is no cost recovery for transfer and disposal of garbage. Up to now, the strategy of the Provincial and municipal governments has also been to address environmental issues on an inefficient highly-localized and largely public sector-based approach.

Private sector involvement. Private sector participation in environmental investments and service provision in China is very limited, but is beginning in the larger cities. In Guangdong province, private sector involvement includes: one concession for a water supply (in Tanzhou); production and transmission of water; wastewater treatment (in Guangzhou); operation of a landfill for Guangzhou with gas extraction and conversion to electricity; and a Build-Operate-Transfer (BOT) operation for a sludge treatment plant for Guangzhou (about to commence). So far, no initiatives have been taken to facilitate entry of private service providers for the distribution of drinking and wastewater collection, where the greatest gains in efficiency and service levels are possible. Considerable opportunities exist for more private sector participation, which could result in greater efficiencies, and greater financial flows to cities in the PRD.

Government Strategy

The Guangdong Provincial Government (GPG) is committed to sustainably develop the PRD and to control its environmental degradation through, *inter alia*, the introduction of cost-recovery pricing, more efficient allocation of investment resources and the promotion of innovative forms of private sector involvement. To implement this plan, Guangdong Province's Environmental Protection Bureau (EPB) has announced a plan to clean-up the PRD through an eight-year, US\$5 billion program of investment in wastewater treatment facilities. Unfortunately the program largely reflects the past fragmented and financially infeasible approach to infrastructure planning, in that it contains too many treatment plants, is too ambitious and costly, and does not take full advantage of private sector service opportunities. Nor does it effectively address the non point source pollution challenge (e.g. agriculture and industrial livestock). The proposed project will help Guangdong Province and its constituent municipalities to convert this financially unrealistic and inefficient plan into a financially rational, least-cost and environmentally effective program.

Baseline (without GEF) Action Scenario

Under the baseline scenario, the GPG and its many cities and towns will make substantial investments in wastewater treatment and in improving solid waste management in the next eight years that will reduce the volume of pollution entering the South China Sea. But some of these facilities will be delayed by jurisdictional squabbles; neighboring municipalities will build their own, inadequately sized facilities that will waste investment resources, raise operating costs and threaten their sustainability; and little effort will be made to involve the private sector in service provision, even though this is often the least-cost and most efficient option.

The GEF Alternative Scenario

Under the GEF Alternative Scenario, the proposed project would constitute the first-phase of a cost-effective, long-term and very large-scale environmental management program that will address the key weaknesses of the Baseline Scenario and thereby achieve significantly larger and more cost-effective environmental improvements in the PRD and in the South China Sea, into which it flows. The GEF Alternative project would support a larger volume of collaborative, least-cost municipal waste management investments; be funded from a wider variety of sources, including the private sector; and would promote greater financial sustainability of these investments than the Baseline Scenario. To achieve these outcomes, the project would implement a package of physical investments, policy and institutional reforms, and financial management improvements. Its over-arching goal would be to achieve the maximum sustainable environment benefits for the PRD area and the South China Sea by identifying and funding the most environmentally efficient, least-cost investment program that can be afforded and sustained with sound financial management. The project and program will commence with the highest priority investments in the city of Guangzhou, which is the largest contributor to pollution in the PRD, with smaller cities also implementing jointly-managed environmental infrastructure investments on a pilot basis. It would also demonstrate innovative service delivery and financing approaches, including private sector provision of environmental infrastructure and services. The Guangdong component of the parallel World Bank/GEF Livestock Waste Management Project would address this specific issue as an integral part of the provincial environmental management program.

GEF support would play a catalytic role in two key, innovative aspects of the GEF Alternative strategy. First the GEF would promote the planning and construction of shared municipal wastewater treatment facilities. This collaborative approach to wastewater management would achieve significant capital and operational cost savings, which in turn would accelerate investment in wastewater treatment, expand the volume of investment and enhance its financial sustainability. Second, the GEF would stimulate greater private sector involvement in waste management investment and operation by (i) encouraging the municipalities to actively seek private sector partners, and (ii) potential private sector investor/operators to prepare waste management investment and operational service proposals for consideration by the municipalities and ensuring that such proposals are evaluated solely on their technical and financial merits and implemented when they are both least-cost and financially sustainable options.

The key outcome of the GEF Alternative is consistent with the project's overall outcome, i.e. improved water quality in the Pearl River Delta. This will be monitored through a comprehensive and replicable water quality testing regime. Key outputs of the GEF assisted project components would be the number of facilitated agreements to share water treatment facilities among the municipalities and the expanded service levels achieved through private sector involvement.

Project Components

The project would support the following specific waste management investments, technical assistance and capacity building activities at both provincial and city levels:

(a) *Wastewater Management in Guangzhou City*, would include an increase in wastewater treatment capacity by about 400,000 m³/day in two plants, construction and rehabilitation of sewage networks to collect wastewater generated, interception of wastewater entering creeks and rivers, and storm water management.

(b) *Incentive-based Lending for Inter-Municipal Environmental Infrastructure in PRD Municipalities and Towns*, would fund wastewater treatment and solid waste investments for groups of two or more contiguous municipalities or towns willing to plan, construct and manage shared facilities or to contract with private investor/operators for their provision and operation. Candidate municipalities will be identified by appraisal, along with proposed investments, and institutional arrangements for the construction and management of the facilities. This is a key component for GEF assistance. GEF funds will be used to facilitate joint municipal water treatment plant identification, design and the preparation of operating plans. This would include review of financing arrangements and stimulating the role of the private sector. GEF assistance would expand the number and rate at which shared treatment facilities are commissioned, and facilitate the government's focus on optimal plant location and operational efficiency.

(c) *Solid Waste Management in Guangzhou City*, would include investments in landfills and/or waste treatment plants for disposing of solid waste in Guangzhou and neighboring towns.

(d) *Water Quality Monitoring and Information Systems*, would include a range of laboratory and field equipment (including automatic water quality recorders) and development of a MIS to measure water quality in rivers in the PRD and to enhance the capacity of the Provincial Environmental Protection Bureau to improve its efficiency and effectiveness for pollution control. GEF funds would co-finance the equipment and training, the results of which would feed into the monitoring and evaluation activities of the UNEP/GEF South China Sea Project.

(e) *Technical Assistance and Capacity Building*, would include (i) project implementation support for detailed design and construction supervision; (ii) launch of a public awareness campaign to inform citizens about the government's plans to clean up the river system, its water quality objectives, and potential benefits and citizen support to detect and report polluters; (iii) strategic plans for urban development, water resource and environment management, wastewater and storm run-off management, agricultural and animal waste management (through coordination with the proposed World Bank/GEF Livestock Waste Management Project, which will promote complementary policy reforms and demonstration investments to address this specific issue), private-private partnerships in funding and managing environmental infrastructure, and financial policies and instruments for mobilizing long-term resources for environmental investments; and (iv) training in urban development, wastewater, solid waste management and water quality monitoring. GEF funds would play a key role in this area as they would facilitate the structuring of private facility 'deals', financing plans and related capacity building in both the private and public sectors.

Rationale for GEF Support

GEF support is therefore requested for project components (b), (d) and (e). In the case of component (b) GEF resources of about \$8 million will be requested to finance the incremental costs of promoting innovative, collaborative, more cost-effective and more sustainable joint municipal environmental infrastructure investments by first helping to identify the first of these options and then by providing modest incentives to the concerned municipalities to collaborate on jointly designing, constructing and operating several joint facilities. The GEF investment incentive funds would only be committed if and when viable joint municipal projects were identified by the GEF-supported identification efforts. This GEF support would catalyze both a greater volume of environmental investment and a greater number of financially sustainable investments than the municipalities would make or could sustain under the Baseline (business-as-usual) Scenario. GEF co-financing for component (d) would enhance water quality monitoring facilities and capacity and strengthen both the project's impact assessment and the PRD's contribution to the UNEP/GEF South China Sea Project's M & E program. In the case of component (e), GEF resources are requested to finance the incremental costs of identifying and preparing viable proposals for private-public and private-private partnerships to finance and operate additional environmental infrastructure facilities. Without GEF support for this component (business as usual), the PRD's constituent municipalities will be reluctant to explore and develop such innovative options and will not fully tap the potential for joint municipal and/or private sector environmental investment and service provision. The private sector investments that the GEF support would supplement scarce public sector environmental investment resources and thereby accelerate pollution reduction in the PRD and from the PRD area into the South China Sea.

GEF support would also catalyze an innovative regional (PRD-wide) and comprehensive approach to water quality improvement. No single municipal investment program is capable of providing all of the treatment facilities and behavioral modifications needed to have a marked improvement to the South China Sea water quality. Plus action on industrial livestock waste and other directed interventions to increase water treatment capabilities and reduce industrial waste discharges is also needed. The GEF Alternative will thus be the first of what is planned to be a series of such integrated yet independently delivered water quality improvement interventions.

Consistency with GEF's Operational Programs and Strategic Priorities, 2004-06

The project is consistent with the GEF's Operational Program 8 in that it would help China to significantly reduce land-based pollution of the South China Sea, which has been identified by the UNEP/GEF Project "Reversing Environmental Degradation Trends in the South China and Gulf of Thailand" as one of this large marine ecosystem's action priorities. The Pearl River is China's largest point source of land-based pollution of the South China Sea and Guangdong province is the most concentrated source of that pollution.

The project is consistent with the GEF's Operational Program 10 in that it will demonstrate innovative options for reducing the contamination of an international water body – the South China Sea. The project's objectives of identifying joint municipal environmental investments and private-public and private-private investments are both innovative, as is the proposed use of GEF resources as an incentive for municipalities to undertake joint investments to demonstrate the feasibility and cost-effectiveness of this approach to environmental investment.

The project is also consistent with the GEF's Strategic Priorities nos. 1 and 3 for the International Waters Focal Area in 2004-06. With respect to priority 1, it will facilitate the efforts of one nation

that is collaborating in the South China Sea and Gulf of Thailand Project to mobilize substantial financial resources for implementing policy/institutional reforms and investments to address a priority trans-boundary water issue (land-based pollution from major river systems). With respect to priority 3, the project will test innovative institutional and financial mechanisms to accelerate investment in facilities that reduce the contamination of an international water body.

The project is also an example of the type of initiative that could be supported by a larger GEF public/private environmental financing facility/revolving fund that is being considered for the East Asian Seas.

Sustainability

The project is confidently expected to be sustainable (a) financially, (b) institutionally, and (c) in terms of its environmental and development objectives. Financially, tariff reforms will enhance the viability of the wastewater and hazardous waste facilities and services that will be supported. Institutionally, the creation of financial autonomous wastewater companies and a solid waste company and continued technical assistance would strengthen utility management. Finally, the project addresses an issue of high priority to central, provincial and local governments--the vital sustainable development objective of achieving environmental conditions necessary for sustained economic and social growth in the PRD, which constitute a strong motivation for the project to succeed and its benefits to be sustained, and for a larger, long-term PRD environmental clean-up strategy to be developed from it and built on it.

Replicability

The project has considerable local, national, regional and perhaps even global replication potential. Locally, the fact that it is the first phase of a long-term environmental program means that there is already a plan and a commitment to replicate its successes in the PRD through its participating institutions. Nationally, there is enormous scope in China's many other large metropolitan areas for replicating its policy and institutional reforms, its pioneering concept of joint municipal wastewater and solid waste treatment facilities, and its initiative to expand the role of private-public and private-private partnerships in waste management investment and service provision. National replication will be facilitated by the Chinese Government and by the World Bank's East Asia Infrastructure Operations Unit. The latter will also apply the lessons learned to its regional portfolio of environmental management projects and disseminate them globally through the World Bank's Infrastructure Operations Network.

The World Bank is fully committed to helping design and deliver a comprehensive and long term assistance strategy for environmental management of the Pearl River Delta and this is the first project in an expected series of investments in water quality improvement. Assistance would be both broadened to neighboring regions and deepened to provide follow on investments such as tertiary waste water treatment and industrial waste water minimization. The GEF funds will assist in the development of a long term aggressive water quality improvement program which could be a model for other countries that share the South China Sea. In order to help ensure the likelihood of this replicability, project preparation is being coordinated with the UNDP/GEF/IMO PEMSEA and the UNEP/GEF South China Seas regional program.

Stakeholder Involvement

Institutions. The Guangdong Provincial Finance Bureau will be responsible for project coordination. Each participating city will set-up its own Project Management Unit (PMO) to

oversee preparation and implementation of its component. Guangzhou has already done this. Individual components would be implemented by the respective sector agencies. In Guangzhou City, the wastewater treatment component will be implemented by the Guangzhou Municipal and Gardens Bureau; the solid waste management component will be prepared and implemented by the Guangzhou Solid Waste Management and Treatment Center; and the Guangdong Provincial Environmental Protection Bureau will be responsible for implementation of the water quality monitoring component.

Individuals/communities. The project is being designed and prepared in a highly participatory manner. The Project Management Office has held numerous consultative meetings and formal workshops with representatives of the provincial and municipal governments to apprise them of the environmental and development issues the project will address, and to formulate the strategic framework for addressing them. PMO consultants are visiting all the local governments to assess their environmental investment plans and priorities and their interest in the project.

The PMO, together with faculty and students at Zhongshan University, is carrying out social surveys of the potential beneficiaries and users of project services. These surveys will guide the project design by, *inter alia*, analyzing beneficiary demand for improved wastewater and solid waste services and the willingness and ability to pay for them. Special attention will be given to ensuring that poorer households can afford services provided under the project.

The Guangzhou wastewater component will involve some resettlement of residents where the new interceptors, sewage network pipes and landfills are to be installed. While many of the residents will receive better accommodations and services, the relocation could impact the social structure of these areas and possibly the economic situation of the affected persons. Following a survey of all affected persons, a Resettlement Action Plan (RAP) will be prepared ensuring consultations with, and full participation of stakeholders, in accordance with the Bank's social safeguards policies and practices. The RAP design will demonstrate that any negative impacts have been mitigated.

Monitoring and Evaluation

The Guangdong Provincial Environmental Protection Bureau would have overall responsibility for project monitoring and evaluation and will develop a detailed monitoring and evaluation plan during the project preparation process. The project will facilitate the implementation of this plan by funding laboratory and field equipment (including automatic water quality recorders) and development of a MIS to measure water quality in all the PRD rivers, and to enhance the capacity of the Provincial Environmental Protection Bureau to improve its efficiency and effectiveness for pollution monitoring and control.

Links to the World Bank's China Program

The project will support several important themes and specific goals of the World Bank's China Country Assistance Strategy. It will facilitate the urban transition that is underway in China, by helping to enhance the environmental sustainability of China's cities--where the overwhelming majority of jobs will be created--and the provision of improved urban living conditions which depend crucially on better environmental management and the availability of adequate financial resources to fund it. It will also support an environmentally sustainable development process, by improving the management of water resources and solid waste management.

The project will also help China meet one of the Millennium Development Goals (Goal 7), which is to "*Improve the environment by implementing national strategies for sustainable development by 2005.*"

Coordination and collaboration with the other IAs

The project will be the first major investment to address the strategic action priorities identified by the participants in the UNEP/GEF project "Reversing Environmental Degradation Trends in the South China Sea and the Gulf of Thailand". The UNEP project's Pollution Working Group has been briefed on and expressed its support for the project. The Working Group will be briefed on the project preparation process and on the emerging final design and its monitoring and evaluation outputs will feed into the UNEP/GEF projects monitoring and evaluation system.

The project will also support the objectives of the UNDP/IMO/GEF East Asian Seas Project and serve as a model for the large-scale policy and institutional reform and public-private investment packages that this project is endeavoring to catalyze in the region.

It will also serve as an example of the type of large-scale, public/private funded environmental investment, policy and institutional reform program that the GEF is hoping to catalyze elsewhere in Asia through the above-referenced projects, and which may in future be supported by a GEF-sponsored regional environment investment and/or revolving fund. If the project is able to generate any re-flows of the GEF resources that are used to catalyze private sector investment, these re-flows will be channeled into the proposed regional investment/revolving fund both to replenish the fund and to demonstrate the revolving environmental investment fund concept.