

**PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE**

Report No.: AB2012

Project Name	China-GEF-Ningbo Water Management
Region	EAST ASIA AND PACIFIC
Sector	General water, sanitation and flood protection sector (100%)
Project ID	P090336
GEF Focal Area	International waters
Borrower(s)	NINGBO MUNICIPALITY
Implementing Agency	The World Bank
Environment Category	<input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> FI <input type="checkbox"/> TBD (to be determined)
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1. Country and Sector Background

East Asia's rapid economic growth has been accompanied by significant environmental degradation. Land-based pollution of the region's coasts, estuaries and rivers is one of its most severe environmental problems and is degrading the region's large marine ecosystems (LMEs). To help littoral states address this problem, the GEF and World Bank have agreed to establish a Partnership Investment Fund for Pollution Reduction in the Large Marine Ecosystems of East Asia (the Fund). The objective of the Fund is to reduce land-based pollution discharges that have an impact on the seas of East Asia by leveraging investments in pollution reduction through the removal of technical, institutional, and financial barriers. In particular, the Fund will finance activities related to World Bank pollution reduction investment projects that are innovative and can be replicated in other areas. Expected outcomes of the Fund would be increased investment in activities that reduce land-based pollution and the replication of cost-effective pollution reduction technologies and techniques demonstrated by the Fund. A Brief on the Fund (Tranche 1 of 3 Tranches) in the amount of US\$25 million was approved by the GEF Council in November 2005.

The activities under this GEF-financed project were originally conceived as part of the IBRD-financed *Ningbo Water and Environment Project* (NWEP). The NWEP project was approved by the World Bank Board in FY05, and this associated GEF project will be the first project financed under the Fund. NWEP has three components: i) Ningbo Water Supply (US\$157.9 million); ii) Cixi Wastewater (US\$128.0 million); and iii) Institutional Development (US\$4.5 million). This GEF project is an environmental enhancement to the Cixi component of NWEP. Cixi City covers an area of 1,100 km², with a population of around 1 million, and is located on the northern coastline of Ningbo Municipality bordering Hangzhou Bay. The proposed GEF project is designed to demonstrate simple and effective wastewater treatment methods – constructed wetlands – and sustainable wetland management approaches.

The rapid economic and population growth in Ningbo, as well as many other coastal cities in China, is increasing pollution from cities into neighboring seas. In addition, non-point source pollution from urban and agricultural run-off is a large and growing problem, and a significant contributor to marine pollution in China. Consequently, the coastline of Ningbo and its neighboring East China Sea are severely polluted. As reported in the *2004 Environmental Quality Report on Near-Shore Ocean Areas of China*, the East China Sea is the worst polluted sea in China, and its major pollutants are nitrogen compounds and phosphates.

Inappropriate wastewater treatment technology has further aggravated coastal pollution situation in Ningbo, as well as in China in general. Wastewater treatment facilities in China are in many cases designed with advanced technologies with insufficient consideration of financial or operational implications. The advanced treatment units may subsequently not be efficiently utilized due to budget constraints or lack of technical expertise. An Annual Audit Report released by the National Auditing Office of China (CANO) reported that in 2004, 60 out of 78 audited wastewater treatment facilities were under-utilized due to lack of operating funds or delay of the construction of auxiliary facilities, such as wastewater collection systems. Non-point water pollution control in China is still in its infancy, as the country is focusing first on the control of point sources, such as discharges from cities and large industries.

In addition to coastal pollution, loss of coastal wetlands is another challenge faced by Ningbo, as well as in China. China has the fourth largest wetland area in the world with 650,000 km², or 10 percent of the world total. However, land reclamation, aquaculture and environmental pollution as a result of rapid population growth and economic development have caused serious loss and degradation of China's wetlands. It is estimated that over half of the country's coastal wetlands have been lost. Bordering to the north to Hangzhou Bay, Ningbo Municipality has a coast line of 788 km and about 1000 km² of inter-tidal mud flat and marshes. These inter-tidal mud flat and marshes and their neighboring estuary waters are important natural habitats for fishes, benthos, migratory and indigenous water birds, and wetland vegetation. Nevertheless, it is reported that large-scale land reclamation in Ningbo has led to the loss of 46% of its coastal wetland areas. In addition, aquaculture activities (including snails, crabs, and fish) in coastal wetlands have inevitably eliminated natural habitat for wetland flora and fauna.

China has implemented extensive national regulations regarding the preservation of marine environment and wetland. The *Marine Environmental Protection Law of People's Republic of China (1999)* regulates the conservation of coastal areas and protection of marine ecosystems from land-based pollution. As a member of the GEF/UNDP/IMO Partnership in Environmental Management for the Seas of East Asia (PEMSEA), China is endeavored to promote integrated coastal management to reduce the degradation of coastal ecosystem. As a signatory party of the Ramsar Convention on Wetlands, China is implementing its *National Engineering Plan for Wetland Conservation (2004-2030)* to conserve 90% of its natural wetlands, to restore 140,000 km² of wetland area, and to develop legal and policy measures to more effectively manage these areas. Coastal wetlands at Hangzhou Bay have been classified as one of the eight nationally significant wetland areas under the *National Engineering Plan for Wetland Conservation (2004-2030)*. It is foreseeable that this GEF project will become an integral part of China's efforts in reducing land-based pollution to East Asia's LMEs and in restoring the country's important wetland areas.

2. Objectives

The Project objectives are to reduce land-based pollution along the Cixi coast and the East China Sea, promote the replication of innovative low cost wastewater treatment techniques, and encourage coastal zone conservation.

3. Rationale for Bank Involvement

The Bank is already making a significant contribution to Cixi's sustainable development by financing the wastewater infrastructure investments under the baseline NWEF. The proposed GEF project further enhances these investments by supporting Cixi's efforts to manage its coastal resources and adopt low-cost and ecologically friendly wastewater treatment methods. The Bank, through the Fund can assist Cixi design and implement an innovative project that would serve as a demonstration model for other coastal cities in China, and in the greater East Asia region.

4. Description

Component 1: Constructed Wetland (US\$7.12 million). The GEF project will support the establishment of a wetland which will provide tertiary treatment for the new 100,000 m³/d North Cixi secondary wastewater treatment plant (WWTP) financed by NWEF. The Cixi City Government has allocated 86 ha of recently reclaimed land for the constructed wetland associated with North WWTP. The proposed constructed wetland will be a combination of vegetated submerged gravel bed and free surface water wetland.

Component 2: Establishment of a Wetland Center (US\$8.0 million). The Cixi City Government has designated an existing area in the vicinity of the Ningbo-Shanghai Bridge as the Wetland Center. The Wetland Center covers an area of approximately 43.5 km² and includes the following plots (see IBRD Map 34441): i) Plot A1-recently reclaimed, non-tidal land within the existing sea dike (4.3 km²); ii) Plot A3-tidal marshland to the west of Plot A1 (1.4 km²); iii) Plot A5- a low lying island to the north of Plot A3 (1.8 km²); and iv) the tidal mudflat/bay section adjacent to Plots A1, A3, and A5, and covering approximately 36 km². Plots A2 and A4 would remain agricultural or low-density buffer areas. Development of the Wetland Center consists of two activities: i) the construction of a visitor center for wetland education and research, and ii) the enhancement and restoration of the Wetland Center's natural wetland area. The Wetland Center has three objectives: i) enhance the ecological functions of the area; ii) serve as an educational and research center for wetland management; and iii) improve water quality in surrounding canals by natural wetland treatment.

Component 3: Design and Management Assistance (US\$2.0 million). The GEF project will finance the following three activities: i) engineering design of the Constructed Wetland and the Wetland Center; ii) Management Assistance for the Wetland Center; and iii) Training and

Dissemination of Project experience. Management assistance is expected to be provided by a consortium of NGOs/Universities.

5. Financing

Source:	(\$m.)
BORROWER/RECIPIENT	12.12
GLOBAL ENVIRONMENT FACILITY	5.0
Total	17.12

6. Implementation

The NWEF PMO will also be the PMO for the GEF project. The Ningbo Municipal Finance Bureau is responsible for management of the Special Account. In Cixi, the Cixi Construction Bureau is the primary government agency responsible for oversight of the GEF project and providing any necessary counterpart funding. The implementing agency for Component 1: Constructed Wetland will be the Cixi Municipal Sewerage Company (CMSC) which is also responsible for implementation of the NWEF Cixi wastewater component. The Cixi Construction Bureau has established a “Wetland Center Management Company” for the implementation of Components 2: Wetland Center, and Component 3: Design and Management. The Management Company, under the oversight of the Construction Bureau, will be responsible for planning, construction, and operation of the Wetland Center. A NGO/university consortium will be hired to provide technical and managerial support to the Wetland Center Management Company during the detailed design, construction and start-up operations of the Wetland Center. The Consortium will be selected at the start of GEF project implementation, and will have expertise in ecology, environmental education, and fund-raising.

7. Sustainability

Both Ningbo Municipality and Cixi City are committed to the success of the GEF project and the associated NWEF. The degree of importance attached to both projects is reflected in the active participation of high-level government officials in the Leading Groups. Under the NWEF, the Ningbo PMO has been established as a permanent government agency, and thus is able to attract qualified individuals who are offered job security and promotion potential. Under the GEF Project, the Cixi Wetland Center Management Company is established with full funding support from the Cixi City Government. Ningbo and Cixi have invested significant amounts of their own funds in the NWEF implementation and preparation of the GEF project. The Cixi City Government has also committed a total of 86 ha of reclaimed lands to be used for constructed wetland and set aside another 43.5 km² of area for the conservation of the Wetland Center. Operational funds for the constructed wetland will be provided by CMSC which generates revenues through wastewater tariffs. Operational funds for the Wetland Center will be generated through a variety of sources including user fees, grants and donations, and funding from the Cixi City government.

This project has also included outreach activities to disseminate experience and knowledge learned from the operation of the Wetland Center and constructed wetland and to promote the replication of innovative use of wetland in wastewater treatment in China and East Asia. The potential for replication of GEF project activities is considered high. Constructed wetlands are an attractive treatment option for both secondary and tertiary treatment, as well as non-point source pollution treatment, in areas where land is readily available. Wetland conservation is now a national policy in China, and many other cities and provinces in China will be eager to learn from the experience of the Cixi Wetland Center.

8. Lessons Learned from Past Operations in the Country/Sector

The project design draws upon the Bank's considerable experience in working with China on environmental issues, including those related to wastewater treatment and wetland conservation. The Bank has been working closely with China on the implementation of other GEF projects and lessons learned in these projects have been taken into account in designing this project. Specific lessons include:

Simplify Wastewater Treatment: China has stringent effluent standards for treatment plants discharging into environmentally sensitive receiving water bodies, such as Hangzhou Bay. In an effort to meet these standards, wastewater companies often select technologically sophisticated treatment processes which are complex and expensive to operate. Consequently, many wastewater treatment plants in China do not perform as originally intended due to lack of operating funds and expertise. The GEF project will take advantage of the abundant reclaimed land in Cixi to develop a constructed wetland for tertiary treatment for the North Cixi plant. Although the constructed wetland has higher initial capital costs than conventional tertiary treatment (chemical coagulation followed by filtration) it has lower operational costs and is a simple and robust treatment method.

Consider Ecological Dimensions of Urban Development: Chinese cities are growing rapidly and transforming agricultural or undeveloped land into industrial, residential, and commercial areas. In the course of this transformation, it is also important to consider environmental and ecological amenities to enhance the quality of life and support the eco-system. The Cixi City Government has taken the bold move under the GEF project of reserving significant amounts of land for both the constructed wetland (86 ha) and the Wetland Center (43.5 km²) to help preserve coastal resources and provide environmental amenities to its citizens and visitors.

Take Into Account Non-Point Source Water Pollution: Run-off from urban areas and agricultural land can contain large quantities of pollution, particularly nutrients which are contributing to massive red tides in the East Asia Sea. In addition to controlling municipal and industrial dischargers, it is important for Chinese cities to begin to tackle non-point sources of pollution in order to achieve ambient water quality objectives. The GEF project will demonstrate an innovative and ecologically friendly approach to non-point source control by filtering water from nearby canals through an enhanced wetland system in the Wetland Center to improve water quality.

Full involvement of local stakeholders: The development of this project has involved a wide group of local stakeholders in government as well as NGOs, and key research institutes and universities which have been working on pollution and conservation issues in Hangzhou Bay. Two stakeholder workshops were organized in June and November 2005. Representatives from over twenty Ningbo and Cixi agencies and over 10 NGO representatives and wetland researchers were invited first to develop a sustainable vision for the project and then to review the conceptual design of the project prepared by consultants. By fully engaging all stakeholders in the project development process, the GEF project has helped stakeholders reach consensus on key activities of the project. It is foreseeable that such consensus will facilitate the successful implementation of the GEF project.

9. Safeguard Policies (including public consultation)

Safeguard Policies Triggered by the Project	Yes	No
<u>Environmental Assessment (OP/BP/GP 4.01)</u>	[X]	[]
Natural Habitats (<u>OP/BP 4.04</u>)	[X]	[]
Pest Management (<u>OP 4.09</u>)	[]	[X]
Cultural Property (<u>OPN 11.03</u> , being revised as OP 4.11)	[]	[X]
Involuntary Resettlement (<u>OP/BP 4.12</u>)	[X]	[]
Indigenous Peoples (<u>OD 4.20</u> , being revised as OP 4.10)	[]	[X]
Forests (<u>OP/BP 4.36</u>)	[]	[X]
Safety of Dams (<u>OP/BP 4.37</u>)	[]	[X]
Projects in Disputed Areas (<u>OP/BP/GP 7.60</u>)*	[]	[X]
Projects on International Waterways (<u>OP/BP/GP 7.50</u>)	[]	[X]

The project is classified as a Category B because it is an environmental enhancement to the recently approved NWEP and is of a relatively small scale. The overall wastewater management approach in Cixi City, including the constructed wetland, was reviewed in the approved NWEP EIA. The negative impacts associated with the project are expected to be non-existent or minimal, and the impacts are expected to be site specific, reversible, and easily mitigated.

Environmental Assessment (OP/BP 4.01): The GEF Ningbo project is primarily an enhancement to the existing NWEP project and minimal or no negative impacts are expected. The key environmental issues are:

- i) *Constructed Wetlands:* Environmental impacts are expected to be positive, providing habitat for plants, aquatic species, and birds. The use of constructed wetlands for tertiary treatment was reviewed in the approved NWEP EIA at a conceptual level.
- ii) *Environmental Education and Research Center:* The Center would, indirectly through public education, have a positive environmental impact. The Center is expected to be constructed within the to-be-designated wetland area in the vicinity of the Ningbo-Shanghai Bridge.

* By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas

- iii) *Enhanced Natural Wetland Area*: The environmental impacts are expected to be positive by preserving habitat for plants, aquatic species, and birds. Cixi authorities are considering designating an existing area in the general vicinity of the Ningbo-Shanghai Bridge as a “wetland area.” Most of the land in this general area has not been developed, although there is some forestry, aquaculture, and mariculture. The potential impacts of eco-tourism associated with the Environmental Center and exploration in the wetland area would be considered and managed during the operations stage.

Natural Habitats (OP/BP 4.04): The objective of the GEF Ningbo project is to help conserve and create new natural habitats along the Cixi coastline. Both the constructed wetland and the wetland area would preserve or enhance existing natural habitats for benthos, vegetation, and migratory and indigenous waterfowl. Components 2 and 3 would help local government make environmentally sound land reclamation decisions while conserving wetland areas with ecological significance.

Involuntary Resettlement (OP/BP 4.12): The lands associated to the natural and constructed wetlands are all state owned lands, either the new claimed or the areas outside the dyke. The project would affect 54 households with 168 rural populations in Zhouxian and Andong townships of Cixi City due to the establishment of the designated natural wetland. The affect these people are performing aquiculture activities in the enhanced natural wetland areas. A resettlement action plan (RAP) meeting the World Bank’s OP/BP 4.12 has been prepared for the Ningbo GEF project. According to the interviews the local farmers expressed that they were supportive to the project but concerned about their investment for aquiculture activities. The Cixi City Government has proposed series of counterpart measures to mitigate negative impacts on local farmers. These measures include: providing replacement compensation for the investment of affected farmers, organizing series of free re-employment training programs to the farmers, providing affected farmers with job opportunity information, and offering bonus to the farmers who prefer to engage in farming.

The other part of the “affected people” is those local farmers who seasonally pick marine products on the mudflats which are to be conserved due to the project. Due to the local understanding, they have not been identified as part of the affected population. The Bank task team will discuss this with local government during the appraisal. Cixi Municipal Construction Bureau, as the project implementation agency, will be responsible for RAP implementation.

10. List of Factual Technical Documents

Feasibility Studies

- a. Conceptual Design of the Environmental Education and Research Center
- b. Conceptual Design of the Enhanced Natural Wetland Associated with the Environmental Education and Research Center

Safeguards Documents

- c. Environmental Baseline Study of the Cixi Coastal Area
- d. Feasibility Study of Constructed Wetland
- e. Environmental Management Plan

f. Resettlement Action Plan

Terms of References

- g. Management Contract for the Environmental Education and Research Center
- h. Engineering Design Consultancy

11. Contact point

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