Ningbo Water and Environment Management Project

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Outline

• Project: background, objectives and principal components
• Benefits evaluation: a retrospective perspective
• Potential linkages, challenges, opportunities and expectations with regard to knowledge management
The Ningbo Water and Environment Project (NWEP)

• Background: Investments in water supply and pollution control in the Ningbo municipality have lagged far behind its rapid economic development, which has caused severely polluted coastal environments.

• Pollution reduction has been declared a priority.

• The NWEP adopted a progressive, sub-regional and multi-sector approach to demonstrate cost-effective and innovative solutions, including a constructed wetland for municipal wastewater treatment and a natural wetland conservation area for non-point source pollution control, biodiversity protection, and environmental education.
Location of the Project
3 components of NWEP

• Ningbo Water Supply (US$157.9 million)
• Cixi Wastewater (US$128.0 million); and
• Institutional Development (US$4.5 million)
• The GEF project is an environmental enhancement to the Cixi component of NWEP designed to 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 NWEP
Cixi project

• **Component 1:** A 86 ha constructed wetland with a combination of vegetated submerged gravel bed and free surface water wetland;

• **Component 2:** a designated 43.5 km² land in the vicinity of the Ningbo-Shanghai Bridge as the Wetland Center, which include 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.

• **Component 3** is Design and Management Assistance
Map of the project
• **Constructed Wetland (at the north WWTP)**
  Under Component 1, a 60 ha CTW of the planned 86 ha was built and with its treatment capacity of 90,000 m$^3$, it is able to treat 90% of the discharge from the Northern WWTP, operating at maximum capacity. (The 26 ha parcel is still available for future CTW or expansion of the Northern WWTP)

• **Cixi Treatment Wetlands (in the Wetlands Center)**
  75 hectares of constructed wetlands were completed in 2009 for sub surface treatment of polluted water from the Sanba Canal before entering Hangzhou Bay and the East China Sea.

  Rehabilitation of 370 (330?) ha of freshwater wetlands that perform critical ecological functions as a habitat for wildlife and treatment of wastewater to reduce land based pollution to the East China Sea.

• **Environmental Education Center**
  With HBNZA's own financing of US$6 million (RMB 40 million), the 6,000m$^2$ EEC includes exhibition space, public demonstration areas, restaurants, gift shops, educational facilities for students (laboratory and classrooms), office space and a 5D virtual experience of bird migration.
Decision-making
Design
Construction
Operation
Maintenance

Cost-benefit analysis

Evaluation of ecosystem services
- Livelihoods
- Health
- Security
- Good social relationship
- Freedom in choice
- Supporting
- Cultural
- Regulating
- Provisioning

Human Well-being

Ecosystem Services

Wetland Center
Constructed Treatment Wetland

Framework of case study
Parameters of HB wetland center

Project Appraisal/Plan/Design/Implementation/Review Reports

Field study

Desk review

Reference studies

Benefit transfer method

Unit cost of other methods

WES classification

WES identification

Cost-benefit analysis: B/C with and without HBWES comparison

Cost-effectiveness of HB Constructed Treatment Wetland

Best practices in decision-making of pollution reduction methods
Indicators

• **Environmental indicators**
  – BOD, N and P reduction in wastewater discharge
  – BOD, N and P concentration of outflow of the constructed wetlands

• **Ecological indicators**
  – Increased abundance of benthic fauna in tidal wetlands and mudflats
  – Increased bird abundance and species diversity

• **Socioeconomic indicators**
  – Number of visitors to the Wetland Center
  – *Contribution to economic development of HBNZ* (green economy)
  – Public environmental education
Applying Knowledge Management to Scale up Partnership Investments for Sustainable Development of Large Marine Ecosystems of East Asia and their Coasts

- A regional coastal and ocean ecosystem governance e-Library and knowledge sharing portal;
- Innovative tools and best practices; and
- Communities of practice and support services.
the objective of Ningbo case study report

• To delineate good practices and innovative measures that were applied in the GEF Cixi project in order to reduce land-based sources of marine pollution; and

• To document corresponding social, economic and/or ecological benefits derived to the community as a consequence of the project.
Lessons Learned

• Constructed wetland as an alternative for double benefits
• Science to inform local governments’ decision-making
• How to develop economy in a greener model?
• Partnerships of financing mechanisms in environmental protection