Evaluation Approach

Project Performance Evaluation Report for Tianjin Wastewater Treatment and Water Resources Protection Project
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A. Background

1. Water pollution remains a serious problem in most People's Republic of China (PRC) cities. This problem is being progressively tackled by the Government in both the 8th and 9th five-year plans. Initial efforts have focused on industrial wastewater treatment. Investment was also made in municipal wastewater treatment where progress was slower, which made it a major cause of pollution in streams, rivers, lakes, and some coastal waters.

2. Under the 9th Five-Year Plan (1996–2000), the PRC has developed an umbrella environmental program with a target year of 2010. This program, the Transcentury Green Plan, designated three river basins (Hai, Huai, and Liao) and three lakes (Chao, Dianchi, and Tai) for intense planning and project implementation to alleviate serious environmental problems affecting water quality and the contiguous population.

3. In response to the required action on the Hai River Basin, the PRC developed the Hai River Pollution Prevention and Control Plan (HRPPCP), approved by the State Council in March 1999. The HRPPCP designated Tianjin as one of four major cities, along with Beijing, Shijiazhuang, and Qinhuangdao, requiring urgent intervention in pollution control. The plan required that all main river sections in Tianjin meet their designated standard, and drinking water sources meet class III national standards for drinking water sources. The PRC likewise designated Bohai Bay as a major body of water requiring national level intervention for cleanup.

4. Tianjin, the PRC's fourth largest city, has 9.6 million people and is a municipality with the status of a province, similar to Beijing, Chongqing, and Shanghai. A high priority in Tianjin's development as a major industrial center has been to improve the urban environment in the densely settled city center, including relocating industry, promoting new industrial developments, and encouraging the development of clean and high technology industry. More than half of Tianjin's wastewater is discharged untreated into canals, rivers, and Bohai Bay. Increasing pollution in the Hai River basin threatens the city's sole raw water supply and if left unchecked, the pollution may have adverse effects on economic growth and, the health and well-being of Tianjin's populace.

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1 The class III standard is one of five classes. Class I, the highest standard, is for water supply resources with limited treatment and national natural reserves (pristine); II and III are for fishing and recreation, and may be used as water supply sources where full treatment is employed; IV is suitable for industrial uses and recreational uses not involving contact between the water and human bodies; and V is for agricultural uses and scenic viewing.

2 ADB has supported environmental improvement in Bohai Bay through TA 2695-PRC: Coastal Resources Conservation and Environmental Improvement for $810,000, approved on 3 December 1996.

5. In 1999, the Asian Development Bank (ADB) approved a technical assistance (TA)\(^4\) to help the Tianjin Municipal Government (TMG) formulate this project. The TA study reviewed the feasibility studies prepared by local design institutes and confirmed the need to improve wastewater collection and treatment and to protect Tianjin's sole raw water supply sourced from the increasing threat of pollution.

B. Project Objective and Scope at Appraisal

6. On 11 December 2000, ADB approved this wastewater treatment and water resources protection project at an amount of $130.0 million. The main objectives of the project were to improve (i) the urban environment by reducing environmental contamination through improved wastewater management, and (ii) the quality of raw water supply in Tianjin. Related objectives included (i) strengthening the capacity of the raw water supply and wastewater operations for more efficiency and management, based on commercial principles; (ii) introducing comprehensive watershed management approaches; and (iii) improving cost recovery from users through an improved tariff structure with gradual increases to achieve full cost recovery.

7. The project has two components. Part A consists of wastewater treatment (WWT), including construction of sewer mains and pump stations connected to a treatment plant in the Beicang area which aimed to enhance urban environmental and public health conditions, contribute to a comprehensive wastewater management program for the Hai River Basin, and help mitigate the pollution loading in Bohai Bay. Part B consists of protecting Tianjin's sole raw water supply, the Luan-Tianjin water diversion system, which served 5 million people, at risk of pollution. The water resources protection component (WRP) also incorporated the best practices for comprehensive watershed management within the Yuqiao Reservoir watershed; constructed a dedicated 34-kilometer closed conduit downstream to avoid the pollution in the passage through the Zhou River; and improved the existing open channel further downstream. For WWT, the beneficiaries refer to those directly served by the wastewater treatment plant (WWTP), with indirect beneficiaries as those who also benefit from the project, for instance, from epidemic disease control, sanitation improvement. For WRP, the beneficiaries refer to the entire urban residents, since it is the sole source of water for the entire Tianjin.

C. Major Findings and Recommendations of the Project Completion Report and Independent Evaluation Report

11. The project completion report (PCR) rated the project successful. It was found to be highly relevant, effective, efficient and likely to be sustainable. Most of the outputs anticipated during appraisal were achieved. Remaining issues concerning sewer and livelihood Restoration for the Yuqiao Reservoir subcomponent and the submission of monitoring and evaluation reports, even after completion of the project, will be dealt with by the TMG. A PCR validation report (PCRVR) done by the Independent Evaluation Department (IED) concurred with the overall successful rating of the project. However, the PCRVR only gave a "relevant" instead of "highly relevant" rating to the project since the project design on institutional strengthening was not fully incorporated during implementation.

12. Lessons learned are the following:

(i) **Sewer construction.** Building a fully functioning sewer system should have been adequately addressed during the Beicang WWT plant's planning stage and implementation period. There is a need to enhance overall coordination of project implementation among government agencies.

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(ii) **Sludge treatment and sound solution.** Proper handling of sludge has already been a broad issue for most WWT plants operating in the PRC. However, since traditional landfill options have encountered more difficulties, the sludge solution may need to be substituted by more sustainable methodology.

(iii) **Land acquisition and resettlement.** Future projects must attempt to resolve such issues at appraisal or an early stage to minimize land acquisition and resettlement challenges during implementation which may cause delay in project completion.

13. **Project-related recommendations were as follows:**

(i) **Future monitoring.** Due to delay in connecting sewer lines under the World Bank project, the collection ratio of sewerage has only been 30%, which resulted in a low operational efficiency of the completed Beicang WWT plant. ADB must be informed of the World Bank funded sewer's progress and WWT plant's operational status under the project, even after completion. Likewise, TMG must ensure that sludge from the plant is integrated into Tianjin's overall sludge treatment program;

(ii) **Covenants.** Financial covenants on tariff reform and current ratio status should be monitored closely by TMG and reported to ADB on an annual basis, 5 years after the projects completion;

(iii) **Enterprise reform.** TMG should continuously work on improvement of both the implementing agencies, Tianjin Sewerage Company (TSC) and the Tianjin Municipal Luanhe Drinking Water Source Protection Engineering, Ltd. (TML), on restructuring and enterprise reform, to ensure their financial independency when project facilities are in full operation; and

(iv) **Timing of project performance evaluation report (PPER).** Project performance evaluation should be done in 2010 by which follow-up monitoring reports would be developed and the full benefit impact could be assessed for the WWT. In a general sense, a project performance monitoring evaluation framework should be prepared before project appraisal, with meaningful and measurable performance indicators, particularly in the economic and social aspects.

14. **Independent evaluation lessons, findings and recommendation.** Lessons from ADB's post-evaluation experience from wastewater, water supply and water resources protection in the Asia and Pacific Region indicate that both supply and demand-side concerns must be integrated into project designs, and appropriate pricing policies for water supply and sanitation services are required. The past country assistance program evaluation in the PRC (April 2007) found the ADB operations in the water supply sector as effective, mainly on the achievement of the physical outputs and the potential outcomes of four completed urban projects. However, ADB's water supply and wastewater loans tend to be implemented as a series of one-off interventions. Sewage treatment facilities have been provided without adequate attention to sludge treatment or disposal while water supply facilities have been provided without an adequate assessment of future raw water demands. Loan 1313-PRC: Dalian Water Supply Project (November 2003), which was rated highly successful in the PPER, demonstrated two lessons related to the sector: (i) commitment by the local government is an important factor for the success of the project; and (ii) consumers accept and understand the need for higher tariffs only if the water supply services are adequate and reliable, as shown in this project.

D. **Key Issues of Concern for Independent Evaluation Mission**

15. The PPER will assess the project against the standard evaluation criteria of relevance, efficiency, effectiveness, and sustainability (four pillars), following the *Guidelines for Preparing*
Performance Evaluation Reports for Public Sector Operations. The PPER will also provide inputs to a broader evaluation study on the SES on Multi-subsector Approach by addressing not only project specific issues, but also a wider set of concerns which may have surrounded the project, and as related to urban development. The project which is classified under the water supply and sanitation in the 2009 sector classification used to be classified under "multisector" in the 2004 classification (defined as having 2-3 sectors involved). In the SES on multi-subsector, the project will be classified as non multi-subsector.

16. To assess the project against the four evaluation criteria plus impact, the PPER will assess the following aspects:

(i) **Relevance.** Assess alignment with country partnership strategy and national development plan. Assess the effectiveness of the project design in achieving the objectives of the project. Assess the level of public participation at project design, during project implementation and post project completion, and assess the level of private sector interest and participation (or lack thereof) in urban development projects. Assess the extent to which local governments could claim ownership of the project.

(ii) **Effectiveness.** Identify contributing factors to the success and failure of the project, and assess the extent of the benefit to the beneficiaries.

(iii) **Efficiency.** Determine the operational performance of the project's wastewater treatment and water protection facilities, as well as the economic internal rates of return. Included will be an assessment of the economic efficiency of the implementing agencies when project facilities are in full operation, i.e., wastewater treatment plant is operating in full capacity.

(iv) **Sustainability.** Assess the financial and physical sustainability of the physical assets created and/or rehabilitated and to determine the adequacy of operations and maintenance to make the project sustainable. Included will be the estimation of financial internal rates of return and appropriateness of tariff levels.

(v) **Impact.** Assess the resettlement issues related to the construction of the wastewater treatment and water resource protection facilities; assess gender and environment impacts; and assess lessons from the project to benefit future assistance, especially those in the pipeline.

17. The PPER will address the following key issues:

(i) **Institutional strengthening.** The project's secondary objective included the strengthening of the capacity for more efficiency and management. The PCR, however, fell short of adequate explanation of what institutional strengthening was provided through the project, other than a number of training sessions. The PPER will assess whether policy, advisory and transition outcomes have resulted from these sessions to ensure the capacity of the executing and implementing agencies in operating the facilities and systems.

(ii) **Monitoring and evaluation and resettlement.** A follow-up monitoring and evaluation report on the Yuqiao Reservoir Resettlement and Alternative Livelihood Restoration Plan should have been submitted last 31 March 2009 since there was incomplete information on income restoration in the PCR. The monitoring and evaluation design, on the other hand, was specific and appropriate for implementation purpose. However, the findings of the socioeconomic surveys (forming the baseline data) during the project preparatory stage was substantially different from the findings of surveys done during the implementation period. The result was that more people were affected by the

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resettlement than originally envisaged.\(^7\) Forward looking, the PPER will confirm and assess how the ADB, executing agency, and implementing agencies dealt with this issue as a lesson for future projects with similar concern.

(iii) **Water treatment full operation.** The Beicang WWT plant was not yet in full operation when the PCR was done, due to a delay in the sewer system construction being implemented under an ongoing World Bank financed project. The plant’s current capacity is only 30% of its designed capacity. A re-estimation of the economic and financial internal rates of returns during the PPER hoped to include the 100% level capacity of the WWT, due for full operation in 2010.

(iv) **Sludge management.** There would be continued problems maintaining wastewater discharge quality until the wastewater treatment plant operates at full capacity. There have been inroads in terms of reduction in nutrient loading but sludge and wastewater recycling has not yet been successfully integrated in the process as planned. The PPER will assess what other sustainable options would be available in order to avoid further environmental hazard brought by saturated landfills.

E. **Independent Evaluation Mission Composition and Project Performance Evaluation Report Approach**

18. The evaluation will include the following key activities:
   (i) desk review of relevant and available documents in ADB;
   (ii) discussion with project staff from PRC resident mission and East Asia Department;
   (iii) consultations with staff of relevant government offices;
   (iv) field visits to the project site to hold discussions with local officials, nongovernment organizations, and the project beneficiaries;
   (v) wrap-up meeting with TMG in Tianjin; and
   (vi) drafting and finalizing the PPER according to standard IED procedures.

19. The evaluation team will comprise: (i) IED evaluation officer (Juanda Dimayuga) as team leader; (ii) an operations evaluation assistant (headquarters-based for intermittent administrative, logistic support and report finalization); (iii) an international water supply consultant; and (iv) a national resettlement specialist (consultant). The independent evaluation mission (IEM) will be fielded around the 3\(^{rd}\) week of May, for 2 weeks, depending on the Government’s clearance. To the extent possible, visits to Beijing will be done jointly with the SES team. The international consultant will be taking the lead in collecting and initially analyzing (and drafting of his/her findings in IED standard format) of data relevant for the bottom-up assessment dimension (evaluation criteria) of the PPER. The national consultant will take care of the resettlement aspect of the project and will provide translation/interpretation services during the mission. The team leader will have overall responsibility for the PPER preparation, methodology and scope of the analysis, and final rating and presentation of the evaluation.

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\(^7\) The original 730 ha in the Report and Recommendation of the President was based on a preliminary survey at appraisal. The actual fishponds inside the dike measured 970 ha after the detailed measurement survey.
BASIC DATA

KEY PROJECT DATA (in $ million) As per ADB Loan Documents Actual
Total project cost 340.7 337.3
Foreign exchange cost 169.20 132.4
Local currency cost 171.50 204.9
ADB loan amount/utilization 130.0 128.4
ADB loan amount/cancellation 0 1.6

KEY DATES
Expected Actual
Fact-finding 15-26 May 2000
Appraisal 11 December 2000
Board approval 01 August 2001
Loan agreement 30 October 2001
Loan effectivity 30 October 2001
Loan closing 30 June 2006 5 September 2007

Developing Member Country: People’s Republic of China
Executing Agency: Tianjin Municipal Government

MISSION DATA

Type of Mission No. of Missions No. of Person-Days
Fact-Finding 1 n.a.
Appraisal 1 n.a.
Inception 1 20
Project administration
Review 6 149
Special project administration 1 18
Project completion review 1 34
Operations evaluation To follow To follow

PROJECT PERFORMANCE REPORT RATINGS

Implementation Period Development Objective Implementation Progress
From 30 October 2000 to 28 February 2001 S S
From 1 March 2001 to 30 June 2001 S U
From 1 July 2001 to 31 December 2001 S S
From 1 January 2002 to 31 December 2002 S S
From 1 January 2003 to 31 December 2003 S S
From 1 January 2004 to 31 December 2004 S S
From 1 January 2005 to 31 December 2005 S S
From 1 January 2006 to 31 December 2006 S S
From 1 January 2007 to 30 June 2007 S S

n.a. = not available, S = satisfactory, U = unsatisfactory.
## EVALUATION DESIGN MATRIX

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<th>Evaluation Criteria</th>
<th>Evaluation Research Scope</th>
<th>Method</th>
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<td><strong>A. Key Standard Issues for PPER Rating:</strong></td>
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<tr>
<td><strong>Relevance</strong></td>
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<tr>
<td>1. Project rationale vis-à-vis government priorities and strategy</td>
<td>• Analysis of Government’s strategy, particularly for urban development and water supply, vis-à-vis that of the project’s objective&lt;br&gt;• Adoption of lessons learned from previous projects of similar nature</td>
<td>• Desk reviews of relevant project documents&lt;br&gt;• Interviews with concerned agencies, such as TMG, TML, and TSC&lt;br&gt;• Interview with past project officers</td>
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<td>2. Project design and financing</td>
<td>• Appropriateness of project design, investment modality, logic, sequencing of components and activities to the achievement of project outcome</td>
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<td>3. Local government ownership of the project and stakeholders participation</td>
<td>• Extent of local government ownership of the project&lt;br&gt;• Confirmation of stakeholders participation in the project design</td>
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<td>4. Institutional arrangements, including safeguard measures</td>
<td>• Appropriateness of institutional set-up and arrangements&lt;br&gt;• Identification of project risks and safeguard measures</td>
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<td>5. Privatization possibilities</td>
<td>• Appropriateness of private sector participation in the duration of the project’s operation.</td>
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<td><strong>Effectiveness</strong></td>
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<tr>
<td>1. Project outcome as defined in the design and monitoring framework</td>
<td>• Analysis of extent of project’s achievement of the outcome set during appraisal&lt;br&gt;• Assessment of factors contributing to the success or failure of project outcome&lt;br&gt;• Identification of project beneficiaries and benefits of project in terms of income and livelihood&lt;br&gt;• Assessment of capability of TMG, TML, and TSC in the</td>
<td>• Data gathering and analysis of secondary data (Government statistics at local/municipality (if it exists) level&lt;br&gt;• Focus! group discussion with EA/IA staff and beneficiaries of project&lt;br&gt;• Survey of affected households</td>
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<tr>
<td>2. Contributing factors to the achievement of outcomes</td>
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<td>Evaluation Criteria</td>
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<td><strong>Efficiency</strong></td>
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| 1. Estimation of economic benefits at least cost; EIRR estimation | - Assessment of assumptions in economic and financial analysis validity (coverage, number of beneficiaries, prices, procurement and management costs, input costs, , risks, etc)  
- Assessment of factors which contributed to the differences in EIRR at appraisal and PPER (if any)  
- Analysis of factors which could have led to project implementation delay, if any  
- Assessment of effectiveness of the intra and inter-agency coordination mechanism in the project  
- Assessment of the government’s policies, as these affected beneficiary participation and resource allocation for O&M of the project | - Review project documents, Board discussion papers, interview with resident mission staff in PRCM, economic reevaluation of the project using PPER parameters  
- Review list of key assumptions at the time of appraisal, revision, and PCR; and economic and financial parameters at the time of PPER for reevaluation (yields, prices, costs, conversion factors etc)  
- Review of procurement documents and committee meeting discussion highlights  
- Assessment of Government policies in terms of beneficiary participation, and resource allocation for water supply treatment and protection at the municipal level |
| 2. Level of efficiency by which government and ADB participated in the project |                           |        |
| **Sustainability**  |                           |        |
| 1. Financial viability of the project; estimation of FIRR | - Assessment of availability of adequate and effective demand for the project’s services (water supply)  
- Appropriateness of the water tariff level  
- Assessment of whether required human resources could be maintained  
- Assessment of the adequacy of policies, regulatory conditions of government to support this projects and those of similar nature and the presence of the political will to ensure the commitment to the project  
- Analysis of environmental, | - Interviews and discussion with executing agency, implementing agencies, and other relevant agencies  
- Conduct of household surveys (if deemed necessary from initial study and interviews) |
| 2. Presence of appropriate policies to ensure continuation of operation |                           |        |
| 3. Adequacy of support for project by government and stakeholders |                           |        |
| 4. Risk factors to affect project operational life |                           |        |
## Evaluation Criteria

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<tr>
<th>Evaluation Research Scope</th>
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<tr>
<td>social and technological, and natural resource risks</td>
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<tr>
<td>ADB Performance 1. Quality at entry</td>
<td>• Conduct of key informant interviews</td>
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<td>2. Quality of supervision, including monitoring</td>
<td>• Review of back-to-office reports on quality of supervision and project review mission reports</td>
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<td>3. Extent of communication/dialogue with and response to executing and implementing agencies</td>
<td>• Review of composition and types of expertise of mission members and time spent on missions (field days)</td>
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<td>• Gather data on time lag between requests and actual disbursements and reasons for any delays</td>
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<td>Executing Agency Performance 1. Quality at entry</td>
<td>• Review of pertinent documents, such as back to office reports and PCR</td>
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<td>2. Monitoring and Evaluation of project implementation</td>
<td>• Conduct of key informant interviews</td>
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<td>3. Quality of communication with ADB and stakeholders</td>
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<tr>
<td>Impact  Socioeconomic impact</td>
<td>• Discussions with</td>
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| 1. Impact of resettlement in terms of incomes and improvement in livelihood | on the economic and social welfare of the households in the project area.  
- Assessment of impact to gender, i.e. equal opportunity to women.  
- Assessment of extent by which adverse impacts are mitigated | government representatives/ executing agencies/ beneficiaries/other MDBs like World Bank (also, to get some lessons from their experience in handling resettlement)  
- Socioeconomic/household survey data analyses or secondary data from relevant sources |
| Environment impact 1. Air and water pollution control |  
- Assessment of the impact of the Project sludge disposal sites and effluent from the wastewater treatment plant  
- Assessment of extent by which adverse impacts are mitigated |  
- Discussions with government representatives/ executing agencies/ beneficiaries  
- Visual inspection  
- Secondary data from relevant sources |

B. Issues to be Tackled for SES on Multi-subsector Approach:

<table>
<thead>
<tr>
<th>Scope of Evaluation</th>
<th>Method of Research</th>
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| 1. Understanding of Government preference or intention to use a multi-sector approach (as against a single focus) and to what extent strategic dialogue has been undertaken at project entry;  
2. Assessment of the synergistic effects of a multi-sector approach in urban development;  
3. Assessment on the effectiveness of a multisector approach on the improvement of urban environment and livelihood and in capacity building; and  
4. Identifying intrinsic weaknesses of a multi-sector approach in urban development [e.g. complicated implementation arrangements or set up (i.e. number of sites and implementing agencies)], and fiscal decentralization, including ownership at various political levels. | Collect data and information on relevant government laws and decrees, among others, on the following:  
- Government internal procedures in sub-project selection, prioritization, approval and disbursement;  
- Provincial decentralization and urban planning authority, including tariff regulation and financial sustainability;  
- Cause and co-relation among project implementation delays and PMU capacity; and  
- Local political process, particularly on planning approvals and tariff increases. |