

**ASIAN DEVELOPMENT BANK**

**TAR:PRC 36505**

**TECHNICAL ASSISTANCE**

**TO THE**

**PEOPLE'S REPUBLIC OF CHINA**

**FOR PREPARING THE**

**SHANDONG HAI RIVER BASIN POLLUTION CONTROL PROJECT**

**November 2003**

## CURRENCY EQUIVALENTS

(as of 15 November 2003)

Currency Unit	–	yuan (CNY)
CNY1.00	=	\$0.121
\$1.00	=	CNY8.277

The exchange rate of the yuan is determined under a managed floating exchange rate system. In this report, a rate of \$1.00 = CNY8.30 is used.

## ABBREVIATIONS

ADB	–	Asian Development Bank
EIA	–	environmental impact assessment
HRPPCP	–	Hai River Pollution Prevention and Control Plan
O&M	–	operation and maintenance
PMO	–	project management office
PRC	–	People's Republic of China
SPCB	–	Shandong Provincial Construction Bureau
SPG	–	Shandong Provincial Government
TA	–	technical assistance
WWTP	–	wastewater treatment plant

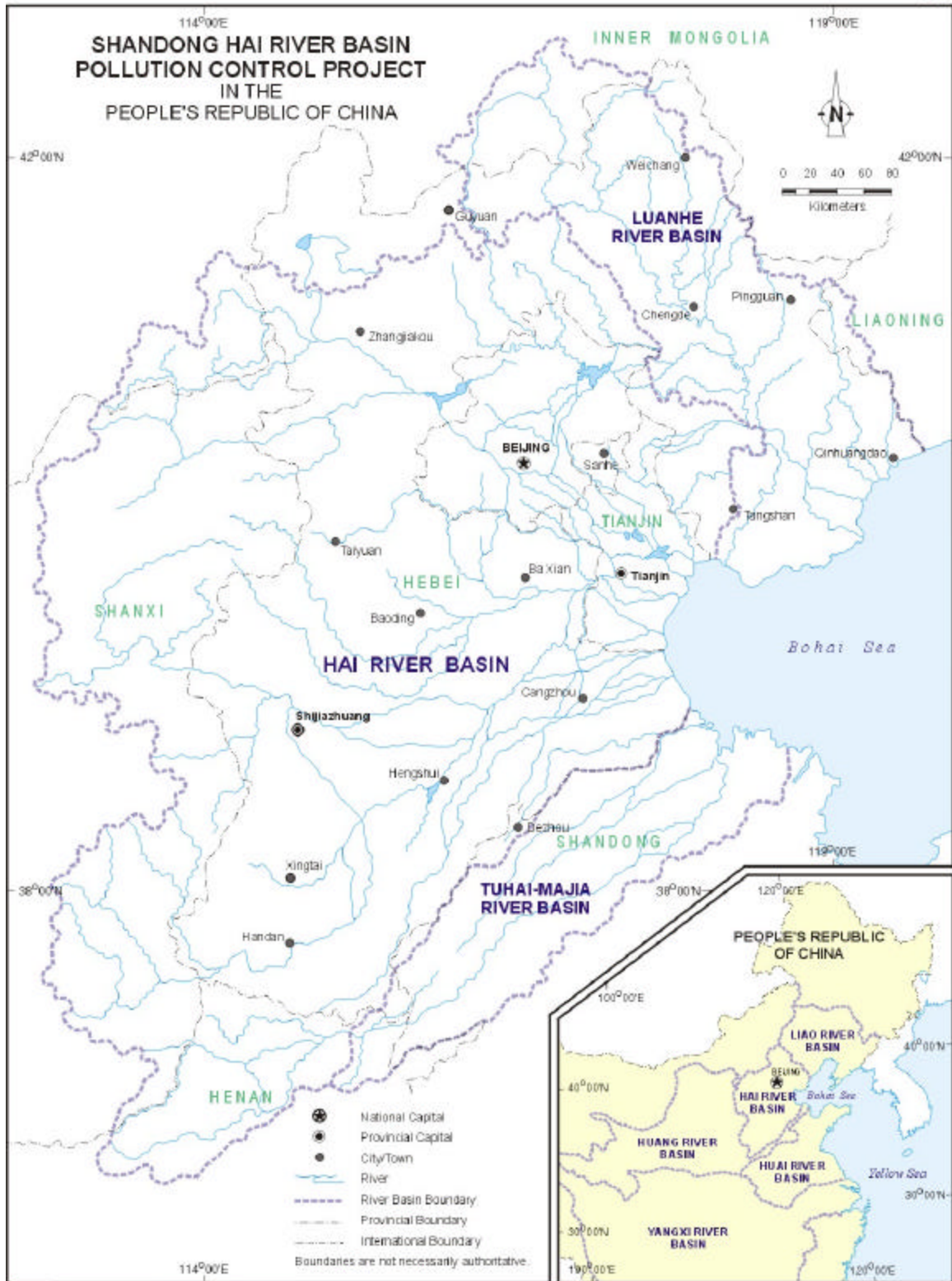
## WEIGHTS AND MEASURES

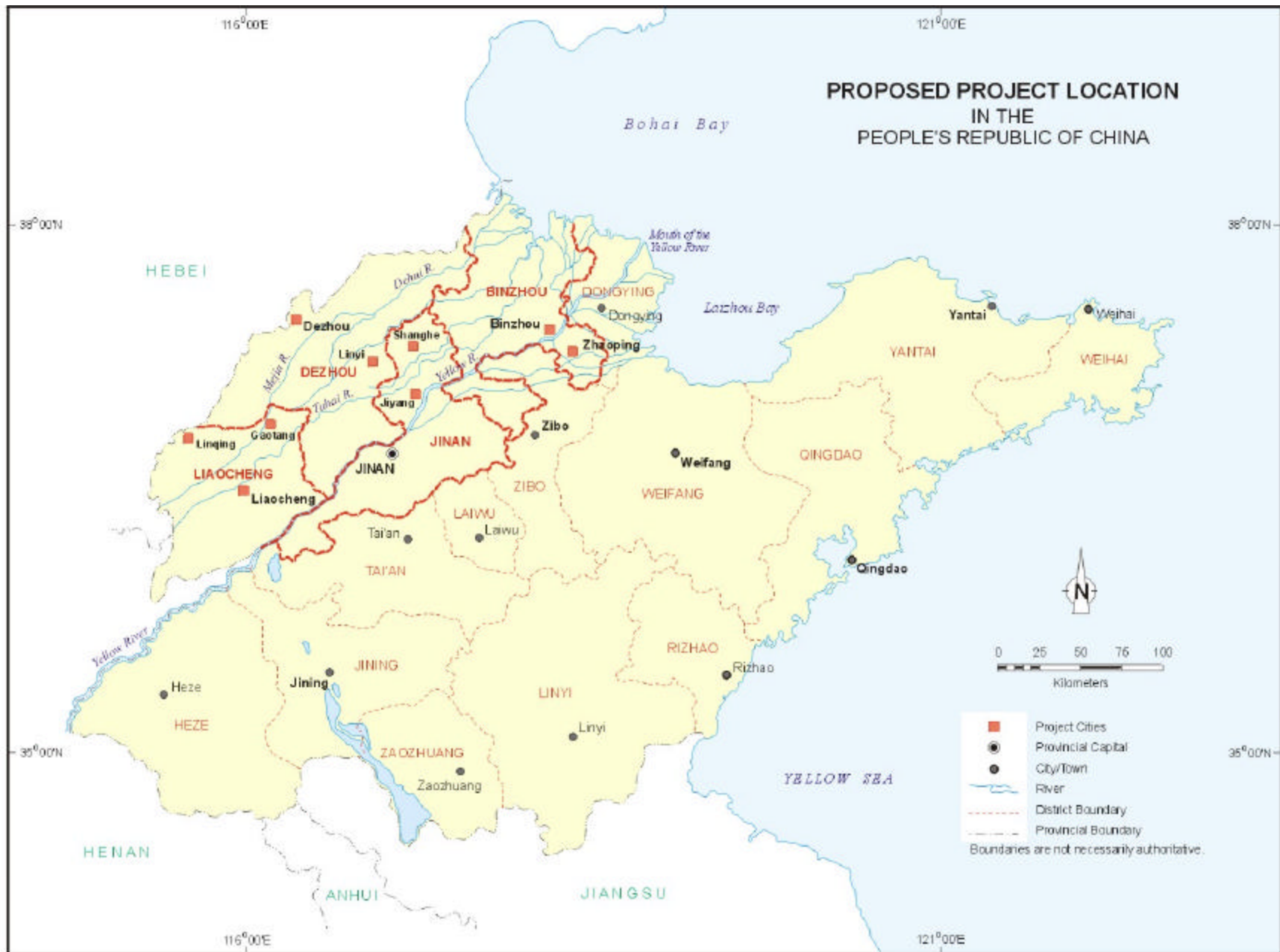
m <sup>3</sup> /d	–	cubic meter per day
t	–	ton

## NOTES

In this report, "\$" refers to US dollars.

This report was prepared by A. Leung.
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03-2023-03

Map 2

## I. INTRODUCTION

1. During the 2003 Country Programming Review Mission, the Government of the People's Republic of China (PRC) reconfirmed its request to the Asian Development Bank (ADB) for technical assistance (TA) to prepare an environmental improvement and pollution control project to cover wastewater treatment and solid waste management components in various cities and towns in the Hai River basin of Shandong Province (Map 1). The ADB Fact-Finding Mission visited the PRC in September 2003 and reached an understanding with the Shandong provincial government (SPG) and concerned municipal governments on the goals, purpose, output, cost estimates, financing plan, and implementation arrangements for the TA.<sup>1</sup>

## II. ISSUES

2. Wastewater has historically been disposed of through septic tanks, with effluents discharged to the inland river and canal systems. Solid waste collection and disposal have been poorly organized and are also environmentally damaging. Rapid urban development and industrialization and increased population density has resulted in heavy pollution of rivers, canals, and open areas in urban environments, causing odor, nuisance, and high risk to health, particularly by waterborne diseases. Against this background, the Government has recognized that adequate environmental protection and pollution controls are preconditions for sustainable economic growth and, therefore, the Green Plan emphasizes wastewater management and pollution control, including in the Hai River basin.<sup>2</sup>

3. The Hai River Pollution Prevention and Control Plan (HRPPCP) is an action program under the Green Plan, which sets pollution control targets for 2000 and 2010, requiring that urban environmental pollution and ecological damage be controlled by 2010.<sup>3</sup> ADB has provided significant assistance in the Hai River basin, including a TA to the Government to develop a strategy to implement HRPPCP.<sup>4</sup> The TA built on the Government's plans by developing prioritized and suitably phased investment packages, and formulating financial management, regulatory enforcement, and institutional frameworks for pollution control. Subsequently ADB approved two wastewater treatment projects in the Hai River basin in Tianjin and Hebei provinces, and a TA to strengthen water resources management, focusing on the Hai River basin.<sup>5</sup> The Government has requested further ADB assistance to control pollution in Shandong and Henan provinces, which are downstream of the Hai River basin.<sup>6</sup>

4. In July 2003 SPG issued its Hai River Basin Water Pollution Control Implementation Plan as a working document in support of the Provincial Environmental 10th Five-Year Plan (2001–2005). The plan includes a requirement to improve solid waste management, defined in the Provincial Urban Solid Waste Implementation Plan, June 2003. The TA will support these plans. The World Bank is financing two environmental protection projects in Shandong outside

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<sup>1</sup> The TA first appeared in *ADB Business Opportunities* (Internet edition) on 15 February 2003.

<sup>2</sup> Trans-century Green Project (Green Plan) was a key element in Government's Ninth Five-Year Plan (1996-2000).

<sup>3</sup> China State Department. Notice 2000(36) requires wastewater treatment rates to reach at least 60% by 2005, and 70% by 2010 for all cities with more than 500,000 people. The 2000 targets were mainly aimed to pretreat industrial wastewater. The targets have largely been achieved.

<sup>4</sup> ADB. 1998. *Technical Assistance for the People's Republic of China for Hai River Basin Wastewater Management and Pollution Control*. Manila. The TA formulated a refined strategic plan to prioritize implementation of HRPPCP for the State Environmental Protection Administration.

<sup>5</sup> ADB. 2000. *Tianjin Wastewater Treatment and Water Resources Protection Project*. Manila; ADB. 2002. *Hebei Provincial Wastewater Management Project*. Manila; and ADB. 2002. *Technical Assistance for the People's Republic of China for the Study of Carrying Capacity of Water Resources*. Manila.

<sup>6</sup> Proposed Shandong Hai River basin pollution control project and Henan Hai River wastewater management project, included in the PRC country program for 2004 and 2005, respectively.

the Hai River basin. The TA, which will cover four of the five northern municipal regions of Shandong within the Hai River basin and focuses on the smaller, secondary towns,<sup>7</sup> will complement SPG's environmental protection efforts. While a number of wastewater treatment plants operate within these five municipalities, further expansion and additions are required if the objectives of HRPPCP and related plans are to be met. The TA will also support SPG's urbanization plans for secondary cities and towns in line with policies of the Central Government.

5. Water quality in the provincial tributaries to the Hai River is worse than class V and is thus below the national and provincial targets of class III (or in limited cases up to class V) for urban rivers in the Hai River basin. SPG has resolved to achieve wastewater treatment rate of 45% for all secondary towns by 2005, and 60% by 2010, thus improving the classification of the Hai River tributaries to class III and meeting or improving on the. Central government guidelines for urban sewage collection and treatment.<sup>8</sup> Accordingly sewage collection networks, wastewater treatment facilities, and solid waste management facilities have been constructed (or are being completed). Wastewater collection and treatment rates in secondary towns are far below 45%, and solid waste management has only started in some towns. Further coverage and capacities are urgently required.

6. The provision of interceptor trunk sewers and first-time or expanded wastewater treatment capacities are required to improve the environment in towns in Jinan, Binzhou, Dezhou, and Liaocheng municipal regions in the Hai River basin (Map 2). Similarly, solid waste collection and effective disposal facilities are needed to protect the local urban environment. A total of 13 project components across nine cities and towns have been identified as forming the project, and are divided into three groups: municipal water supply and wastewater treatment, municipal solid waste management, and major industrial wastewater treatment. The proposed facilities are required to serve rapidly expanding populations in the cities and towns.

7. Six municipal wastewater treatment components are proposed to support environmentally acceptable means of disposal. The two wastewater treatment components in Jiyang and Shanghe towns in Jinan comprise new trunk sewers, and the construction of a 40,000 cubic meter (m<sup>3</sup>)/day capacity wastewater treatment plant (WWTP) in each town. The facilities will serve a population expected to increase from 160,000 to 280,000 by 2008. The component in Binzhou is in Binzhou City, where rapid urban expansion of a 12-square-kilometer hi-tech administrative and residential zone is under development. A first-phase WWTP with 40,000 m<sup>3</sup>/day capacity is needed to deal with sewage flows that would otherwise discharge untreated into the Xisha River. The population of 86,500 in this area is estimated to increase to 180,000 by 2008. The remaining three wastewater treatment components are in Liaocheng. The provision of trunk sewers and WWTPs with capacities of 40,000, 50,000, and 100,000 m<sup>3</sup>/day are required for the urban towns of Gaotang, Liaocheng, and Linqing, respectively. The population served in this region is expected to increase from 105,000 to 700,000 by 2008. Tertiary treatment is proposed for about 145,000 m<sup>3</sup>/day of effluent to enable water recycling to industry, agriculture, and amenity support. One water supply component is proposed in Jiyang town to provide a replacement source facility providing 39,000 m<sup>3</sup>/day of potable quality water.<sup>9</sup>

8. Four municipal solid waste management components are proposed. Two will be in Binzhou, each with a capacity of 500 tons (t)/day. The facilities will include bulk waste transport

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<sup>7</sup> Towns have populations of 80,000–300,000 and are thus not subject to China State Notice 2000(36) (footnote 3).

<sup>8</sup> Towns of less than 500,000 people are not subject to wastewater treatment targets and timeframe in China State Notice 2000(36) (footnote 3).

<sup>9</sup> Development of new borehole abstraction well-fields and closure of inadequate water sources to ensure sustainable potable water supply to Jiyang town.

equipment, on-site composting, and sanitary landfill. A population projected of about 835,000 by 2015 will be served. Linyi town in Dezhou will be provided with first-time solid waste management capacity comprising collection and transportation facilities, 260 t/day composting and sanitary landfill, and institutional support. Linqing town in Liaocheng plans to build transfer stations and a 400 t/day waste treatment facility to serve about 250,000 people.

9. Two large paper-making industries operate in Changyuan town in Dezhou, and Gaotang town in Liaocheng, immensely influencing the economy and well-being of the communities and generating major point sources of pollution.<sup>10</sup> Proposals are for an additional 40,000 m<sup>3</sup>/day WWTP at Changyuan, and 13,400 m<sup>3</sup>/day WWTP at Gaotang to treat effluents from the two paper mills. The direct benefits of including these two components include the following: (i) up to 624 t/day of chemical pollutants will be removed from effluents before discharge into the Majai River; (ii) 3,100 t/day of raw materials<sup>11</sup> will be purchased from thousands of farmers within the region, thereby funneling CNY600 million into its economy; (iii) recycling of 17,000 m<sup>3</sup>/day of treated wastewater will be available for agricultural irrigation, enabling a further 2,400 hectares of agricultural output within the water-short area; and (iv) 1,600 people will be directly employed.<sup>12</sup>

10. Pre-feasibility studies have been prepared for each proposed project component. These describe the proposed wastewater and solid waste treatment and disposal processes to attain the requisite effluent standards or disposal volume of solid waste, populations to be served, capital expenditure, and operation and maintenance costs attributable to each component and a proposed tariff structure that will provide for full cost recovery and project sustainability. The tariff levels for water, wastewater, and solid waste have been reviewed against average household incomes, municipal poverty lines, and number of people falling below these lines, and are expected to be affordable.

11. The conceptual project framework is in Appendix 1. An initial assessment of the social and poverty impacts of the project is in Appendix 2. Impacts on poverty will be through environmental improvement, health benefits, and job creation. Each component has no or minor resettlement issues.

12. Environmental improvement and environmental and natural resource management are among ADB's strategic objectives in the PRC. ADB's strategy for the environment and water and wastewater sectors as reflected in the ADB Water Policy: *Water for All* is focused on strengthening the legal and regulatory framework for sustainable environmental management, supporting integrated water and wastewater management, promoting tariff reform, and encouraging the use of cleaner technologies. ADB's poverty reduction strategy for the PRC envisages a range of measures, including improvement of urban living conditions by providing safe drinking water and environmental protection and by promoting employment and sustainable growth. Policy dialogue on these issues will continue with the proposed project to enhance ADB's effort in the sector and strengthen the provincial and local governments' capacities to effect environmental protection measures, urban development targets, and integrated environmental management.

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<sup>10</sup>Treatment does not consistently comply with provincial effluent discharge standards and could result in closing down of the industries. To date, 23 paper mills have been closed down in Shandong due to noncompliance with wastewater discharge standards.

<sup>11</sup>Straw, reeds, rushes, and other agricultural products.

<sup>12</sup>The Shandong Quanlin Paper Industrial Company Limited in Gaotang employs over 11,000 people, about 30% of the town's working population.

### III. THE TECHNICAL ASSISTANCE

#### A. Purpose and Output

13. The objective of the project preparatory TA is to help SPG prepare a project suitable for ADB financing by assessing the technical, environmental, financial, economic, social, and institutional feasibility of a proposed investment project comprising water supply, wastewater treatment, and solid waste management to control pollution within the expanding secondary towns of the Hai River basin, and to improve water quality in urban streams from class V to classes III–V. The TA will also identify institutional capacity-building measures, including integrated wastewater management, solid waste management, and policy reforms to ensure the sustainability of the project and related facilities. The TA output will be workshops and a series of reports recommending ways to control pollution and improve the environment improvement in the least-cost, most sustainable way, to further the government's environmental protection and urban development plans and help improve living conditions, particularly of the urban poor.

#### B. Methodology and Key Activities

14. The TA will, separately for each project component, (i) forecast water demand and determine the potential for water conservation management practices; (ii) assess the present wastewater and solid waste generation in the urban drainage areas and predict future trends; (iii) review and evaluate the technical options proposed by the pre-feasibility studies and confirm that the project components are based on the least-cost option; (iv) provide cost estimates and procurement arrangements and prepare a contract packaging plan; (v) carry out the economic and financial analyses; (vi) prepare environmental impact assessments; (vii) review government's land acquisition and resettlement plans, provide summaries of each, and prepare a resettlement framework; (viii) analyze financial governance and financial performance of the executing agency and implementing agencies; (ix) recommend enterprise and sector reforms; (x) evaluate the poverty impact of the project and identify ways to make it more pro-poor; and (xi) establish monitoring indicators and a monitoring mechanism. Consultants will undertake a poverty and social survey analysis and social impact assessment.

15. The major assumptions and risks that need to be considered for successful TA implementation include (i) adequate counterpart support and performance; (ii) timely provision of necessary technical, social, economic, financial, and environmental data; (iii) timely submission of required studies; (iv) timely appointment and mobilization of consultants; and (v) adequate performance by consultants. Competent consultants will be recruited on time, and regular performance checks carried out. SPG agreed to provide adequate counterpart support and all necessary data and to undertake and update all required studies according to a timetable agreed on with ADB. Close coordination among the consultants, executing and implementing agencies, and ADB will further mitigate the risks.

#### C. Cost and Financing

16. The total cost of the TA is estimated to be \$750,000 equivalent, of which \$440,000 is the foreign exchange cost and \$310,000 equivalent the local currency cost. The Government has requested ADB to finance \$600,000 equivalent, covering the entire foreign exchange cost, and \$160,000 equivalent of the local currency cost. The TA will be financed on a grant basis by ADB's TA funding program. The Government of the PRC has agreed to provide the balance of the local currency cost, equivalent to \$150,000 for counterpart staff, office space, furniture, administrative support and interpretation services, logistics, and local transportation. The

Government has been advised that approval of the TA does not commit ADB to financing any ensuing project. Details of the cost estimates and financing plan are in Appendix 3.

#### **D. Implementation Arrangements**

17. SPG will be the executing agency for the TA. The vice governor of Shandong will chair the project leading group for the TA and ensuing project. The group members will be from the Shandong Provincial Planning Committee, Shandong Provincial Construction Bureau (SPCB), Shandong Provincial Finance Bureau, Shandong Environmental Protection Bureau, and each project city or town to ensure that their views are adequately considered and necessary support provided. A senior official of SPCB will be the director for the TA and project management office (PMO). A full-time qualified and experienced senior staff member of SPCB will be appointed as PMO deputy director to oversee TA implementation. Two qualified and experienced full-time counterpart staff will help the consultants. To facilitate TA implementation, SPG will provide support to the consultants, including a suitably furnished office with utilities and telecommunication access, materials, maps, data, and other documents.

18. The TA will be implemented over 5 months, from March to August 2004. Total input of the consultants is estimated at 42 person-months, consisting of 16 person-months of international and 26 person-months of domestic consultant services. The consultants will provide expertise in wastewater and solid waste engineering and management, water supply technology, environmental assessment, economic and financial analyses, social development, resettlement issues, and institutional development. The consultants will be engaged in accordance with ADB's *Guidelines on the Use of Consultants* based on the quality- and cost-based selection method and other arrangements satisfactory to ADB on the selection and engagement of domestic consultants. The consultants' outline terms of reference are in Appendix 4. As they define in detail consultants' tasks and the methodology to be used, ADB's simplified technical proposal approach will be used to select and engage the consultants.

19. The consultants will submit to ADB inception, interim, draft final, and final reports, as well as summary and full environmental impact assessment, social impact assessment, and resettlement reports. The executive summary of the interim report and the complete draft final and final reports will be translated into Chinese.

#### **IV. THE PRESIDENT'S DECISION**

20. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$600,000 on a grant basis to the Government of the People's Republic of China for preparing the Shandong Hai River Basin Pollution Control Project, and hereby reports this action to the Board.

## CONCEPTUAL PROJECT FRAMEWORK

Design Summary	Project Targets and Measurable Indicators	Monitoring Mechanism	Risks and Assumptions
<p><b>Sector/Area Goals</b>            Improve environmental and social conditions in secondary cities and towns in the Hai River basin to support planned urban development</p>	<p>Restore river water quality classification to classes III–V as specified in the State Hai River Pollution Prevention and Control Plan</p> <p>Provide safe drinking water to all</p> <p>Increase the ratio of wastewater treatment to 60% by 2010</p> <p>Provide safe disposal of 100% solid waste</p>	<p>Surveys conducted at midterm and at project completion as part of project performance monitoring system</p> <p>Implementation reporting</p> <p>River water quality monitoring</p> <p>Government statistics</p>	<p>Institutional monitoring and sanctioning capacities are adequate.</p> <p>Project outputs are sustainable.</p>
<p><b>Purpose/Objectives</b></p> <p>Replace exhausted potable water source</p> <p>Collect and treat wastewater and solid waste to improve the urban environment and control pollution of rivers in secondary towns</p> <p>Provide recycled water for irrigation and public amenity use</p>	<p>Improve potable water availability to about 250,000 people</p> <p>By 2008 provide solid waste collection and sustainable disposal to about 1.35 million people in four cities and towns</p> <p>By 2008 provide a piped sewerage system and full wastewater treatment to about 1.5 million people in six cities and towns</p> <p>By 2008 improve effluent standards from wastewater treatment plants (WWTPs) to reduce xx tons (t)/day of pollutant load to rivers</p> <p>Provide tertiary treatment at WWTPs for recycled water</p>	<p>Implementing agencies' management information system</p> <p>Surveys at midterm and project completion</p> <p>Project performance reporting</p> <p>Quarterly progress reports</p> <p>Reduction in fines and compensation paid for pollution of rivers</p>	<p>Infrastructure is properly managed, operated, and maintained.</p> <p>Community participation in project design and implementation is effective.</p> <p>Maintenance of the infrastructure facilities is sustainable.</p> <p>Project implementation is effective.</p> <p>Tariff strategy is effective, and communities are willing to pay.</p>

Design Summary	Project Targets and Measurable Indicators	Monitoring Mechanism	Risks and Assumptions
<p><b>Components/Outputs<sup>a</sup></b></p> <p>Water supply</p> <p>Wastewater treatment and pollution control</p> <p>Recycling of water for non-potable uses</p> <p>Solid waste management</p>	<p>Develop new bulk water resource of 39,000 cubic meters (m<sup>3</sup>)/day in Jiyang town in Jinan</p> <p>Construct or expand eight wastewater treatment plants in the cities and surrounding towns in Binzhou, Liaocheng, Jinan, and Dezhou municipal regions</p> <p>Provide 145,000 m<sup>3</sup> treated water distribution for secondary uses</p> <p>Provide bulk waste transport and construct four solid waste treatment facilities with a combined capacity of 1660 t/day in 4 cities and surrounding towns in Binzhou, Dezhou, and Liaocheng municipal regions</p>	<p>Survey of consumers</p> <p>Monitoring of effluent and river water quality</p> <p>Volume and rate of delivery</p> <p>Volumes treated and social survey</p> <p>Completion of proposed works and river class achieved</p>	<p>Sufficient connections are installed to intercept wastewater flows.</p> <p>Pumping stations are operated correctly.</p> <p>Foul sewage is treated in a separate system, and WWTPs are operated effectively.</p> <p>Wastewater and solid waste tariffs are fully applied as planned.</p> <p>Management and enforcement of industrial effluent discharge regulations are improved.</p> <p>Solid waste collection and transport is properly managed.</p> <p>Solid waste disposal facilities are operated effectively.</p>
<b>Activities<sup>b</sup></b>	<b>Inputs<sup>b</sup></b>		

<sup>a</sup> To be confirmed during technical assistance (TA) implementation.

<sup>b</sup> To be developed during TA implementation.

## SUMMARY INITIAL POVERTY AND SOCIAL ANALYSIS

### A. Linkages to the Country Poverty Analysis

Sector identified as a national priority in country poverty analysis? Yes	Sector identified as a national priority in country poverty partnership agreement? Yes
Contribution of the sector / subsector to reduce poverty in the People's Republic of China:	
<p>Improvements in sewage and solid waste collection will help reduce pollution of open urban waterways and groundwater, improve living conditions, and decrease the incidence of waterborne diseases and food contamination. More jobs created through development of urban residential and industrial areas, and the ability to retain functional operation of existing major industries are core to the strategy for social protection. The urban poor should benefit directly from the project through jobs first during construction and then in tertiary industries. Health problems and their attendant costs will be reduced.</p>	

### B. Poverty Analysis

#### Proposed Classification: Other

<p>What type of poverty analysis is needed?</p> <p>A poverty and social analysis is proposed. This will review government policy, strategy, and programs to improve urban environmental conditions and reduce poverty within the project area. Socioeconomic surveys will be conducted, data analyzed, and recommendations offered. The Government has clearly defined poverty lines, the values of which vary by area. Initial indications are that 2–6 % of each town's population have incomes below the poverty line. The outline terms of reference for consultant are in Appendix 4.</p>
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### C. Participation Process

<p>Stakeholder analysis :</p> <p>Identify consultation needed.</p> <p>Refer to Appendix 4 for terms of reference for consultancy services.</p> <p>Participation strategy required: Yes</p> <p>See Appendix 4.</p>
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### D. Potential Issues

Subject	Significant, Not Significant, Uncertain, None	Strategy to Address Issues	Plan Required
<b>Resettlement</b>	Not significant. About 200 people affected in total. Affected people in each of the nine project cities and towns range from 0 to less than 100.	To be assessed in poverty and social analysis	Short resettlement plan—categories B and C Resettlement framework
<b>Gender</b>	Not significant	To be assessed in poverty and social analysis	Not known
<b>Affordability</b>	Not significant	To be assessed in poverty and social analysis	Not known
<b>Labor</b>	Not significant	To be included in poverty and social analysis	Not known
<b>Indigenous People</b>	None	Not required	None—category C
<b>Other Risks/ Vulnerabilities</b>	None	Not required	None

**COST ESTIMATES AND FINANCING PLAN**  
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
<b>A. Asian Development Bank Financing<sup>a</sup></b>			
1. Consultants			
a. Remuneration and Per Diem			
i. International (16 person-months)	330	0	330
ii. Domestic (26 person-months)	0	100	100
b. International and Local Air Travel	30	2	32
2. Provisional Sums			
a. Reports and Communications	5	3	8
b. Equipment <sup>b</sup>	16	0	16
c. Seminars and Workshops	6	2	8
d. Surveys	1	20	21
3. Miscellaneous Administration, Car Rental, and Support Costs	1	18	19
4. Representatives for Contract Negotiations	5	0	5
5. Contingencies	46	15	61
<b>Subtotal (A)</b>	<b>440</b>	<b>160</b>	<b>600</b>
<b>B. Government Financing</b>			
1. Office Accommodation	0	50	50
2. Remuneration and Per Diem of Counterpart Staff	0	70	70
3. Workshops	0	10	10
4. Others	0	20	20
<b>Subtotal (B)</b>	<b>0</b>	<b>150</b>	<b>150</b>
<b>Total</b>	<b>440</b>	<b>310</b>	<b>750</b>

<sup>a</sup> Financed by ADB's TA funding program.

<sup>b</sup> Including a minimum of two Pentium computers, one photocopier, one scanner, two laser printers, and one facsimile machine.

Source: ADB estimates.

## OUTLINE TERMS OF REFERENCE

### A. Review of Medium- and Long-Term Plans

1. The consultants will review and analyze the medium- and long-term plans for wastewater and solid waste management within the Shandong Hai River urban areas. In particular, reference will be made to the final reports prepared under an Asian Development Bank (ADB) sector study<sup>1</sup> and technical assistance.<sup>2</sup> The scope of works proposed under the pre-feasibility reports will also be analyzed against the background of ongoing work under the central, provincial, and municipal environment and wastewater management programs under the 10th Five-Year Plan (2001–2005) and, in particular, the Haihe Basin Water Pollution Control Implementation Program, July 2003. Recommendations will be made on the suitability of the proposed works to fulfill the objectives of the medium- and long-term plans and to offer value for money. Where necessary, the consultants will recommend changes to the scope of works.

### B. Policy Dialogue-Related Activities

2. In relation to the ongoing policy dialogue between ADB and the People's Republic of China (PRC) in conjunction with ADB's urban lending program, and to strengthen the dialogue in conjunction with the project, the consultants will prepare notes for policy dialogue, based on discussions with the Shandong provincial government and the various city and district (county) governments on (i) integrated environmental planning and management; (ii) urban poverty reduction, social protection, and resettlement policies; (iii) cost recovery and tariff reform; (iv) water conservation; (v) industrial pretreatment programs, effluent recycling, and introduction of clean production techniques; (vi) discharge standards; (vii) rationalization of land use; and (vi) regulatory enforcement and monitoring.

### C. Technical Aspects

3. The consultants will (i) review and agree on populations and population equivalents in the project cities and towns and their respective planned increases to the life-span date of each project facility; (ii) identify and assess domestic, commercial, and industrial water demands and resulting wastewater discharges within each city and town under the project, including variations in diurnal volumes and pollutant loading; (iii) review, confirm, or advise on changes to the options for effective wastewater treatment having regard for volumes, pollutants, climatic conditions, effluent standards, recycling, and sludge treatment and disposal; (iv) evaluate the overall environmental impacts and of the mitigating measures recommended in the pre-feasibility study reports; (v) determine groundwater levels and soil types based on previous studies carried out in the project cities/towns and assess their effects on construction; (vi) review and assess the volumes and composition of municipal solid wastes; (vii) assess the best practice of collection, transfer, and bulk transport of solid waste to the sites for treatment and/or disposal; (viii) review, reconfirm, or revise the technical options proposed by the pre-feasibility studies for solid waste sorting, treatment, and disposal, including containment of landfill and safe disposal of leachates; (ix) review and quantify the associated costs and benefits resulting from the proposed project components; and (x) evaluate the technical viability of the project components and confirm that the components are based on least-cost options in financial and economic terms under a combined systems approach and analysis.

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<sup>1</sup> RSC C00524. *Urban Wastewater Management in the People's Republic of China (PRC)*. Beijing.

<sup>2</sup> ADB. 1998. *Technical Assistance for the People's Republic of China for Hai River Basin Wastewater Management and Pollution Control*. Manila.

4. The findings of these investigations and reviews will lead to the confirmation of works as proposed or to the recommendation of modifications. Quality control for the proposed technical options under the feasibility study should be emphasized.

5. Other aspects to be covered by the consultants' review, modification, and additional study will include the following for each proposed project component as relevant: (i) design criteria and standards; (ii) outline designs; (iii) staging of construction; (iv) instrumentation and controls systems to be included; (v) estimated quantities of major civil works items; (vi) unit rate for civil works items; (vii) manufacturers' budget quotations for major items of plant (aeration systems, pumps etc.); (viii) staffing requirements for operation and maintenance (O&M); (ix) implementation schedules; (x) consulting services inputs needed for project implementation, including institutional strengthening and development, engineering design, and construction supervision during implementation; (xi) detailed cost estimates (by foreign exchange cost and local currency cost) and cost for O&M, following ADB guidelines and standards (consultants should use costing models incorporating ADB's requirements for physical and price contingencies and interest during construction); (xii) detailed financial plans and disbursement schedule; (xiii) indicative procurement packages; and (xiv) commissioning procedures and O&M manuals.

#### **D. Wastewater Management**

6. The consultants will evaluate, and recommend ways to improve, the following: (i) environmental monitoring systems for industrial discharges to sewerage systems to protect the sewer networks and the downstream treatment process (ii) collection of data on industrial discharges needed for an industrial pretreatment program; (iii) technical O&M procedures to ensure efficiency and longer life for the sewers, pumping stations, wastewater treatment plants, and all associated equipment; (iv) equipment for sewerage system and wastewater treatment maintenance and inspection; (v) equipment and procedures for the safety of O&M workers; (vi) strategy for, and means of financing, a program of sewer connections; (vii) monitoring, management, and control of final effluent discharges and recycling.

#### **E. Solid Waste Management**

7. The consultants will evaluate, and recommend ways to improve, the following: (i) operational strategy, and use of collection, transfer, and bulk transport facilities; (ii) health and safety procedures, training, and equipment required to safeguard the operatives; (iii) present facilities for disposal of clinical and toxic wastes; (iv) a centralized strategy for solid waste management with regard to the economics of transportation, disposal processes, and costs and benefits; (v) options for dealing with leachates, flue-gas cleansing, and other residues from solid waste processes; (vi) marketing, storage, and supply of residual fertilizer and other materials from solid waste management processes.

#### **F. Environmental Impact Assessment**

8. To assess environmental impacts, consultants will prepare for each project component an *Environmental Impact Assessment (EIA)* and a summary EIA in accordance with *Environment Policy of ADB (2002)* and *ADB's Environmental Assessment Guidelines (2003)*. This work will (i) identify and quantify positive and negative environmental project impacts, (ii) identify risks relevant to each component during construction and operation, and (iii) recommend mitigation measures and an environmental management program for each component. The environmental issues to be considered will include, but not be limited to, pretreatment of industrial wastes; impact of type and operation of facility proposed; final effluent

discharges and use of recycled water where appropriate; gaseous emissions, discharges, and residues from solid waste reduction processes; resettlement; construction techniques; and material impacts on water quality. This work will build on and review environmental assessments completed in the domestic EIA. The consultants will also help the government prepare public consultation required by ADB and the government and coordinate with the social development specialist to ensure that environmental issues are included in the social surveys and interviews.

## **G. Financial and Economic Analysis**

9. The consultants will extend the financial and economic analyses presented in the pre-feasibility studies to assess the economic, financial, and fiscal sustainability of the project; financial viability of the implementing agencies; and development impact of the components, including distribution of benefits. The proposed components should be the least-cost option based on ADB *Guidelines for Economic Analysis of Projects*. The financial and economic analyses will be undertaken in accordance with ADB guidelines.<sup>3</sup> The consultants will also assess the opportunity cost of pollution reduction, water recycling, and removal of land blight.

10. Specifically, the consultants will undertake the following: (i) use the Standard Project Cost Table (COSTAB) or similar models to analyze and summarize project costs; (ii) carry out an economic analysis for each project component and the project as a whole, incorporating assessment of the sector and demand for public services, identification of economic rationale and project alternatives, benefit-and-cost analysis, assessment of financial and institutional sustainability, distribution analysis, sensitivity-and-risk analysis, and indicators for project performance monitoring; (iii) review tariff levels and structure for each project component and assess the necessary increase in tariffs and charges in the short and medium term, taking into account affordability, willingness to pay, full cost recovery, and other aspects with respect to the ADB's Water Policy: *Water for All*; (iv) review current accounting and administrative capacities, internal control system, and auditing procedures; (v) establish financial objectives and targets for each project component and prepare financing plans and projections and other relevant financial statements for operations for 20 years after project completion; (vi) examine the availability of local counterpart funds and borrowing commitments; (vii) identify potential project risks, introduce risk mitigation measures in the project design, and conduct comprehensive sensitivity analyses; (viii) compute in real terms the financial and economic internal rates of return, and average incremental cost in financial and economic terms for each project component; (ix) identify deficiencies and prepare recommendations to strengthen the agencies' institutional and technical capability, including administrative, managerial, organizational, technical, and financial aspects; (x) propose possible commercial cofinancing and private sector investment in the financing plan; and (xi) determine the distribution of project benefits among different beneficiaries.

## **H. Socioeconomic Analysis**

11. Focusing on social issues, the consultants will accomplish the following tasks: (i) survey of project beneficiaries to cover each component area under the project (the survey results will be disaggregated by gender and income group); estimate the number of project beneficiaries with income below the official poverty line in project component areas; conduct affordability

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<sup>3</sup> The following ADB guidelines and references will be used: *Framework for the Economic and Financial Appraisal of Urban Development Sector Projects*, *Guidelines for Financial Analysis of Projects*, *Handbook for the Economic Analysis of Water Supply Projects*, *Economic Issues in the Design and Analysis of a Wastewater Treatment Project*, and *Guidelines for the Financial Governance and Management of Investment Projects Financed by the ADB*.

analysis; identify vulnerable groups, including ethnic minority nationalities; and assess any impacts and recommend mitigating measures required for these groups; (ii) assess the social impact of income levels and distribution, affordability, including willingness to pay, socioeconomic benefits, gender issues, and possible negative impacts within the project areas following ADB's *Guidelines for Incorporation of Social Dimensions in ADB Operations*, *Gender Checklist for Water Supply and Sanitation* and *Handbook on Poverty and Social Analysis*; (iii) develop a project performance monitoring system to estimate benefits and impacts, including relevant benchmarks; and evaluate project performance, following ADB's guidelines; (iv) review existing arrangements and procedures to involve beneficiaries in project design and implementation, hold workshops with beneficiaries and other stakeholders, develop a tailored information and health education campaign with provision for monitoring benefits, and prepare programs to promote public awareness and participation; and document past and expected future public consultation program; (v) collect and analyze health data, including the incidence of morbidity and mortality rates due to waterborne diseases; (vi) evaluate project poverty impact; and (vii) calculate the poverty impact ratio and provide a statement of the project features relating to poverty reduction.

## **I. Resettlement**

12. The consultants will assess the likely extent of resettlement and determine if a full resettlement plan is needed for any of the project components. The consultants will review the Government's draft resettlement plans and identify modifications required to comply with the PRC's Land Administration Law, Implementing Regulations, 1998; ADB's *Policy on Involuntary Resettlement*; and ADB's *Handbook on Resettlement*. In particular, the consultants will (i) evaluate the relevant local resettlement experience; (ii) as part of the socioeconomic baseline survey (para. 11), assess the social impact of displaced people and workers; (iii) based on the survey results, identify compensation and rehabilitation options, and develop livelihood rehabilitation programs for displaced people; (iv) review the institutional arrangement to distribute resettlement compensation; (v) help the Shandong provincial government and implementing agencies refine the resettlement plan to include budget, implementation schedule, and arrangements for internal and external monitoring and evaluation; (v) help the provincial government initiate a participatory process; (vi) translate the Government's resettlement plan into English and prepare a summary resettlement plan; and (vii) prepare a resettlement framework and establish grievance procedures and public disclosure of the resettlement framework.

## **J. Capacity Building and Training**

13. Review and assess the institutional capacity of the provincial and local government departments and agencies responsible for urban construction, water supply and wastewater management, and solid waste management, including water resource management, integration of wastewater and environmental management, capacity for financial management and audit requirements, and monitoring and evaluation systems. The consultants will also review and assess the institutional capacity of the implementing agencies and industrial enterprises. Based on the assessment, the consultants will accomplish the following tasks:

- (i) Develop corporate management arrangements and a finance procedure for implementing agencies. Specifically, prepare (a) an improved organizational structure and human resource plan, (b) a full financial analysis of the project companies to verify their financial status and ensure their financial health, and (c) an outline budgeting and business plan and framework for a management information system.

- (ii) Propose internal and external capacity-building and training assistance programs, including training of managers and staff responsible for service delivery to strengthen their capacity to efficiently implement, operate, and maintain the facilities. Recommend the appropriate modality to implement the program (e.g., through loan proceeds, or as part of a provincial program to improve water conservation, water supply, wastewater treatment, solid waste management) to ensure sustainability of project benefits.

## **K. Project Framework**

14. The consultants, in consultation with the government agencies and the project stakeholders, will develop a logical project framework that outlines the goal, purposes, outputs, and inputs or activities with links to the set of indicators, including social data such as health data, to monitor project performance. The project framework should be developed using the problem-tree analysis. The project framework will include measures to enhance the level of participation of the beneficiaries and stakeholders in project development. The project framework will be a basis for the project performance and monitoring system and the risk and sensitivity analyses. The consultants will also help the government draw up the detailed terms of reference for consultants to provide project management assistance during project implementation.

## **L. Reporting**

15. The consultants will submit the following reports: (i) an inception report within 4 weeks after the TA starts; (ii) a simplified interim report within 10 weeks after the TA starts; (iii) summary and full EIA reports 16 weeks after the TA starts; (iv) a social impact assessment report and a summary resettlement plan, if required, within 16 weeks after the TA starts; (v) a draft final report, within 18 weeks after the TA starts; and (vi) a final report, 4 weeks after receiving comments on the draft final report from the government and ADB.

16. Reports should address all aspects of the terms of reference to the level of detail appropriate for the given stage of the TA and include revised project logical frameworks. The executive summary of the interim report and the complete draft final and final reports will be translated into Chinese. The consultants will present key findings in workshops. Members of the Shandong project leading group, representatives of the Ministry of Finance and local communities, and ADB staff will participate in the workshops and tripartite meetings, which will be organized after the submission and review of the inception, interim, and draft final reports.

17. The consultants will help ADB prepare a draft report and recommendation of the President to the Board of Directors of ADB.