

ASIAN DEVELOPMENT BANK

TAR: PRC 36507

TECHNICAL ASSISTANCE

TO THE

PEOPLE'S REPUBLIC OF CHINA

FOR PREPARING THE

JILIN WATER SUPPLY AND SEWERAGE DEVELOPMENT PROJECT

November 2003

CURRENCY EQUIVALENTS

(as of 30 October 2003)

Currency Unit	–	yuan (CNY)
CNY1.00	=	\$0.121
\$1.00	=	CNY8.265

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

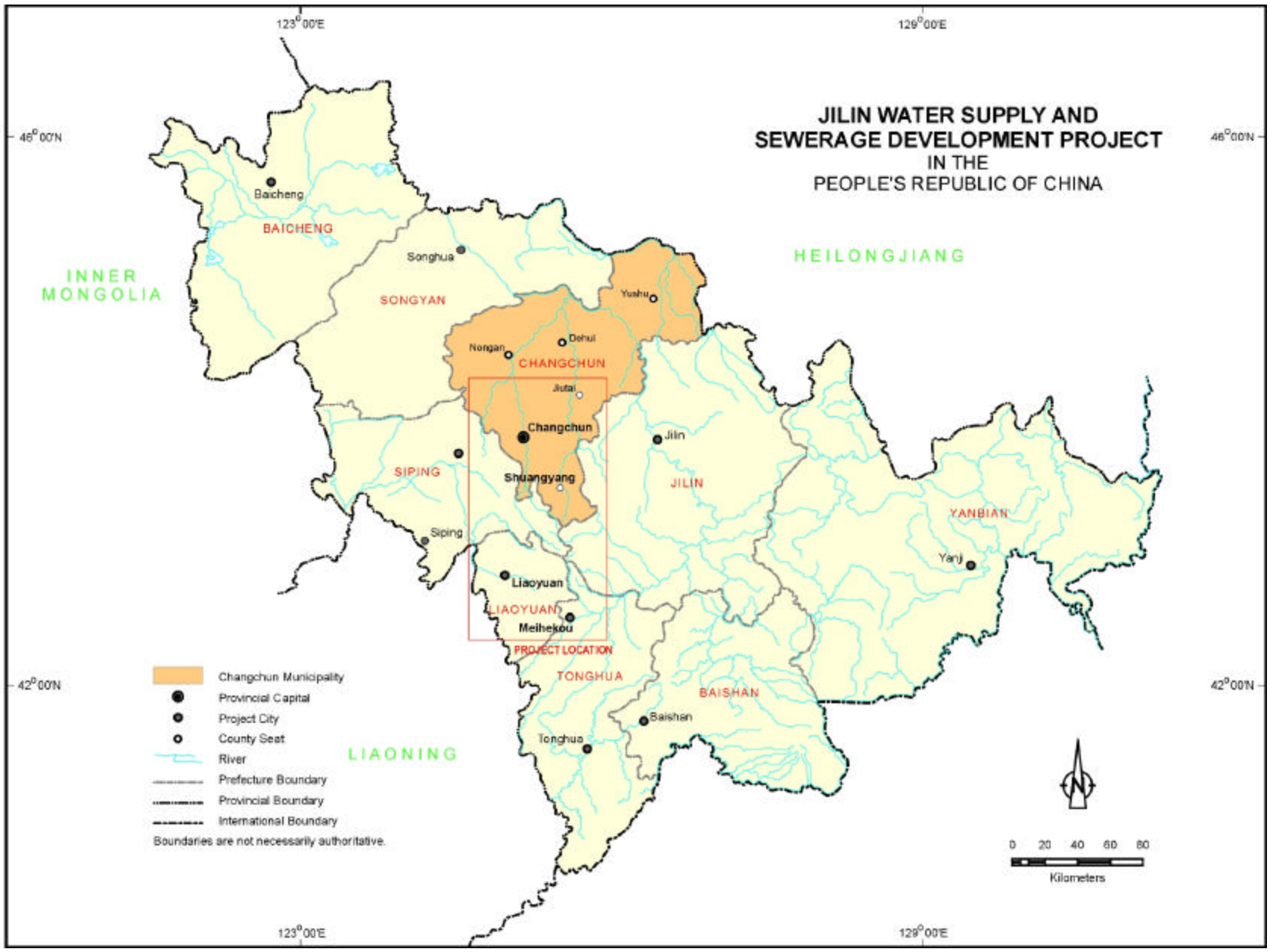
ADB	-	Asian Development Bank
CMG	-	Changchun municipal government
EA	-	executing agency
EIA	-	environmental impact assessment
EPB	-	environmental protection bureau
JPG	-	Jilin provincial government
O&M	-	operation and maintenance
PPMS	-	project performance monitoring system
PSP	-	private sector participation
PRC	-	People's Republic of China
SRB	-	Songhua River Basin
SEIA	-	summary environmental impact assessment
TA	-	technical assistance
WWTP	-	wastewater treatment plant

NOTE

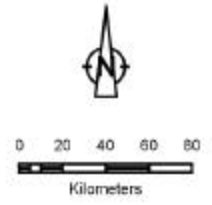
In this report, "\$" refers to US dollars.

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JILIN WATER SUPPLY AND SEWERAGE DEVELOPMENT PROJECT IN THE PEOPLE'S REPUBLIC OF CHINA



- Changchun Municipality
 - Provincial Capital
 - Project City
 - County Seat
 - River
 - Prefecture Boundary
 - Provincial Boundary
 - International Boundary
- Boundaries are not necessarily authoritative.



I. INTRODUCTION

1. During the 2003 Country Programming Mission, the Government of the People's Republic of China (PRC) confirmed the request to the Asian Development Bank (ADB) to provide technical assistance (TA) to prepare a project covering water supply and wastewater components in Jilin Province (Map 1), including Changchun, Liaoyuan, and Meheikou cities (Map 2). The ADB Fact-Finding Mission visited the PRC in September 2003, and reached an understanding with the Jilin provincial government (JPG) on the TA goals, purpose, outputs, cost estimates, financing plan, and implementation arrangements.¹

II. ISSUES

2. The PRC's urban population has grown rapidly in line with economic growth during the past two decades. Rapid economic growth and continuing urbanization place pressure on an overloaded urban infrastructure and causes a rapid increase in the demand for urban services, and intensifies environmental threats from pollution. Most cities' physical and financial capacity to provide adequate water and wastewater treatment infrastructure is being strained, leading to deteriorating quality of life for urban residents, degraded urban environment, and inefficient economic development. Some cities have a critical shortage of water supply, and many others lack water supply delivery capacities and wastewater treatment facilities. The Government has classified more than 300 cities as "water short," 108 as having serious water problems, and more than 60 as being critically short of water. The need to cut back on groundwater extraction to sustainable levels due to salinity intrusion and ground subsidence has worsened the water shortage problem. The situation has been exacerbated by the pollution of raw water sources through the discharge of inadequately treated agricultural, municipal, and industrial wastewater. In most cities, untreated industrial wastewater is the major source of water pollution, posing a risk to public health, particularly by waterborne diseases and severely polluting streams, canals, rivers, lakes, and oceans. Municipal wastewater management is still at an early stage, with only 7.5 billion cubic meters (m³) (34% of the total discharge) of municipal wastewater estimated to have received secondary treatment. The Government is paying increasing attention to water resources management, wastewater treatment and pollution control, and formulation of investment plans to address water supply shortages and wastewater treatment.

3. The Songhua River Basin (SRB) is the third largest in the PRC after the Changjiang and Yellow river basins. Located in Jilin and Heilongjiang provinces and in the Autonomous Region of Inner Mongolia, SRB has a catchment area of 557,000 square kilometers and a population of 62 million. The Songhua is one of the most polluted of the 47 major rivers, contaminated with organic chemicals, heavy metals, and conventional pollutants. Water pollution is a major constraint on sustainable economic development. An ongoing ADB cluster TA² is helping the Government implement the transjurisdictional provisions of the Water Pollution Prevention and Control Act. To help reduce SRB's pollution, ADB has provided the Songhua River Basin Water Quality and Pollution Control Management TA³ to strengthen capacity for water quality and pollution control management, and help develop an SRB pollution control plan. The plan will oblige compliance from industrial, domestic, and non-point source polluters through selected programs and priority investment projects. The TA will help the Government undertake a public information campaign on the health risks of pollution and mobilize public support to clean up SRB. ADB policy dialogue has stressed the need to strengthen the Songliao Water Resources Commission to give it greater

¹ The TA first appeared in *ADB Business Opportunities* (Internet edition) on 30 May 2003.

² ADB. 2000. *Technical Assistance to the People's Republic of China for Transjurisdiction Environment Management*. Manila.

³ ADB. 2002. *Technical Assistance to the People's Republic of China for Songhua River Water Quality and Pollution Control Management*. Manila.

authority for comprehensive flood management.⁴ The 2002 Law on the Management of Water Resources⁵ introduces the concept of river basin management. The State Environment Protection Bureau is coordinating SRB pollution reduction and developed the Five-Year Songhua Pollution Control Plan,⁶ which is the first of a series of steps to improve the Songhua's water quality to minimum levels.

4. Changchun, the capital of Jilin, has an urban population of 3 million and is in the upper reaches of SRB, between Heilongjiang and Liaoning provinces in the northeast of the PRC. The Yitong and Yongchun rivers in Changchun, which flow into the Songhua, are highly polluted due to inadequate treatment of wastewater discharge. Jilin, therefore, has a critical role to play in wastewater management upstream of SRB. The Yitong and Yongchun do not meet class V of national water quality standards,⁷ severely pollute the Songhua, and threaten urban and downstream public health. The Government recognizes that adequate environmental protection and pollution controls are required for sustainable economic growth. The Changchun sewer network and wastewater treatment capacity must be expanded to improve water quality of the Yitong and Yongchun. State guidelines require that major cities have a wastewater treatment rate of 70% by 2010.⁸ The project will help significantly reduce discharge of untreated wastewater upstream of SRB and help the Changchun municipal government (CMG) achieve its goal of 70% wastewater treatment rate by 2010.

5. The project rationale is consistent with the ADB water policy to foster integrated management of water resources from a river basin perspective. The Government has proposed three wastewater treatment subprojects with sewers and interceptors in Changchun, and one water supply subproject each in the Shuangyang district and Liaoyuan and Meihekou cities. CMG's overall wastewater treatment plans include (i) expansion of the capacity of the Beijiao Wastewater Treatment Plant (WWTP) to 390,000 (m³/day); (ii) construction of the Yanming Lake WWTP with a capacity of 100,000 m³/day, and of a WWTP in south Changchun with a capacity of 150,000 m³/day (including 50,000 m³/day tertiary treatment to recycle treated wastewater), and a WWTP in the east with a capacity of 100,000 m³/day; and (iii) 183 kilometers (km) of sewer mains and six pumping stations in north and south Changchun.

6. Shuangyang, which is 46 km southeast of Changchun, has an urban population of 85,000. Shuangyang sources its drinking water from groundwater, depleting the aquifer beneath the city, resulting in land subsidence. To address the water shortage and increased demand through 2010, the water supply subproject will convey class II raw water (39,000 m³/day) from the Shuangyang Reservoir through two 2.9 km pipelines.

7. Liaoyuan, with an urban population of 470,000, is south of Changchun. Average daily urban water demand is 132,000 m³/day, which is met only from April to August with water shortages for the rest of the year. Water sources include the Yangmu and Daliang reservoirs, and some enterprise self-supplied groundwater. Because of prolonged drought, the Yangmu Reservoir, Liaoyuan's major source of water, has been running for years under the dead water storage of the reservoir. The Daliang Reservoir did not have any water in 2002. Liaoyuan proposed to create a new water source by constructing a regulating barrage and raw water mains on the East Liao River to provide approximately 100,000 m³/day raw water to the city.

⁴ ADB. 2002. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to People's Republic of China for the Songhua River Flood Management (Sector) Project*. Manila.

⁵ Approved by the Standing Committee of the National People's Congress on 29 August 2002, and effective 1 October 2002.

⁶ The plan is expected to be approved by the State Council within 2003.

⁷ PRC water quality standards range from level I (pristine) to level V (very polluted). Level III is considered the lowest suitable for a municipal raw water source.

⁸ China State Department Notice 2000 (36) requires at least 60% by 2005, and 70% by 2010 for all major cities.

8. Meihekou, with a population of 629,000, is southeast of Jilin. The water supply shortfall is estimated at 22,663 m³/day. Shallow underground aquifers are the sole source of city water. They contain iron and manganese concentrations that exceed national drinking water standards. The proposed water supply component includes developing the Hailong Reservoir⁹ as a source of drinking water for Meihekou through a 40 km pipeline and a water treatment plant.

9. The project will relocate about 2,000 people close to their present homes.¹⁰ A detailed resettlement plan will be prepared in consultation with the affected people, who will receive replacement land of equal or better quality; full compensation for relocation expenses, including housing; and financial assistance for loss of income opportunities. Particular attention will be paid to poverty issues and ensuring that people are at least as well-off after resettlement as before. The Government's strategy for poverty reduction will be reviewed, the impact of the project on the poor assessed, and specific measures proposed to make it pro-poor. As unemployment and poverty are likely to increase in Changchun, Liaoyuan, and Meheikou as a result of the reform of state-owned enterprises, the TA will suggest ways to make safe water affordable to the poor through appropriate tariff design, including lifeline tariffs.¹¹ ADB has helped develop national guidelines for wastewater tariffs¹² to improve urban wastewater management and enable investment in wastewater infrastructure. A progressive tariff structure will be considered when reviewing current and proposed water and wastewater tariffs. The conceptual project framework is in Appendix 1. An initial assessment of the project's social and poverty impact is in Appendix 2.

10. The project will also support the Government's objectives for water and wastewater as set out in the Tenth Five-Year Plan (2001–2005). The project will improve living conditions and health in Changchun, Liaoyuan, and Meihekou, and have a positive impact on downstream cities in SRB such as Harbin in Heilongjiang Province. Policy dialogue will be pursued in the following areas: (i) improving cost recovery by strengthening tariff systems and structures for raw and treated water and introducing wastewater treatment charges, (ii) wastewater management, (iii) water conservation, (iv) integrated water resource and wastewater management and environmental issues, (v) regulatory enforcement and monitoring, (vi) corporate governance and enterprise reform, (vii) institutional strengthening, (viii) poverty reduction, and (ix) promotion of private sector participation. The project is consistent with ADB's PRC Country Strategy and Program (2004-2006), which emphasizes (i) addressing urban environmental problems, (ii) reducing poverty and improving the living conditions and standards of urban dwellers, and (iii) reducing bottlenecks that increase transaction and production costs and hamper the growth of urban industry and services. Since 1994 ADB has provided loans for nine water supply and wastewater treatment projects in the Chao Lake area, Dalian, Fuzhou, Harbin, Hebei Province, Shanghai, Wenzhou, Tianjin, and Wuhan. These projects have generally been implemented on schedule and have performed well. Operations Evaluation Department has postevaluated the Dalian Water Supply Project.

III. THE TECHNICAL ASSISTANCE

A. Purpose and Output

11. The objective of the TA is to help JPG prepare a project suitable for ADB financing by assessing the technical, environmental, financial, economic, social, and institutional feasibility of a project to (i) increase wastewater treatment capacity and improve the urban environment in

⁹ The Hailong Reservoir, constructed in 1959, has been used mainly for irrigation. The water quality standard is class II.

¹⁰ Resettlement affects the wastewater treatment component in Changchun.

¹¹ ADB has supported the water supply tariff reform process in the PRC through two completed water tariff studies with the Ministry of Construction: ADB. 1997. *Technical Assistance to the People's Republic of China for Water Supply Tariff Study*. Manila; and ADB. 1999. *Technical Assistance to the People's Republic of China for Water Tariff Study II*. Manila.

¹² ADB. 2001. *Technical Assistance to the People's Republic of China for National Guidelines for Urban Wastewater Tariffs and Management Study*. Manila.

Changchun to help clean up SRB; (ii) address problems linked to drinking water shortages and water quality in Shuangyang, Liaoyuan, and Meihekou; and (iii) promote the project cities' sustainable economic development. The TA will identify institutional capacity-building measures, including wastewater management and policy reforms, to ensure the long-term sustainability of the project and related facilities. The TA output will be workshops and reports recommending the least-cost solution to develop wastewater treatment and water supply facilities in Changchun, Liaoyuan, and Meihekou to support the Government's development master plans and help improve living conditions, particularly of the urban poor.

B. Methodology and Key Activities

12. The TA will (i) evaluate the project in the context of long-term plans and alternative strategies for wastewater management and water supply capacity to meet project cities' increasing demand, (ii) review the technical alternatives proposed in the domestic feasibility studies and confirm that the project components have the least economic cost, (iii) assess the situation and project water demand and wastewater generation in urban drainage areas, (iv) prepare cost estimates and procurement packages, (v) evaluate local counterpart fund sources and prepare financing plans for each subproject, (vi) evaluate water and wastewater tariff levels and promote tariff reform and cost recovery, (vii) review and update the Government's land acquisition and resettlement plan in the context of ADB guidelines, (viii) review and update the environmental impact assessment (EIA) and prepare a summary EIA (SEIA), (ix) carry out financial and economic analyses, (x) assess the potential impact on the urban poor and propose poverty reduction options to ensure that urban poor families will benefit from the project, (xi) propose enterprise management reform options, (xii) evaluate opportunities for private sector participation, (xiii) prepare a comprehensive project framework and establish monitoring indicators and an effective monitoring mechanism, and (iv) review the information and data on water supply leakage.

13. The major assumptions and risks that need to be considered for successful TA implementation include (i) inadequate counterpart support and performance, (ii) lack of adequate and timely provision of data, (iii) delay in submitting required studies, (iv) delay in appointing and mobilizing consultants, and (v) inadequate performance by the consultants. Competent consultants should be recruited on time and subjected to regular performance checks. JPG agreed to provide adequate counterpart support and provide all data when required and to undertake and update all studies according to a timetable agreed on with ADB. Close coordination among the consultants, executing and implementing agencies, and ADB will mitigate the potential risks. The TA consultants will coordinate their work with the ongoing and planned ADB-financed projects in Jilin and Heilongjiang, particularly with respect to cross-border water pollution issues (e.g., SRB clean-up), maintenance of water resource infrastructure, quality of construction, and rehabilitation works.

C. Cost and Financing

14. The TA is estimated to cost \$845,000 equivalent, comprising \$491,000 in foreign exchange costs, and \$354,000 equivalent in local currency costs. The TA will be financed on a grant basis by ADB's TA funding program. ADB will provide \$650,000 equivalent to finance the entire foreign exchange cost, and \$159,000 equivalent of the local currency cost. The Government has agreed to provide the balance of local currency cost, equivalent to \$195,000 in cash and kind for counterpart staff, office space, furniture, administrative support services, and logistics. Details of the cost estimates and financing plan are in Appendix 3. The Government has been informed that approval of the TA does not commit ADB to finance any ensuing project.

D. Implementation Arrangements

15. JPG will be the Executing Agency of the TA. A vice governor will chair the TA steering committee, with members from the Jilin planning committee; Jilin bureaus of construction, finance,

environment protection, water resources, and price administration; CMG; and Liaoyuan and Meihekou municipal governments to ensure that their views are adequately considered and necessary support provided. The TA office is headed by the vice director of the construction bureau and will include staff from all the mentioned bureaus to maintain interdepartmental coordination and ensure consultants' access to relevant project information and data, and to liaise with ADB on matters relating to TA implementation. CMG and the Liaoyuan and Meihekou municipal governments have established a similar organization structure, chaired by their respective vice mayors, to implement the TA. JPG will provide the consultants with a suitably furnished office with utilities, telecommunication access, materials, maps, data, and all required project documents.

16. The TA will be implemented over 5 months, from April to August 2004. Total consultants' input is estimated at 43 person-months: 16 international and 27 domestic. The consultants will be engaged through a firm in accordance with *Guidelines on the Use of Consultants by Asian Development Bank and Its Borrowers*, based on the quality- and cost-based selection method and other arrangements satisfactory to ADB for engaging domestic consultants. The consultants will have expertise in water and wastewater management, wastewater treatment, tariff analysis, financial and economic analysis, institutional and regulatory development, social analysis and poverty impact assessment, resettlement issues, and environmental matters. The consultants' outline terms of reference are in Appendix 4. ADB's simplified technical proposal approach will be used to select and engage the consultants. TA equipment will be procured by the consultants in accordance with *Guidelines for Procurement under Asian Development Bank Loans*.

17. The consultants will submit to ADB inception, interim, draft final, and final reports; EIA and SEIA reports; and an English translation of the Government's resettlement plan and its summary. The consultant will translate the executive summary of the interim report and complete draft final and final reports into Chinese for review by concerned officials.

IV. THE PRESIDENT'S DECISION

18. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$650,000 on a grant basis to the Government of the People's Republic of China for preparing the Jilin Water Supply and Sewerage Development Project, and hereby reports this action to the Board.

CONCEPTUAL PROJECT FRAMEWORK

Design Summary	Project Targets and Measurable Indicators	Monitoring Mechanisms	Risks and Assumptions
<p>Sector/Area Goals</p> <p>Improve water-related environmental and social conditions in Changchun, Liaoyuan, and Meheikou cities, and in cities downstream of the Songhua River Basin (SRB)</p>	<p>Yitong and Yongchun rivers' water quality restored to class III, significantly reducing pollution upstream of SRB</p> <p>National wastewater treatment rate requirement of 70% met by 2010 in Changchun</p> <p>100% of urban residents and industries receive good quality and adequate water supply</p>	<p>Water quality monitoring and reporting by the Changchun Environmental Protection Bureau (EPB)</p> <p>Conduct surveys at mid-term and at project completion as part of the project performance monitoring system</p> <p>Household surveys to be conducted by the project management office</p> <p>Records of the water supply companies</p>	
<p>Purpose/Objectives</p> <p>1. Increase Changchun's wastewater treatment capacity and sewer collection capacity to improve the urban environment and control river pollution</p> <p>2. Provide recycled water for irrigation and commercial use</p> <p>3. Improve the quality and reliability of urban water supply in Shuangyang, Liaoyuan, and Meihokou</p>	<p>By 2010 provide 3 million people in Changchun with a piped sewerage system, and treat at least 70% of wastewater</p> <p>Expand and rehabilitate sewer mains and water distribution network</p> <p>Provide tertiary treatment at wastewater treatment plant for recycled water</p> <p>Improve potable water availability to approximately 1.1 million people by providing a clean, reliable 24-hour water supply to urban residents and industries in Shuangyang, Liaoyuan, and Meihokou by 2008</p>	<p>Environmental monitoring and enforcement by Changchun EPB</p> <p>Flow monitoring</p> <p>Water quality monitoring program</p> <p>Records of the water supply companies</p>	<p>Sufficient connections</p> <p>Increased wastewater tariffs</p> <p>Improved management and enforcement of industrial wastewater discharge regulations</p> <p>Completed and maintained infrastructure</p> <p>Willingness to pay increased tariffs</p> <p>Continued economic growth in the project area</p> <p>Appropriate operation and maintenance</p>
Outputs^a			
Activities^a	Inputs^a		

^a To be developed during technical assistance implementation.

SUMMARY INITIAL POVERTY AND SOCIAL ANALYSIS

A. Linkage to the Country Poverty Analysis

Sector identified as a national priority in the 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:			
Expanding and improving sewerage collection and wastewater treatment capacity will reduce pollution in urban watercourses, improve living conditions, and decrease the incidence of waterborne diseases. The project will improve the health and well-being of beneficiaries through improved water supply in Changchun, Liaoyuan, and Meheikou cities. The poor are more susceptible to health problems because of poor diet and lack of ability to pay for preventative and curative measures. As homemakers, women will benefit from fewer pollution-induced illnesses among family members, and from a healthier, safer environment in which to raise their children. The urban poor should benefit directly from the project through jobs during construction and operation.			

B. Poverty Analysis

Proposed Classification: Other

What type of poverty analysis is needed?
A poverty and social analysis is proposed to review policies, strategies, and programs to reduce poverty within the project area. Socioeconomic surveys will be conducted, data analyzed, and recommendations offered. The outline terms of reference for consultants are in Appendix 4.

C. Participation Process

Stakeholder analysis:
Identify consultation needed. Refer to Appendix 4 for terms of reference for consultants.
Participation strategy required: Yes
The participation strategy will include beneficiaries and affected people. See Appendix 4.

D. Potential Issues

Subject	Significant, Not Significant, Uncertain, None	Strategy to Address Issues	Plan Required
Resettlement	<ul style="list-style-type: none"> About 2,000 people are expected to be resettled: Significant Other subprojects: Insignificant 	To be assessed in poverty and social analysis	Full resettlement plan that meets ADB standards (category A) Short RP (category B)
Gender	Not significant	To be assessed in poverty and social analysis	Not known
Affordability	Not significant	To be assessed in poverty and social analysis	Not known
Labor	Not significant	To be included in the poverty and social analysis	Not known
Indigenous People	None	Not required	None (category C)
Other Risks/Vulnerabilities	None	Not required	None

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
A. Asian Development Bank Financing^a			
1. Consultants			
a. Remuneration and Per Diem			
i. International (16 person-months)	372	0	372
ii. Domestic (27 person-months)	0	101	101
b. International Travel	35	0	35
c. Local Travel	0	7	7
d. Reports and Communications	5	2	7
e. Translation of Technical Assistance Report	0	4	4
2. Seminars/Workshops	0	7	7
3. Representatives at Contract Negotiations	5	0	5
4. Equipment ^b	14	0	14
5. Contingencies	60	38	98
Subtotal (A)	491	159	650
B. Government Financing^c			
1. Remuneration, Travel, and Per Diem of Counterpart Staff	0	80	80
2. Project Offices	0	70	70
3. Administration and Support Costs	0	40	40
4. Translation/Interpretation	0	5	5
Subtotal (B)	0	195	195
Total	491	354	845

^a Financed by ADB's TA funding program.

^b Equipment includes two desktop computers, software, one printer, one scanner, accessories, one facsimile, and one photocopier for use by consultants. The equipment will be turned over to the executing and implementing agencies upon completion of the technical assistance.

^c Jilin provincial government will provide counterpart staff time to include water supply and wastewater treatment, civil engineers, an environmental specialist, a social specialist, a financial economist, and support staff to work with the consultants.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE

A. General

1. The consultants will review and analyze the medium- and long-term plans for water supply and wastewater management in the project cities. The consultants will review the (i) prefeasibility and feasibility study reports prepared by Northeast China Municipal Engineering Design Institute and Changchun Municipal Engineering Design Institute; (ii) Environmental Impact Assessment (EIA) reports prepared by the Jilin Environmental Protection Bureau (JEPB), (iii) state, provincial, and municipal water supply and wastewater management programs and municipal infrastructure development plans under the Tenth Five-Year Plan (2001– 2005), and (iv) long-term city master plans.

2. The consultants will also review the prefeasibility and feasibility study reports prepared for the drainage rehabilitation projects in Liaoyuan and Changchun cities, including the land-use plan, flood alleviation schemes, and water resource management targets. Specifically, the consultants will (i) analyze the wastewater management situation and review long-term plans for water supply and wastewater management of Changchun; (ii) assess the water supply situation and wastewater situation in Shuangyang district and Liaoyuan and Meihekou cities; and (iii) review long-term plans for water supply development, treatment, and distribution, and for wastewater collection and disposal.

B. Policy Dialogue-Related Activities

3. In relation to the ongoing policy dialogue between the Asian Development Bank (ADB) and the People's Republic of China (PRC) in conjunction with its urban lending program, and to strengthen the dialogue on the project, the consultants will prepare notes for policy dialogue, based on discussions with the Jilin provincial government (JPG), Central Municipal Government, and Liaoyuan and Meihekou cities on (i) water and wastewater tariff reform and cost recovery; (ii) corporate governance and enterprise reform; (iii) water conservation; (iv) integrated water and wastewater management and related environmental issues; (v) regulatory enforcement and monitoring; (vi) urban poverty reduction and social protection; (vii) institutional strengthening; (viii) private sector participation; (ix) industrial pretreatment programs, effluent recycling, and introduction of clean production techniques; and (x) cross-border (provincial) pollution issues. The consultants will review material prepared under various technical assistance (TA)¹.

C. Demand Assessment

4. The consultants will review and update water demand projections by residential, commercial, industrial, institutional, and irrigation use in the project areas. The consultants will analyze the water supply sources and water quality, and their capacity to meet present and future water demand.

¹ ADB. 2000. *Technical Assistance to the People's Republic of China for Transjurisdiction Environment Management*. Manila; ADB. 2002. *Technical Assistance to the People's Republic of China for Songhua River Water Quality and Pollution Control Management*. Manila; ADB. 2001. *Technical Assistance to the People's Republic of China for National Guidelines for Urban Wastewater Tariffs and Management Study*, Manila; ADB. 1998. *Technical Assistance to the People's Republic of China for Hai River Basin Wastewater Management and Pollution Control*. Manila; and ADB. 1999. *Technical Assistance to the People's Republic of China for Water Tariff Study II*. Manila.

D. Technical Aspects

5. The consultants will review feasibility studies, environmental assessments, and social surveys for the subprojects, and relevant socioeconomic, environmental, hydrological, hydraulic, and other reports. Major water users and major effluent discharges will be identified to evaluate the subprojects' overall environmental impacts and benefits. The potential of sludge and dredged materials for agricultural use will be assessed. The Hailong Reservoir was previously used solely for irrigation. For the Meheikou water supply subproject, the consultants will assess the socioeconomic impacts of using the reservoir for municipal water supply as well. Quality control for the proposed technical options under the feasibility study should be emphasized. Other aspects to be covered by the consultants' review, modifications, and additional studies will include (i) design criteria and standards; (ii) outline designs; staging of construction; schedules of major items of civil works, plant, and equipment; and staffing requirements for operation and maintenance (O&M); (iii) implementation schedule; (iv) consulting inputs needed for project implementation, including institutional strengthening and development; (v) estimated wastewater flows, plant capacity, and selected treatment process, (vi) potential for effluent reuse; (vii) impact of wastewater collection and treatment on water quality in the receiving watercourses, and plans to connect existing sewers to treatment facilities to be constructed under the project; (viii) assessment of the technical viability of project components, and confirmation that they are based on the least-cost option under a combined system approach; and (ix) assessment of the adequacy of the wastewater treatment facilities and future expansion plans to accommodate the incremental wastewater generated from the subprojects.

E. Wastewater Management

6. The consultants will submit to JPG, the Executing Agency, evaluations and recommendations on the following: (i) environmental monitoring systems for influents to the sewerage systems and wastewater treatment plants to protect the fabric of the sewers and downstream treatment process; (ii) proper technical O&M procedures to ensure efficiency and longer life for the sewers, inland waterways, pumping stations, and treatment plants; (iii) proper equipment for sewerage system maintenance and inspection; (iv) appropriate equipment and procedures for the safety of maintenance workers; (v) strategy for and means of financing a program of sewer connections; (vi) collection of data on industrial discharges needed for an industrial pretreatment program; (vii) preparation of a general action plan to strengthen the wastewater management system in the project cities; (viii) assessment of the impact of wastewater collection and discharge into the Yitong and Yongchun rivers and the Songhua River Basin (SRB); and (ix) assessment of options and recommendations for project facility operation .

F. Environmental Impact Assessment

7. The consultants will (i) broadly review environmental aspects to improve wastewater management of the Yitong, Yongchun, and SRB, including urban wastewater treatment and transboundary water pollution and prevention; (ii) evaluate positive and negative environmental impacts with and without project alternatives and incorporate these findings in the environmental impact assessment (EIA) and summary EIA (SEIA); and (iii) conduct a detailed analysis of potential project impact and recommend mitigation measures and an environmental management program for each wastewater treatment and water supply subproject. The consultants will also (i) conduct a rapid field survey in the major affected project areas to confirm and strengthen current environmental impact conclusions; (ii) based on the EIA and any additional studies, prepare the SEIA in accordance with *Environmental Policy of ADB (2002)*

and ADB's *Environmental Assessment Guidelines (2003)*. ADB's environment policy requires consultants to undertake public consultation work (i) once during the early stages of EIA field work; and (ii) once when the draft EIA report is available, and before ADB appraises the loan. The public consultation process and results should be reported in the EIA and SEIA.

G. Project Costs and Financing Plan

8. The consultants will use the COSTAB program to (i) estimate project costs; (ii) summarize project cost estimates for land, civil work, equipment and materials, resettlement, environmental mitigation, consulting services, taxes and duties, project management, and interest and other charges during construction, all broken down into direct and indirect foreign exchange and local currency cost for each year of implementation; (iii) compile and present procurement contract packages, including for international competitive bidding, international shopping, local competitive bidding, force account, and consulting services, clearly indicating packages to be financed by the ADB loan in line with the *Guidelines for Procurement under Asian Development Bank Loans*; and (iii) prepare detailed financing and disbursement plans.

H. Economic Analysis

9. The consultants will conduct economic analysis of the project in accordance with ADB's *Guidelines for the Economic Analysis of Projects* and *Guidelines for the Economic Analysis of Water Supply Projects*. The consultants will undertake the following tasks: (i) describe the macroeconomic and sectoral context within which the project will be implemented; (ii) update the wastewater discharge forecast, and demand projections for water in the project area by user group (domestic, industrial, agricultural, commercial, and other);² (iii) assess the project alternatives and confirm the least-cost solution to meet the water supply and wastewater treatment requirements in the project area; (iv) review tariff levels and structure for each subproject and assess the need to increase tariffs and charges in the short and medium term, taking into account affordability, willingness to pay, and full cost recovery requirements; (iv) estimate the detailed economic project cost for the selected alternative to ensure that the appropriate disaggregation of costs required to establish the economic costs can be derived by applying standard conversion factors and shadow prices as required; (v) identify all quantifiable and nonquantifiable project economic benefits by apportioning and comparing with- and without-project scenarios; (vi) quantify incremental and nonincremental economic benefits, including analysis of the cost of bottled water for drinking and cooking, and cost of waterborne diseases and evaluating these in terms of savings realized because of the project; (vii) determine the competing water users in the project area and calculate the average incremental economic cost of water; (viii) estimate the economic internal rate of return of the project in constant prices, and perform sensitivity and risk analyses, including calculation of switching values; (ix) demonstrate the financial and fiscal sustainability of the project, including an analysis of existing tariffs and taxes, cost recovery options, affordability, and project beneficiaries' willingness to pay; an assessment and justification for any proposed subsidies; and an assessment of the project's fiscal impact; and (x) demonstrate the project's development impact, and perform a distribution analysis.

² The demand projections should address the expected changes in patterns of water consumption in the with- and without-project scenarios.

I. Financial Analysis

10. The consultants will conduct the financial analysis of each subproject and the performance of relevant wastewater management entities and water supply entities in accordance with ADB's *Framework for the Economic and Financial Appraisal of Urban Development Sector Projects*, and the *Guidelines for the Financial Governance and Management of Investment Projects*. The consultants will (i) review water and wastewater tariff level and structure, and determine their adequacy by comparing them with the project's average incremental financial cost; (ii) assess the mechanisms for approval of water and wastewater tariff increases for which public hearings are required as stipulated in the National Guidelines on Water Tariffs; (iii) recommend any improvement, taking into consideration the full cost recovery requirement, cross subsidy, affordability, water conservancy aspects, and future operating capacity replacement and expansion (capital investment) and debt repayment; (iv) recommend a plan for tariff increase in line with the national water and wastewater tariff guidelines, taking into consideration affordability; and (v) assess the financial viability of the project; estimate the project's financial internal rate of return; and perform sensitivity and risk analyses, including switching values and calculation of the project's real weighted average cost of capital.

J. Social Dimensions and Resettlement

11. The consultants will accomplish the following tasks: (i) survey project beneficiaries by gender and income group, estimate the number of project beneficiaries with income below the official poverty line, conduct affordability analysis, identify vulnerable groups (including ethnic minorities), assess project impacts, and recommend mitigating measures; (ii) assess the project's social impact, including patterns of water use, water costs (tap and bottled water), perception of the environment, willingness to pay, affordability analysis, income levels and distribution, and socioeconomic benefits and possible negative impacts, in accordance with ADB's *Guidelines for Incorporation of Social Dimensions in ADB Operations*, *Gender Checklist for Water Supply and Sanitation* and the *Handbook on Poverty and Social Analysis*; (iii) carry out public consultation to ensure participation of key stakeholders in service planning during the feasibility study and TA implementation, including documentation of public consultation; (iv) collect and analyze health data, including morbidity and mortality rates due to waterborne diseases; (v) develop a project performance monitoring system (PPMS) to estimate benefits and impacts, including relevant benchmarks; and evaluate project performance, following ADB's PPMS Guidelines; and (vi) review the poverty situation in Changchun, Liaoyuan, and Meihekou, and assess the project's impact on the poor.

12. Regarding resettlement, the consultants will (i) survey and interview people losing their land, income, housing, or other assets to ensure proper participation; (ii) assess the willingness of people to be resettled, adequacy of the compensation budget, and organizational structure to implement the resettlement action plan; (iii) check and confirm that no minority nationalities are affected; (iv) help prepare the English version of the resettlement plan and its summary in accordance with the 1998 PRC Land Administration Law and ADB's *Handbook on Resettlement and Policy on Involuntary Resettlement*; (v) document the mechanisms for public information, beneficiary consultation, and grievance procedures, and recommend measures to enhance public involvement and participation, particularly of women and poor households; and (vi) recommend ways to improve grievance procedures for resettlement planning and implementation. Consultants should also ensure that (i) the resettlement plans prepared by the Changchun Municipal Government (CMG) and JPG meet ADB standards and requirements, and (ii) that the Chinese and English versions of the RP are submitted to ADB.

K. Institutional Aspects

13. The consultants will (i) assess the institutional capacity of CMG, and the municipal governments of Liaoyuan and Meihekou and the technical and managerial expertise of staff to implement, operate, maintain, and manage the facilities to be constructed under the project; (ii) prepare institutional capacity-building and training programs for wastewater management companies and water supply agencies; (iii) review and propose detailed, realistic, and operational organization for the project management office to ensure efficient project implementation; (iv) prepare a corporate plan for the wastewater management entities and water supply agencies, including an improved organizational structure and human resource plan, and an outline budgeting and business plan and framework for a management information system; and (v) assess the need for and prepare a water purchase agreement between the project company and the existing water supply company to ensure sale of water from the project.

L. Project Framework

14. The consultants, in consultation with government agencies and project stakeholders, will develop a logical project framework outlining the goals, purposes, outputs, and inputs or activities with clear links to the set of indicators to monitor project development impact and overall performance. The consultants will undertake a structured problem analysis, prepare a problem tree, and from this work derive the project framework. It will be prepared in line with the staff instruction, *Use of the Logical Framework for ADB-Assisted Loan and TA*.

M. Private Sector Participation

15. Given that the Government has an interest in private sector participation (PSP) in the project, the consultants will (i) identify priority performance improvements that can be achieved via technology transfers from a PSP operator, given Jilin's specific situation; (ii) identify which government companies should be open to investment; and (iii) from a PSP perspective, review other aspects of the TA necessary for an "enabling environment" for investors, including basic transparency and regulatory matters covering management, tariff setting, and financial reporting, among other issues.

N. Reporting

16. The consultants will submit (i) an inception report within 4 weeks after the TA starts; (ii) a simplified interim report within 12 weeks; (iii) an SEIA and full EIA reports within 14 weeks; (iv) a social and poverty analysis report; and the resettlement plans (full and short), including a summary plan for the entire project within 14 weeks; (v) a draft final report, within 17 weeks; and (vi) a final report, 4 weeks after receiving comments on the draft final report from the Government and ADB. The consultants will also prepare the draft report and recommendation to the President for the project along with all the appendixes and other details.