ADB

Report and Recommendation of the President to the Board of Directors

Project Number: 46079
January 2014

Proposed Loan
People's Republic of China: Guangdong Chaonan Water Resources Development and Protection Demonstration Project

Asian Development Bank

CURRENCY EQUIVALENTS
(as of 24 January 2014)

Currency unit	–	yuan (CNY)
CNY1.00	=	$0.1652
$1.00	=	CNY6.0527

ABBREVIATIONS

ADB	–	Asian Development Bank
CDG	–	Chaonan district government
CWSC	–	Chaonan Water Supply Company
EMP	–	environmental management plan
ha	–	hectare
m^3	–	cubic meter
mcm	–	million cubic meters
NRW	–	nonrevenue water
O&M	–	operation and maintenance
PAM	–	project administration manual
PRC	–	People's Republic of China
WSP	–	water supply plant

NOTES

(i) The fiscal year of the Government of the People's Republic of China and its agencies ends on 31 December.
(ii) In this report, "$" refers to US dollars.

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CONTENTS

PROJECT AT A GLANCE

1. Project Name: Guangdong Chaonan Water Resources Development and Protection Demonstration Project	**2. Project Number:** 46079-002
3. Country: People's Republic of China	**4. Department/ Division:** East Asia Department/Environment, Natural Resources, and Agriculture Division

5. Sector Classification:

Sector	Primary	Subsector
Multisector	√	Water supply and sanitation
Multisector		Waste management
Multisector		Water-based natural resources management

6. Thematic Classification:

Themes	Primary	Subthemes
Social development	√	Human development
Economic growth		Promoting economic efficiency and enabling business environment
Environmental sustainability		Natural resources conservation
Capacity development		Institutional development

6a. Climate Change Impact

Adaptation	Medium
Mitigation	Low

6b. Gender Mainstreaming

Effective gender mainstreaming (EGM)	√
Gender equity theme (GEN)	
Some gender benefits (SGB)	
No gender elements (NGE)	

7. Targeting Classification:

General Intervention	Targeted Intervention		
	Geographic Dimensions of Inclusive Growth	Millennium Development Goals	Income Poverty at House-hold Level
√			

8. Location Impact:

Urban	High
Rural	Medium

9. Project Risk Categorization: Low

10. Safeguards Categorization:

Environment	B
Involuntary resettlement	B
Indigenous peoples	C

11. ADB Financing:

Sovereign/ Nonsovereign	Modality	Source	Amount ($ million)
Sovereign	Project loan	Ordinary capital resources	100.00
Total			**100.00**

12. Cofinancing:

Source	Category	Amount ($ million)	Administration Type
Nil			

13. Counterpart Financing:

Source	Amount ($ Million)
Government	130.75
Total	**130.75**

14. Aid Effectiveness:

Parallel project implementation unit	No
Program-based approach	No

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed loan to the People's Republic of China (PRC) for the Guangdong Chaonan Water Resources Development and Protection Demonstration Project.[1]

2. The project will protect water resources and improve water security in Chaonan District, Shantou Municipality, Guangdong Province. The project will ensure new or more reliable water supply to about 1.23 million urban and rural inhabitants of Chaonan District by integrating urban–rural water supply systems and reducing water losses. It will also support watershed management through reforestation, pollution prevention and water quality monitoring, public awareness building, and institutional capacity development.[2]

II. THE PROJECT

A. Rationale

3. Chaonan District is a county-level administrative division of Shantou Municipality in Guangdong Province. About 30 kilometers away from the Shantou City center, Chaonan District has a population of about 1.33 million spreading over about 600 square kilometers, of which 1.13 million or about 85% are rural residents. Chaonan District, which administers 232 villages in 11 towns, is a plain with hills in the northeast and coastlines in the east. Annual rainfall averages about 1,830 millimeters. The total annual water resources of the district are about 580 million cubic meters (mcm), equivalent to only about 450 cubic meters (m^3) per capita per year, which is internationally considered as absolute water scarcity.[3] There are about 70 small and medium-sized reservoirs in the district with a total storage capacity of about 224 mcm, of which eight reservoirs along the three river systems (Jinxi, Longxi, and Qiufeng) are the district's dominant water sources, contributing about 180 mcm.

4. Guangdong Province has achieved remarkable growth since 1980 and it is now one of the most developed provinces in the PRC, accounting for over 11% of the PRC's 2011 gross domestic product. However, Guangdong faces a serious challenge of poverty and rising inequality, representing a microcosm of the PRC. More than 18% of its rural residents lived on less than $2/day in 2007, and two-thirds of those who lived in poverty were found in the eastern and western regions, where Chaonan District is.[4] Due to its large rural population and less-developed industry and services, the district's economy and fiscal revenue fall far behind the developed regions in Guangdong and even below the national average. Its per capita gross domestic product in 2011 was only CNY16,379, which was about 32% of the provincial average of CNY50,807; or about 46% of the national average of CNY35,198. The per capita annual net income of rural households in 2011 was CNY5,076, which was about half the provincial average of CNY9,372, or 72% of the national average of CNY6,977.

5. **Inadequate and unsafe water supply.** Chaonan District faces a great challenge of ensuring water security for its social and economic development due to (i) lack of adequate water treatment and supply facilities, (ii) weak institutional capacity for managing water

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[1] The design and monitoring framework is in Appendix 1.

[2] The Asian Development Bank (ADB) provided project preparatory technical assistance for Guangdong Chaonan Water Resources Protection and Conservation Demonstration Project (TA 8112-PRC).

[3] Hydrologists typically assess scarcity by looking at the population–water equation. An area is experiencing water stress when annual water availability drops below 1,700 m^3/person. When annual water availability drops below 1,000 m^3/person, the population faces water scarcity; and below 500 m^3 absolute water scarcity.

[4] World Bank. 2011. *Reducing Inequality for Shared Growth in China: Strategy and Policy Options for Guangdong Province*. Washington, DC.

resources and providing water services, and (iii) water pollution in rivers and other water bodies around the towns and villages in the plain area. Current water supply capacity, including the three major water supply systems of Jinxi, Longxi, and Qiufeng, is about 135,000 m^3/day, which is far from meeting both the current and future demand for domestic and industrial uses in the district. Water demand is estimated to reach 288,800 m^3/day by 2020 and 331,423 m^3/day by 2025. The current water supply systems serve about 70% of the district population, but cannot guarantee 7-day, 24-hour services. The three water supply systems are independent from each other and cannot supplement each other if one system is facing water shortage. Due to low technical standards, aging of the pipes, and lack of maintenance, nonrevenue water (NRW) of the current district supply systems are as high as 50% (40% leakage, 10% nonpayment), resulting in serious water and energy losses, high water tariffs, and limited service coverage.[5]

6. Moreover, about 429,600 residents (32% of the population) do not have access to tap water. Some residents are still using wells as direct source for cooking and drinking without appropriate treatment, which has caused serious health problems due to the high fluoride content in the groundwater. Such unreliable and inequitable water supply has affected economic development and people's living standards in Chaonan District.

7. **Water pollution.** The water quality in the reservoirs is generally good (class II)[6] but soil erosion occurs in some catchment areas and eutrophication risk[7] is increasing, especially in the Qiufeng reservoir, due to nonpoint source pollution[8] from agricultural practices in the watershed. Lian River, which originates from Puning Municipality and flows through Chaonan District, is seriously polluted. The water quality of most Lian River sections is below class V, and cannot be used for irrigation or landscaping. In 2011, the total domestic wastewater discharge amounted to 22.6 mcm, and total industrial discharge reached 19.2 mcm, primarily from textile and dyeing factories in the district. Inadequate wastewater treatment capacity and rural sanitation networks are also concerns. Currently, less than 50% of the district's wastewater is treated and only about 20% of rural wastewater is connected to the district's sewerage system.

8. **Weak institutional capacity.** The district lacks adequate institutional capacity and a water supply master plan for integrated water resources management. The Chaonan district government (CDG) established the Chaonan Water Supply Company (CWSC) in 2012 to operate and maintain the district's several independently operated water supply plants (WSPs) and the pipe networks. However, CWSC has limited control over water distribution to and tariffs for end users because ownership of the distribution pipes belongs to individual towns or villages. CWSC supplies water through these towns and/or villages to end users, and charges the towns or villages instead of directly charging the end users. Such an arrangement has resulted in higher overall cost, low efficiency, inadequate maintenance, and unfair and high tariffs. CWSC needs to be entrusted with overall responsibility over the water supply system, and empowered with qualified professionals to provide better services to its clients. There is also a need to strengthen the district's overall water resources management capacity, and to increase public awareness on water resources protection and environmental improvement. This is to ensure the sustainability of water supply and thus the economic development of the district.

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[5] Nonrevenue water refers to water that has been produced and is "lost" before it reaches the customer.

[6] The PRC's national standard defines five water quality classes: class I for headwaters and natural reserves; class II for first-class drinking water sources and habitats of rare species; class III for second-class drinking water sources, aquaculture, and swimming; class IV for water sources for industrial use, and recreational use that does not involve direct human contact with water; and class V for water sources for agricultural use and landscaping.

[7] Eutrophication refers to excessive richness of nutrients in a lake or other body of water, frequently due to runoff from the land, which causes a dense growth of plant life and death of animal life from lack of oxygen.

[8] Nonpoint source pollution refers to diffuse pollution caused by sediment, nutrients, organic, and toxic substances originating from land-use activities, which are carried to lakes and streams by surface runoff.

9. **Government efforts and opportunities for Asian Development Bank support.** The provincial, municipal, and district governments have been increasing their investments in the district's water resources management, and water supply and wastewater treatment facilities. Conservation zones were established around the district's three major reservoirs to protect water from pollution. The reservoirs were rehabilitated to their designed function and full-storage capacity. The governments are also restoring the severely polluted Lian River. Two wastewater treatment plants, with a total treatment capacity of 60,000 m^3/day, have been in operation since December 2010. In 2013, CDG approved its wastewater treatment plan, 2013–2020, which aims to expand the two wastewater treatment plants to their design capacity of 130,000 m^3/day and to construct three additional wastewater treatment plants and associated sewerage and sanitation networks by 2020 to cope with increasing wastewater volumes.[9] To implement and coordinate these activities, the district needs an integrated approach to water resources management and construction of water supply infrastructure for both urban and rural residents. It needs external support to help (i) ensure equitable water supply and thus equitable urban and rural development, (ii) improve the district's water resources management and CWSC's performance, and (iii) promote water conservation and step up water security for both urban and rural residents. During project preparation, opportunities for private sector participation in the project were explored but found to be limited due to the fragmented ownership of the current water supply pipe networks in the district.

10. The project is consistent with the Twelfth Five-Year Plan, 2011–2015 of the Government of the People's Republic of China (government), which aims to build a harmonious and moderately prosperous society through livelihood improvement, equitable urbanization and coordinated urban–rural development, and balanced regional and environmentally sustainable growth.[10] The project supports the Water Operational Plan, 2011–2020 of the Asian Development Bank (ADB) for increasing water use efficiency and rural water supply coverage, and promoting integrated water resources management.[11] The project is in line with ADB's country partnership strategy, 2011–2015 for the PRC, which supports the government's goal of building a harmonious society by focusing on three strategic pillars of inclusive growth, environmentally sustainable growth, and regional cooperation and integration.[12] The twelfth five-year plans for Guangdong Province and Shantou Municipality also focus on building a resource-oriented and environment-friendly society to increase water use efficiency, improve the environment, reduce regional development gaps, and improve people's living environment. The project also conforms to the Guangdong Provincial Water Resources Development and Protection Master Plan, which emphasizes that water resources will be developed, used, and managed in a coordinated and sustainable way.[13]

11. **Lessons.** The project design builds on ADB's experiences and lessons from previous projects and knowledge generated from policy-oriented studies on integrated water resources management, water supply, wastewater treatment, urban and rural development, and flood and wetland management in the PRC and other countries. Major lessons from those earlier projects and incorporated in the current project design are (i) an integrated approach of structural and nonstructural measures to water resources management; (ii) wide community participation and increased public awareness for environmental improvement; (iii) adequate operation and maintenance (O&M) with sustainable financial sources based on a realistic and enforceable

[9] Chaonan District Government. 2013. *Chaonan District Wastewater Treatment Plan, 2013–2020*. Chaonan.
[10] Government of the People's Republic of China, National People's Congress. 2011. *Outline of the Twelfth Five-Year Plan of the People's Republic of China, 2011–2015.* Beijing.
[11] ADB. 2011. Water *Operational Plan, 2011–2020.* Manila.
[12] ADB. 2012. *Country Partnership Strategy: People's Republic of China, 2011–2015*. Manila.
[13] Guangdong Provincial Water Resources Department. 2011. *Guangdong Water Resources Development and Protection Master Plan.* Guangzhou.

tariff structure and reforms; (iv) capacity development of the executing, implementing, and other relevant agencies; (v) effective cross-sector coordination between relevant agencies at various levels; and (vi) establishment of an effective project monitoring and evaluation system.

12. **Special features and demonstration.** The project is expected to demonstrate the following innovations that can be replicated in other regions of Guangdong Province and the PRC: (i) an integrated approach to water resources management, (ii) inclusive water supply services and integration of urban and rural water supply systems, (iii) strengthened operational performance of the water utility, and (iv) institutional and tariff reforms.

13. **Integrated approach to water resources management.** The project will not only support structural measures to build water supply facilities, but also support nonstructural measures to improve watershed management and protect water sources from pollution. The nonstructural measures include reforestation in upstream catchment areas, a pollution prevention study, environmental awareness building and education, solid waste treatment in rural villages, institutional strengthening and capacity development for water resources planning, and support for the establishment of a water quality monitoring center and a three-prevention (flood, drought, and typhoon) management center. The project will also support NRW reduction from the current 50% to 25% by project completion. In addition, extensive environmental and social due diligence was conducted, including assessment of potential climate change impacts and sensitivity analysis of the water supply facilities, and the assessment of social risks and promotion of community participation.

14. **Inclusive water supply services and integration of urban and rural water supply systems.** The project will cover the majority of Chaonan District and provide better water supply services to both urban and rural residents in the district by adopting unified service standards and water tariffs. Water demand projections and the design of the water supply system have factored in future urbanization requirements. The project will also improve responses to droughts and the reliability of water supply by integrating the three major supply systems of the district so they can supplement each other when one system encounters problems. Such an inclusive integration is ADB's value addition to inclusive and balanced development, and applies to future urbanization and regional integration of Guangdong Province and other regions in the PRC. This model can be replicated in many similar rural and small-town water supply systems in the PRC to improve services and efficiency.

15. **Strengthened operational performance.** The project will strengthen CWSC, the major implementing agency and the operator of the water supply system under the project. The project will upgrade the skills of operational staff, improve operational performance and viability, establish water quality monitoring and control centers, and reduce operating losses. The current water supply systems' NRW is particularly high, and an assessment was carried out during project preparation to determine improvement measures. The project incorporates such measures to reduce NRW with an agreed target.

16. **Institutional and tariff reforms.** The project will support the executing agency's institutional and tariff reforms by (i) streamlining institutional arrangements for water supply services in the district, which means removing involvement of towns and villages to allow CWSC to collect tariffs directly from end users; (ii) making services equitable to all and affordable to the poor according to local conditions; (iii) strengthening tariff-setting mechanisms through public hearings; and (iv) increasing industrial tariffs and improving CWSC's performance to recover costs.

B. Impact and Outcome

17. The impact of the project will be better health and quality of life in Chaonan District. The outcome will be improved and equitable water supply services to urban and rural residents in Chaonan District.

C. Outputs

18. The project will have three outputs: (i) improved water resources protection, (ii) improved water supply infrastructure, and (iii) strengthened institutional and staff capacity.

19. **Output 1: Improved water resources protection.** This output comprises (i) public awareness and learning on environment and sanitation, (ii) water conservation reforestation of about 1,682 hectares (ha) in the catchments of Jinxi, Longxi, and Qiufeng reservoirs, (iii) a study on pollution prevention and control measures in the catchments of Jinxi, Longxi, and Qiufeng reservoirs, and (iv) solid waste collection and treatment in Chengpo and Qiufeng villages.

20. **Output 2: Improved water supply infrastructure.** This output comprises (i) expansion of the capacity of the Qiufeng WSP from 70,000 m^3/day to 142,000 m^3/day, and construction of a sludge treatment facility and water intake facility; (ii) rehabilitation of the Jinxi WSP by constructing a pump station and a sludge treatment facility; (iii) construction of the Longxi WSP with a capacity of 100,000 m^3/day, including a sludge treatment facility and a pump station; (iv) installation and upgrade of water delivery and distribution pipelines in the district for a total length of about 1,000 kilometers; (v) establishment of a water quality monitoring center; (vi) installation of about 37,770 household water meters; and (vii) provision of O&M equipment, including leakage detection equipment.

21. **Output 3: Strengthened institutional and staff capacity.** This output comprises (i) provision of consulting services and training, including study tours for project implementation; (ii) support for the establishment of a water supply control center with a remote monitoring and control system, a data transmission and dispatching center, and communication network; (iii) support for the establishment of a water resources management and three-prevention (flood, drought, and typhoon) management center; (iv) preparation of a water resources protection and development action plan to address issues concerning water safety, water allocation optimization, and water reuse and conservation; and (v) establishment of a project monitoring and evaluation system.

D. Investment and Financing Plans

22. The project is estimated to cost $230.75 million (Table 1). Detailed cost estimates by expenditure category and by financier are in the project administration manual (PAM).[14]

23. The government has requested a loan of $100,000,000 from ADB's ordinary capital resources to help finance the project. The loan will have a 25-year term, including a grace period of 5 years, an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility,[15] a commitment charge of 0.15% per year (the interest and commitment charges during implementation to be capitalized in the loan), and such other terms and conditions as set forth in the draft loan and project agreements. The government is the borrower of the loan. The government will relend the loan to the Guangdong provincial government, who will in turn onlend it to CDG through the Shantou municipal

[14] Project Administration Manual (accessible from the list of linked documents in Appendix 2).

[15] The interest rate includes a maturity premium of 0.10%. This is based on the above loan terms and the government's choice of repayment option and dates.

government. The terms and conditions of the relending and onlending will be the same as those of the ADB loan to the government. CDG will assume the foreign exchange and interest variation risks of the loan.

Table 1: Project Investment Plan
($ million)

Item			Amount[a]
A.	**Base Cost**[b]		
	1.	Improved water resources protection	8.78
	2.	Improved water supply infrastructure	177.44
	3.	Strengthened institutional and staff capacity	9.17
		Subtotal (A)	**195.39**
B.	**Contingencies**[c]		**29.80**
C.	**Financing Charges During Implementation**[d]		**5.56**
		Total (A+B+C)	**230.75**

[a] Includes taxes and duties of $12.73 million to be financed from government resources and Asian Development Bank (ADB) loan resources.
[b] In mid-2013 prices.
[c] Physical contingencies computed at 6% for all expenditure categories. Price contingencies computed at 2.2% for 2014, 1.9% for 2015, and 1.8% thereafter on foreign exchange costs; and 3.2% for 2014, 3.5% for 2015, and 3.0% thereafter on local currency costs.
[d] Includes interest and commitment charges. Interest during construction for the ADB loan has been computed at the 5-year US dollar swap rate plus a spread of 0.4%. Commitment charges for the ADB loan are computed at 0.15% per year to be charged on the undisbursed loan amount.
Source: Asian Development Bank estimates.

24. The financing plan is in Table 2. The ADB loan will finance 43.34% of the total project costs, including civil works, equipment, materials, consulting services, training, and taxes and duties relating to goods and services.[16] Local governments will provide the counterpart funds.

Table 2: Financing Plan

Source	**Amount** ($ million)	**Share of Total** (%)
Asian Development Bank		
Ordinary capital resources (loan)	100.00	43.34
Local governments:		
Guangdong provincial government	21.15	9.17
Shantou municipal government	11.57	5.01
Chaonan district government	98.03	42.48
Total	**230.75**	**100.00**

Source: Asian Development Bank estimates.

E. Implementation Arrangements

25. CDG will be the executing agency responsible for overall project planning and management. A project leading group, headed by the governor of CDG, will ensure coordination across sectors and guide project preparation and implementation. A project management office has been established within CDG to be responsible for daily coordination of project preparation and implementation. The implementing agencies include CWSC and the Chaonan bureaus of education, environmental protection, forestry, urban management, and water affairs. The Guangdong Provincial Finance Department, which has implemented several ADB- and World

[16] The amount of taxes and duties to be financed in the project has been determined based on the principles that (i) the amount is within the reasonable threshold identified during the country partnership strategy preparation progress, (ii) the amount does not represent an excessive share of the project, (iii) the taxes and duties apply only with respect to ADB-financed expenditures, and (iv) the financing of taxes and duties is relevant to the success of the project since the percentage of some financed expenditures needs to be 100%.

Bank-financed projects, will provide overall guidance, coordination, supervision, and management, and will be responsible for establishment, management, monitoring, and reconciliation of the imprest account. The implementation arrangements are summarized in Table 3 and described in detail in the PAM (footnote 14).

Table 3: Implementation Arrangements

Aspects	**Arrangements**		
Implementation period	October 2014–September 2019		
Estimated completion date	30 September 2019 (loan closing date: 31 March 2020)		
Management			
(i) Oversight body	Project leading group: Governor of the Chaonan district government (chair) Various district bureaus and town governments (members)		
(ii) Executing agency	Chaonan district government		
(iii) Key implementing agencies	Chaonan Water Supply Company and the Chaonan bureaus of education, environmental protection, forestry, urban management, and water affairs		
(iv) Implementation unit	Project implementation unit under each implementing agency, with 3–5 staff each		
Procurement	International competitive bidding	9 contracts	$61.75 million
	National competitive bidding	14 contracts	$86.46 million
	Shopping	1 contract	$0.10 million
Consulting services	Quality- and cost-based selection	220 person-months	$2.18 million
	Individual consultant selection	10 person-months	$0.14 million
Retroactive financing and advance contracting	The Chaonan district government has requested advance contracting and retroactive financing to enable early start of procurement of civil works, goods, consulting services, and training. Retroactive financing will apply to up to $20 million, with respect to expenditures incurred before loan effectiveness but not earlier than 12 months before the date of the loan agreement.		
Disbursement	The loan proceeds will be disbursed in accordance with the Asian Development Bank's *Loan Disbursement Handbook* (2012, as amended from time to time) and detailed arrangements agreed upon between the government and the Asian Development Bank.		

Source: Asian Development Bank estimates.

III. DUE DILIGENCE

A. Technical

26. The project technical designs are based on locally proven engineering designs and in accordance with relevant PRC design guidelines and local regulations. Technical feasibility was assessed to be adequate after detailed examination of the project's compatibility with local conditions, including projections of water resources balance and demand–supply relationship. Alternative technical options identified the most suitable WSP locations and water treatment systems in terms of economic and safeguards aspects. The processes selected for water and sludge treatment are appropriate for O&M and are in accordance with the technical capacity of the local implementing agencies. To ensure adequate skills, the project will finance capacity building such as (i) training under the capacity development output to ensure sustainable O&M of project facilities, (ii) preparation of a water resources protection and development action plan, and (iii) strengthening of the capacity for water management by financing a water supply control center and a three-prevention management center. Installation of water meters and NRW reduction are closely coordinated with the proposed water tariff reforms.

B. Economic and Financial

27. The project economic analysis used with- and without-project scenarios following ADB's Guidelines for the Economic Analysis of Projects (1997). The project's economic costs were

derived from the investment and O&M costs. The project's economic benefit was derived from willingness-to-pay estimation based on the survey conducted in the project area. The economic net present value was CNY146.8 million and the economic internal rate of return was estimated at 15.1%, which confirmed the economic viability of the project. Sensitivity analysis further confirmed robustness of the economic viability by showing economic viability in four adverse scenarios: 10% reduction in benefits, 10% increase in investment cost, 10% increase in O&M cost, and 1-year delay in project implementation.

28. The financial analysis confirmed the financial viability of the revenue-generating output (i.e., improved water supply infrastructure) and the financial sustainability of the nonrevenue-generating outputs. For the revenue-generating output, the financial internal rate of return was estimated at 4.4%, which exceeds the weighted average cost of capital of 2.9% and confirmed the financial viability of the output. Sensitivity analysis further showed that the project is sensitive to a revenue reduction and an investment cost increase. The financial analysis also examined financial sustainability of nonrevenue-generating outputs and confirmed that CDG, the end borrower of the ADB loan, has sufficient financial capacity to provide counterpart funds and shoulder recurrent costs, and principal and financing charges, for the nonrevenue-generating outputs.

C. Governance

29. The procurement capacity assessment indicated that (i) CDG and the implementing agencies have the necessary technical and human resources to undertake procurement of consulting services, goods, and works; and (ii) monitoring and internal controls regarding procurement are generally in place. The financial management assessment indicated that (i) the Chaonan Finance Bureau has adequate and qualified staff for operating and administering the project account and (ii) its internal control and audit will be mitigated through capacity building and close monitoring during project implementation. However, the assessments also found that CDG and its implementing agencies have limited knowledge and experience with ADB or development partners. The project will provide necessary technical assistance and training on ADB procedures and requirements for financial management, procurement, disbursement, safeguards, and monitoring and evaluation.

30. ADB's Anticorruption Policy (1998, as amended to date) was explained to and discussed with the government and CDG. The specific policy requirements and supplementary measures are described in the PAM (footnote 14).

D. Poverty and Social

31. The project will directly benefit 1.23 million people in the plain areas of Chaonan District by improving urban and rural water supply services, providing safe drinking water, and promoting sustainable protection of water and environment. The direct beneficiaries include about 76,500 members of low-income households. The project is expected to create about 655 full-time employment opportunities during implementation. Most of them will be provided to local people, including the local poor. The project includes measures, detailed in the social action plan, to ensure participation of beneficiary communities.

32. **Gender.** A gender analysis was carried out during project preparation. The project is categorized as effective gender mainstreaming and contains design features to help advance gender equality. The project will bring gender benefits to women, and a gender action plan was prepared to ensure women's participation and employment benefits. The gender action plan has set numerical targets for minimal female participation in the labor force, training activities, and

public awareness activities. CDG will implement the measures, monitor impacts, and provide ADB with sex-disaggregated data on employment and participation.

E. Safeguards

33. **Environment.** The project is classified as category B for environment. An initial environmental examination and an environmental management plan (EMP) were prepared, and are consistent with the requirements set out in ADB's Safeguard Policy Statement (2009). The initial environmental examination incorporates the results of the domestic environmental assessment report approved by the Shantou Municipality Environmental Protection Bureau. Consultations to raise public awareness of the project and receive stakeholders' inputs were conducted with communities and local government agencies. The conclusions and recommendations of assessments and consultations were integrated in the project design. The initial environmental examination and EMP were disclosed on ADB website on 25 October 2013. CDG will be responsible for EMP implementation, including monitoring, mitigation, reporting, and corrective actions or measures. The project management office will have final responsibility for handling any disputes in the grievance redress mechanism. The institutional capacity of the implementing agencies to enforce the EMP is weak, and the project will include a capacity development program to ensure compliance with ADB's Safeguard Policy Statement. Implementation of the EMP, including capacity development programs, is expected to prevent or minimize potential impacts.

34. The project is expected to achieve environmental benefits, including water quality improvement, better water supply services to a large majority of residents in Chaonan District, climate change adaptation, reduced water and energy losses, and better health by alleviating drinking water endemics. No major adverse impacts were identified. Potential construction impacts include air, noise, and water pollution; fugitive dust; soil erosion and contamination; solid waste disposal; interference with traffic and municipal facilities; land acquisition and resettlement; and occupational and community health and safety. Potential operational impacts include noise and energy use of the WSP pumps, occupational health and safety during WSP operation, and the need to maintain protection efforts at the three reservoirs to minimize nonpoint source pollution from agriculture and rubbish dumping by local communities. A water balance assessment was conducted, and potential environment-related livelihood impacts were assessed. No irrigated land will be reduced, and water allocated for environment will remain the same as the current level. No environment-related livelihood impacts are anticipated.

35. **Involuntary resettlement and indigenous peoples.** The project is classified as category B for involuntary resettlement and category C for indigenous peoples. The project will require permanent land acquisition of 5.3 ha of village collective land for the construction of the three WSPs, including farmland, orchard land, construction land, wasteland, and water ponds. In all, 15 persons from two households renting 3.0 ha of collective land are affected directly by the permanent land acquisition. Use of the remaining 2.3 ha of affected collective village land will have only indirect impacts. In addition, total temporary land occupation for laying the pipelines, access road, storing construction materials, and other requirements will be about 151.4 ha, including 53.5 ha of state-owned land and 97.9 ha of collective land. The project will not trigger any house or building demolition. A resettlement plan was prepared, which is consistent with the requirements set out in ADB's Safeguard Policy Statement. The budget for land acquisition is included in the project. When final design becomes available, the resettlement plan will be updated in consultation with the affected villages and submitted to ADB for approval. No land acquisition will be undertaken before ADB's approval of the final resettlement plan. The resettlement plan was disclosed on ADB website on 25 October 2013.

F. Risks and Mitigating Measures

36. The project has some potential environmental, institutional, governance, and financial risks. The project provides adequate measures to mitigate these risks, and the integrated benefits and impacts are expected to outweigh the costs. Major risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.[17]

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigating Measures
The tariff reform plan is not timely or not fully implemented.	CDG has committed strongly to support the realization of CWSC's direct charge to end users. The project will provide training and capacity development to CDG and CWSC for implementing the institutional and water tariff reforms. An assurance on water-supply-related institutional and tariff reforms has been included in the project.
Inadequate wastewater treatment capacity as a result of increased water supply capacity	CDG endorsed its wastewater treatment plan, 2013–2020 in 2013. An assurance to implement this plan with progress targets has been included in the project. In addition, during project implementation, ADB will explore opportunities to help CDG develop public–private partnership to facilitate the implementation of the plan.

ADB = Asian Development Bank, CDG = Chaonan district government, CWSC = Chaonan Water Supply Company.
Source: Asian Development Bank estimates.

IV. ASSURANCES

37. The government and CDG have assured ADB that implementation of the project will conform to all applicable ADB policies including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the PAM and loan documents.

38. The government and CDG have agreed with ADB on certain covenants for the project, which are set forth in the loan and project agreements.

V. RECOMMENDATION

39. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the loan of $100,000,000 to the People's Republic of China for the Guangdong Chaonan Water Resources Development and Protection Demonstration Project, from ADB's ordinary capital resources, with interest to be determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility; for a term of 25 years, including a grace period of 5 years; and such other terms and conditions as are substantially in accordance with those set forth in the draft loan and project agreements presented to the Board.

Takehiko Nakao
President

31 January 2014

[17] Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Better health and quality of life in Chaonan District	By 2025 (baseline year 2011): Per capita annual disposable income of urban households increased from CNY20,761 to CNY58,393 Per capita annual net income of rural residents increased from CNY5,739 to CNY10,822 Fluorosis morbidity rate reduced by 30% (2009 baseline: 11.1%)	Provincial and local statistical reports periodically published by the governments of Guangdong Province and Shantou Municipality Water resources bulletin by Shantou and Chaonan water affairs bureaus Sample surveys	**Assumptions** The government's development plan to balance urban–rural development remains a priority. Improved sanitation–household connections to the wastewater treatment system **Risk** Water demand due to economic and population growth exceeds available resources.
Outcome Improved and equitable water supply services to urban and rural residents in Chaonan District	By 2020 (baseline year 2012): A total of 233,550 households directly benefited from new or more reliable water supply, including 83,250 households (12,490 urban, 70,760 rural) newly connected to piped water supply and 150,300 households (22,540 urban and 127,760 rural) with more reliable water supply services Water service coverage for urban–rural residents increased from 70% to 95% Nonrevenue water reduced from 50% to 25% Satisfaction with the water supply services increased from 50% to 80% About 4,000 women will be released from fetching water during dry season	Reports by the governments of Chaonan District and Shantou Municipality Records of the water supply company Sample social surveys Project completion report	**Assumption** Water security remains the local government's first agenda. **Risks** Measures for demand management to conserve water are insufficient. Extreme droughts in all the three water source rivers and reservoirs could result in reduced water availability for 24-hour water supply, particularly for rural residents.
Outputs 1. Improved water resources protection	By 2020 (baseline year 2012): Water quality standard in the district water source reservoirs maintained at class II About 1,682 ha of land reforested in the catchment areas of Jinxi, Longxi, and Qiufeng reservoirs About 600 households' solid waste in Chengpo and Qiufeng villages collected and treated	Government's water quality monitoring reports Regular project progress reports by the executing and implementing agencies Site inspection and monitoring reports	**Assumption** A well-defined reforestation plan is prepared and implemented. **Risks** The public fails to change its behavior toward environmental protection. The Chaonan district government fails to construct wastewater treatment plants to keep pace with the increased volume of wastewater.

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
	Average of 30% of female employment of 169 full-time positions during project construction An exhibition hall on water and environmental awareness built and opened to the public At least 40% of people visiting the exhibition hall on water and environmental awareness are women	ADB and government review missions Construction supervision reports Project completion report Sex-disaggregated data from visitors' logbook	
2. Improved water supply infrastructure	Qiufeng WSP expanded from 70,000 m^3/day to 142,000 m^3/day Jinxi WSP rehabilitated, with newly built pumping station and sludge treatment facility Longxi WSP newly built with a capacity of 100,000 m^3/day About 1,000 km of water supply pipelines installed and/or upgraded About 37,770 new meters installed in those households without meters A water quality monitoring center operated About 655 job positions will be created during project implementation, of which 30% for women	Regular project progress reports by the executing and implementing agencies Site inspection and monitoring reports ADB and government review missions Construction supervision reports Project completion report	**Risks** Water supply institutional reform and water tariff reform will not be implemented as planned. Infrastructure assets are poorly operated and maintained due to lack of capacity and/or budget.
3. Strengthened institutional and staff capacity	A water supply control center established and water quality regularly monitored A three-prevention (flood, drought, and typhoon) management center established and operated A water resources protection and development action plan developed A project monitoring and evaluation system established and project progress quarterly reported A 5-year training plan for project implementation and operation enhanced and implemented About 100 project staff trained, of which 40% are women; and the district government officials independently perform project implementation, water	Regular progress reports by the executing and implementing agencies ADB and government review missions Capacity development and training summaries and reports by the project management office Project completion report	**Assumptions** The project management office and implementing agencies are adequately staffed and well trained. Trained project implementation and operation staff will stay with the project during project implementation and operation.

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
	resource planning, and water supply services to acceptable quality standards		

Activities with Milestones

1. Improved water resources protection
   - 1.1 Plant the conservation forest of 1,682 ha from 2014 to 2019
   - 1.2 Implement solid waste collection and disposal from 2015 to 2018
   - 1.3 Conduct research program on water resources protection and pollution control measures in the reservoir areas from 2015 to 2019
   - 1.4 Conduct public awareness campaigns from 2015 to 2019
   - 1.5 Build and open an environmental public education exhibition hall by the end of 2015
2. Improved water supply infrastructure
   - 2.1 Expand the capacity of the Qiufeng WSP from 2014 to 2018
   - 2.2 Upgrade the Jinxi WSP from 2014 to 2019
   - 2.3 Construct the Longxi WSP from 2014 to 2018
   - 2.4 Rehabilitate and/or construct water delivery and distribution pipelines from 2014 to 2019
   - 2.5 Establish the water quality monitoring center by June 2018
   - 2.6 Install household water meters from 2017 to 2019
   - 2.7 Procure operation and maintenance equipment by end 2017
3. Strengthened institutional and staff capacity
   - 3.1 Recruit consulting services for project implementation by June 2015
   - 3.2 Develop a training plan and conduct training programs from 2014 to 2019
   - 3.3 Establish a water supply control center by June 2019
   - 3.4 Establish a water resources management and three-prevention management center by June 2019
   - 3.5 Develop the water resources protection and development action plan by end of 2018
   - 3.6 Establish a project monitoring and evaluation system and conduct regular monitoring from 2014 to 2019
   - 3.7 Implement the gender action plan and the social action plan from 2014 to 2019
   - 3.8 Implement the initial environmental examination, the environmental management plan, and the resettlement plan from 2014 to 2019

Inputs

Loan

ADB:	**$100.00 million**
Civil works:	57.22
Equipment and materials:	33.65
Consulting services:	2.32
Training:	1.25
Financial charges:	5.56
Local Governments:	**$130.75 million**
Civil works:	57.39
Land acquisition:	7.74
Environmental protection:	2.55
Project management:	20.43
Survey and design:	11.72
Consulting services:	1.12
Contingencies:	29.80

ADB = Asian Development Bank, CNY = yuan, ha = hectare, km = kilometer, m^3 = cubic meter, WSP = water supply plant.
Source: Asian Development Bank estimates.

LIST OF LINKED DOCUMENTS

http://www.adb.org/Documents/RRPs/?id=46079-002-3

1. Loan Agreement
2. Project Agreement
3. Sector Assessment (Summary): Multisector
4. Project Administration Manual
5. Contribution to the ADB Results Framework
6. Development Coordination
7. Financial Analysis
8. Economic Analysis
9. Country Economic Indicators
10. Summary Poverty Reduction and Social Strategy
11. Gender Action Plan
12. Initial Environmental Examination
13. Resettlement Plan
14. Risk Assessment and Risk Management Plan

Supplementary Documents

15. Social Action Plan
16. Procurement Capacity Assessment
17. Financial Management Assessment
18. Summary Water Balance Assessment
19. Nonrevenue Water Assessment
20. Climate Change Risk Assessment