Technical Assistance Report

Project Number: 48058
Policy and Advisory Technical Assistance (PATA)
September 2014

People's Republic of China: Country Water Assessment

(Cofinanced by the Multi-Donor Trust Fund under the Water Financing Partnership Facility)

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 31 July 2014)

Currency unit	–	yuan (CNY)
CNY1.00	=	$0.1620
$1.00	=	CNY6.1710

ABBREVIATIONS

ADB	–	Asian Development Bank
CPS	–	country partnership strategy
CWA	–	country water assessment
GDP	–	gross domestic product
MWR	–	Ministry of Water Resources
PRC	–	People's Republic of China
TA	–	technical assistance

NOTE

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

Vice-President	S. Groff, Operations 2
Director General	A. Konishi, East Asia Department (EARD)
Team leader	Q. Zhang, Officer-in-Charge, Environment, Natural Resources and Agriculture Division, EARD
Team members	M. Ancora, Urban Development Specialist, PRC Resident Mission (PRCM), EARD E. Arcillas, Operations Assistant, EARD J. Huang, Senior Urban Development Specialist, Regional and Sustainable Development Department Y. Jiang, Environment Economist, EARD K. Katich, Urban Development Specialist, EARD Y. Kobayashi, Senior Water Resources Specialist, EARD A. Lopez, Natural Resources and Agriculture Specialist, EARD P. Perera, Principal Energy Specialist, EARD F. Radstake, Senior Environment Specialist, EARD A. Ressano Garcia, Senior Urban Development Specialist, EARD S. Saxena, Senior Transport Specialist, EARD S. Tirmizi, Young Professional, EARD L. Wang, Senior Project Officer (Urban Development), PRCM, EARD C. Yeager, Climate Change Specialist, EARD F. Yu, Natural Resources Economist, EARD B. Zheng, Senior Project Officer (Water Supply and Sanitation), PRCM, EARD Y. Zhou, Senior Water Resources Specialist, EARD

CONTENTS

		Page
POLICY AND ADVISORY TECHNICAL ASSISTANCE AT A GLANCE		
I.	INTRODUCTION	1
II.	ISSUES	1
III.	THE POLICY AND ADVISORY TECHNICAL ASSISTANCE	3
	A. Impact and Outcome	3
	B. Methodology and Key Activities	3
	C. Cost and Financing	4
	D. Implementation Arrangements	4
IV.	THE PRESIDENT'S DECISION	5
APPENDIXES		
1.	Design and Monitoring Framework	6
2.	Cost Estimates and Financing Plan	9
3.	Outline Terms of Reference for Consultants	10

POLICY AND ADVISORY TECHNICAL ASSISTANCE AT A GLANCE

1. Basic Data — **Project Number:** 48058-001

Project Name	Country Water Assessment	**Department /Division**	EARD/EAER
Country	China, People's Republic of	**Executing Agency**	Ministry of Water Resources
Borrower	N/A		

2. Sector

	Subsector(s)	Financing ($ million)
✓ Agriculture, natural resources and rural development	Agricultural policy, institutional and capacity development	0.06
	Forestry	0.06
	Land-based natural resources management	0.06
	Rural water policy, institutional and capacity development	0.06
	Water-based natural resources management	0.06
Water and other urban infrastructure and services	Urban flood protection	0.06
	Urban sanitation	0.06
	Urban water supply	0.06
	Total	**0.50**

3. Strategic Agenda

	Subcomponents	Climate Change Information	
Inclusive economic growth (IEG)	Pillar 2: Access to economic opportunities, including jobs, made more inclusive	Climate Change impact on the Project	Low
Environmentally sustainable growth (ESG)	Global and regional transboundary environmental concerns		
	Natural resources conservation		
	Urban environmental improvement		

4. Drivers of Change

	Components	Gender Equity and Mainstreaming	
Governance and capacity development (GCD)	Institutional development	No gender elements (NGE)	✓
Partnerships (PAR)	Bilateral institutions (not client government)		
	Official cofinancing		

5. Poverty Targeting

		Location Impact	
Project directly targets poverty	No	Nation-wide	High

6. TA Category: B

7. Safeguard Categorization Not Applicable

8. Financing

Modality and Sources	Amount ($ million)
ADB	**0.20**
Sovereign Policy and advisory technical assistance: Technical Assistance Special Fund	0.20
Cofinancing	**0.30**
Water Financing Partnership Facility - Multi Donor	0.30
Counterpart	**0.00**
None	0.00
Total	**0.50**

9. Effective Development Cooperation

Use of country procurement systems	Yes
Use of country public financial management systems	Yes

I. INTRODUCTION

1. During the 2013 country programming mission, the Government of the People's Republic of China (PRC) requested policy and advisory technical assistance (TA) from the Asian Development Bank (ADB) for a country water assessment (CWA). During a fact-finding mission on 6 March 2014, ADB and the government agreed on the TA's impact, outcome, outputs, cost estimates and financing plan, implementation arrangements, and terms of reference for consultants. The design and monitoring framework is in Appendix 1.[1]

II. ISSUES

2. Although approximately 20% of the world's population lives in the PRC, the country is endowed with only 7% of global freshwater resources. Development and growth, while critical for moving the country's economy forward, are putting further stress on its limited freshwater resources. Demand for water, food, and energy is increasing rapidly as urbanization, industrialization, and population rise. When combined with climate change and natural disasters, the sustainable future of the country's water becomes even more uncertain.

3. Feeding a population of 1.4 billion by 2030 will require producing more food with less water through improved water productivity and efficiency in agriculture. Higher rates of urbanization and increasing demand for drinking water and domestic use will increase stress on existing water sources. Energy demands could more than double in the next 20 years and will come with simultaneous increases in water demand. Hydropower will be a key contributor for clean energy production and "green development." Aside from these human activities, ensuring that environmental water flow required to sustain ecosystems and biodiversity are also maintained is critical.

4. Climate change scenarios for the PRC show an increased likelihood of more severe storms, flooding, and droughts in many provinces. For example, the drought in 2011 illustrated that even the Yangtze Basin, one of the largest basins in the world and recognized for high annual rainfall, is susceptible to the impacts of climate change and unsustainable water consumption. The drought reinforced the need to implement appropriate adaptation measures and natural disaster risk management.

5. Undermining the country's resilience to droughts is a growing scarcity of water. The PRC has a far smaller amount of available (usable) water than its total renewable water resources, a result of not only the natural characteristics of the country's diverse landscape and microclimates, but also of the fragmented and uncoordinated management of its economic development and natural resources. When the effects of pollution are factored in, only about 30% of the country's total renewable water resources are usable.[2]

6. The PRC recently experienced several river pollution incidents, including (i) the high-profile Songhua River toxic chemical spill in November 2005; (ii) drinking water source pollution in Tai Lake, Wuxi in May 2007 due to algae; and (iii) water pollution accidents in Lanzhou and Wuhan during 2014. If not immediately and effectively controlled, these incidents can cause pollution releases to spread across boundaries of administrative jurisdictions, causing environmental and economic damages, as well as public concern and potential social unease.

---

[1] The TA first appeared in the business opportunities section of ADB's website on 29 May 2014.
[2] ADB. 2012. *Drying-Up: What to Do About the Droughts in the People's Republic of China*. Manila.

7. The mounting challenges posed by changing and often conflicting demands for natural resources in the PRC highlight the importance of water in any development and growth agenda. The country's ability to make adequate water available for domestic, agricultural, industrial, and environmental uses will depend on better management of water resources and increased cross-sector planning and integration.

8. In January 2011, for the first time in the 62-year history of the modern PRC, the No. 1 Central Document explicitly targeted and called for water conservancy and watershed management in response to record-breaking water-related natural disasters.[3] The document prioritizes the government's work on water resources, with spending estimated at CNY4 trillion through 2020, and urges local governments to set aside 10% of their revenue from land sales for use in agricultural water conservancy and irrigation works. It also calls for comprehensive flood protection and drought management plans to be in place by 2020.

9. The Third Plenary Session of the 18th Central Committee of the Communist Party Congress reiterated its commitment to economic restructuring, inclusive growth, and sustainable natural resources management. The reform agenda includes programs in major areas of economic and social development and ecological civilization that will create new opportunities for improving human health and natural resources management (including water resources) in an integrated manner, striving for green development. In addition, the government is now developing the 13th Five-Year Plan on Social and Economic Development, 2016–2020.[4] The 13th plan is expected to place significant emphasis on the PRC's water resources management policy, and preventive and corrective actions in the coming years.

10. Following the decision of the Third Plenary Session, on 16 March 2014 the State Council issued the new National Urbanization Plan, 2014–2020, which highlights the environmental carrying capacity of river basins and urges the urban master planning to draw "red lines"[5] to protect surface and underground waters during future urbanization.

11. Given rapidly changing growth dynamics and the pressing need to integrate sustainable development planning, ADB and the government have agreed to conduct a CWA. The TA for the CWA will be used to improve policies and strategies in the water sector, particularly to improve national water security and to deal with water scarcity. The CWA will support preparation of the 13th plan on water resources management, and will ensure that ADB's strategy and programs respond to water security challenges and are consistent with the PRC's water policy directions.

12. Conducting a CWA for the PRC is consistent with ADB's Water Operational Plan and knowledge management plan.[6] It is also in line with ADB's country partnership strategy (CPS), 2011–2015 for the PRC, which supports the government's goal of building a harmonious society by promoting environmentally sustainable development.[7]

---

[3] China Daily. Environment. http://www.china.org.cn/environment/2011-01/31/content_21849849.htm

[4] The 13th Five-Year Plan outline on social and economic development is expected to be approved in March 2015. The water resources component of the plan is expected to be approved by the end of 2015.

[5] Described as the bottom line in ensuring national and regional ecological and resources security.

[6] ADB. 2011. *Water Operational Plan*. Manila; ADB. 2013. *Knowledge Management Directions and Action Plan, 2013–2015: Supporting "Finance ++" at the Asian Development Bank*. Manila.

[7] ADB. 2012. *Country Partnership Strategy: People's Republic of China, 2011–2015*. Manila.

III. THE POLICY AND ADVISORY TECHNICAL ASSISTANCE

A. Impact and Outcome

13. The impact will be increased water security through improved water governance in the PRC. The outcome will be strengthened water management by the government and enhanced ADB water operations in the PRC.

B. Methodology and Key Activities

14. The TA will produce three outputs: CWA completed, potential assistance to the government for the 13th plan delineated (as inputs to the upcoming ADB CPS), and a stakeholder engagement mechanism established.

15. **Output 1: Country water assessment completed**.[8] The TA will produce a CWA report, which will include (i) a water resources profile, (ii) international best practices and implications for water management in the PRC, (iii) assessment of water security risks and identification of options, and (iv) a water management strategy for a green economy to 2030.

16. **Output 2: Potential assistance to the government for the 13th plan delineated** (as inputs to the upcoming ADB CPS). Activities will include (i) identification of key issues and options in water resources management as an input to the PRC's 13th plan; (ii) presentation of recommendations to the Ministry of Finance and ADB management, and incorporation in the CWA and CPS; (iii) identification of specific recommendations and formulation of concept papers for water resources lending and nonlending projects; and (iv) identification of specific recommendations for water resources programs of the PRC and ADB to enhance strategic relations for capacity building.

17. **Output 3: Stakeholder engagement mechanism established**. Activities will include (i) establishment of a cross-agency expert panel, (ii) conduct of four stakeholder consultations, and (iii) conduct of three consultation workshops to reach consensus on the CWA.

18. The CWA will be complemented by a set of water security case studies based on the *Asian Water Development Outlook* approach led by ADB.[9] These case studies will include (i) household water security: nonrevenue water reduction, and rural–urban integration and reform for access to water supply; (ii) economic water security: water–food nexus, water–energy nexus, and inland water transport; (iii) urban water security: storm-water management, urban flood management, and urban wastewater and water supply; (iv) environmental water security: sustainable groundwater management, eco-compensation schemes in interprovincial river basins, cleaning up water in the PRC (lessons from reviving Chao Lake), and agricultural nonpoint source pollution management; (v) resilience to water-related disasters: water-related disaster risk management; and (vi) cross-cutting issues: water allocation schemes in river basins, and a water secure future in the Poyang lake watershed.

19. The TA assumes that (i) government is committed to implementing the 13th plan on water resources, (ii) the Ministry of Water Resources (MWR) and ministries concerned have strong commitment and ownership and will participate in CWA preparation, and (iii) the

[8] High quality knowledge product and policy brief geared for high-level decision-makers and international audiences will be produced using staff time.

[9] ADB. 2013. *Asian Water Development Outlook 2013.* Manila.

recommended measures will be adopted. Some risks are associated with TA implementation: (i) the government has inadequate investment and capacity in water resources management, (ii) deliverables are not delivered on time, and (iii) agencies not involved in natural resources are not provided with incentives to participate actively.

20. The strong leadership, vision, and ownership demonstrated by the Ministry of Finance and MWR during ADB's involvement in the PRC will mitigate the risks and ensure efficient and effective TA implementation. Extensive consultations and planning meetings with involved national, provincial, and local stakeholders will be held to ensure that all sectors are fully aware of the new development approaches and opportunities.

C. Cost and Financing

21. The TA is estimated to cost $700,000, of which $200,000 will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-other sources) and $300,000 will be financed on a grant basis by the Multi-Donor Trust Fund[10] under the Water Financing Partnership Facility and administered by ADB. The government will provide counterpart support in the form of office space, administrative staff, workshop facilities, data collection, establishment of the cross-agency expert panel, and other in-kind contributions.

D. Implementation Arrangements

22. The Ministry of Finance will provide policy and institutional support for TA implementation. MWR, as the executing agency, will establish a steering committee chaired by its vice minister, and with members from the planning department, international department, and water strategic research center. TA implementation will be coordinated with other key line agencies, including the National Development and Reform Commission, the Ministry of Environmental Protection, and the Ministry of Housing and Urban–Rural Development. A cross-agency expert panel will be established to ensure good coordination and quality control of CWA preparation. A project management office will be established in MWR. Three consultation workshops will be held with government agencies and relevant stakeholders. MWR has implemented ADB-financed TA projects since the 1990s and has experience with TA administration.

23. ADB will supervise the TA activities. Given the nature and importance of this policy and advisory TA, a national entity or firm will be hired to manage the national consultants and ADB will engage the international consultants on an individual basis in compliance with its Guidelines on the Use of Consultants (2013, as amended from time to time). Among the required expertise are water resources management, water resources planning, water resources policy, water resources economics, urban development, watershed ecosystem management, agricultural irrigation, urban water supply and demand management, water pollution control, ecosystem management, water–energy nexus, climate change adaptation, and groundwater management. The outline terms of reference for consultants are in Appendix 3. The TA proceeds will be disbursed in accordance with ADB's *Technical Assistance Disbursement Handbook* (2010, as amended from time to time).

24. The TA will be implemented from 1 October 2014 to 31 March 2016. The ADB team will collaborate with MWR during TA implementation to ensure proper monitoring and evaluation of results and maintain progress on plans for the CWA exercise. TA progress will be measured

[10] Financing partners: the governments of Australia, Austria, Norway, Spain, and Switzerland.

against the design and monitoring framework, the consultants' terms of reference, and TA progress reports. TA results will be disseminated through the release of the project reports, the TA workshops, and media releases.

IV. THE PRESIDENT'S DECISION

25. The President, acting under the authority delegated by the Board, has approved (i) ADB administering a portion of technical assistance not exceeding the equivalent of $300,000 to be financed on a grant basis by the Multi-Donor Trust Fund under the Water Financing Partnership Facility, and (ii) ADB providing the balance not exceeding the equivalent of $200,000 on a grant basis, to the Government of the People's Republic of China for the Country Water Assessment, and hereby reports this action to the Board.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Increased water security through improved water governance in the PRC	Goal and targets specified in the 13th Five-Year Plan on water resources are achieved and tasks specified in the 13th plan are fulfilled by 2020	MWR's annual statistics report	**Assumption** The government is committed to implement the 13th plan on water resources. **Risk** The government's investment and capacity in water resources management are not adequate.
Outcome Strengthened water management by the government and enhanced ADB water operations in the PRC	Emerging issues and instruments addressing water security are identified and adopted by the PRC CPS by September 2015 Recommendations for the water management strategy for green economy toward 2030 are considered by the government by December 2015	ADB's CPS for the PRC MWR's annual work report	**Assumptions** MWR and ministries concerned have strong commitment and ownership and will participate in preparing the CWA. The recommended measures will be adopted. **Risks** Deliverables are not completed on time. Some agencies outside of the natural resources sector may not participate actively.
Outputs 1. Country water assessment completed[a]	CWA report published by December 2015: (i) water resources profile by December 2014 (ii) international best practices and implications for the PRC's water management by December 2014 (iii) assessment of water security risks and identification of options by March 2015	TA review missions and reports Reports and documents related to the CWA update for discussion at the three national workshops Consultant reports Dialogue with MWR, MOF, and NDRC	**Assumptions** Senior authorities within MWR consider TA implementation a priority. MWR and MOF will provide timely advice and guidance. Consensus is reached through consultations with key stakeholders.

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
	(iv) water management strategy for green economy toward 2030 by September 2015		
2. Potential assistance to the government for the 13th plan delineated (as inputs to the upcoming ADB CPS)	Identification of key issues and options in water resources management as input to the PRC's 13th plan by November 2014	TA review missions and reports	
	Recommendations are presented to MOF and ADB management, and incorporated in the CWA and CPS by September 2015	Reports and documents related to the CWA update for discussion at the three national workshops	
	A set of specific recommendations for water resources lending and nonlending projects by September 2015	Consultant reports	
	A set of specific recommendations for water resources programs of the PRC and ADB to enhance strategic relations for capacity building by September 2015	Dialogue with MWR, MOF, and NDRC	
3. Stakeholder engagement mechanism established	A cross-agency expert panel established by October 2014		
	Four stakeholder consultations conducted by March 2015		
	Three consultation workshops held and consensus on the CWA reached (November 2014, March 2015, and November 2015)		

Activities with Milestones	Inputs
1. Country water assessment completed 1.1 Water resources profile by December 2014 1.2 International best practices and implications for the PRC's water management by December 2014 1.3 Assessment of water security risks and identification of options by March 2015	**ADB:** **Technical Assistance Special Fund (TASF-other sources)** **$200,000**

Activities with Milestones	**Inputs**
1.4 Water management strategy for a green economy to 2030 by September 2015	**Multi-Donor Trust Fund[b] under the Water Financing Partnership Facility: $300,000**
2. Potential assistance to the government for the 13th plan delineated (as inputs to the upcoming ADB CPS)	
2.1 Identification of key issues and options in water resources management as input to the PRC's 13th plan by November 2014	
2.2 Recommendations presented to MOF and ADB management and incorporated in the CWA and CPS by September 2015	Note: The government will provide counterpart support in the form of office space, administrative staff, workshop facilities, data collection, establishment of the cross-agency expert panel, and other in-kind contributions.
2.3 A set of specific recommendations for water resources lending and nonlending projects by September 2015	
2.4 A set of specific recommendations for water resources programs of the PRC and ADB for enhancing strategic relations for capacity building by September 2015	
3. Stakeholder engagement mechanism established	
3.1 A cross-agency expert panel established by October 2014	
3.2 Inception workshop held by November 2014	
3.3 Four stakeholder workshops held by March 2015	
3.4 Interim workshop held by March 2015	
3.5 Final workshop held by December 2015	

ADB = Asian Development Bank, CPS = country partnership strategy, CWA = country water assessment, MOF = Ministry of Finance, MWR = Ministry of Water Resources, NDRC = National Development and Reform Commission, PRC = People's Republic of China, TA = technical assistance.

[a] High quality knowledge product and policy brief geared for high-level decision-makers and international audiences will be produced using staff time.

[b] Financing partners: the governments of Australia, Austria, Norway, Spain, and Switzerland. Administered by ADB.

Source: Asian Development Bank.

COST ESTIMATES AND FINANCING PLAN
($'000)

Item	Amount
A. Asian Development Bank[a]	
1. Consultants	
a. Remuneration and per diem	
i. International consultants	60.0
ii. National consultants	100.0
b. International and local travel	15.0
2. Miscellaneous administration and support costs	10.0
3. Contingencies	15.0
Subtotal (A)	**200.0**
B. Multi-Donor Trust Fund[b] **under the Water Financing Partnership Facility**	
1. Consultants	
a. Remuneration and per diem	
i. International consultants	140.0
ii. National consultants	60.0
b. International and local travel	16.0
c. Reports and communications	20.0
2. Workshops, training, seminars, and conference	40.0
3. Miscellaneous administration and support costs	10.0
4. Contingencies	14.0
Subtotal (B)	**300.0**
Total	**500.0**

Note: The technical assistance (TA) is estimated to cost $700,000, of which contributions from the Asian Development Bank (ADB) and the Multi-Donor Trust Fund under the Water Financing Partnership Facility are presented in the table above. The government will provide counterpart support in the form of office space, administrative staff, workshop facilities, data collection, establishment of the cross-agency expert panel, and other in-kind contributions. The value of government contribution is estimated to account for 28% of the total TA cost. Funding from the Multi-Donor Trust Fund under the Water Financing Partnership Facility will be administered by ADB on a front-loaded basis.

[a] Financed by the Asian Development Bank's Technical Assistance Special Fund (TASF-other sources).

[b] Financing partners: the governments of Australia, Austria, Norway, Spain, and Switzerland. Administered by ADB.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The technical assistance (TA) will hire a national entity to manage the national consultants, and engage the international consultants on an individual basis in compliance with the Guidelines on the Use of Consultants (2013, as amended from time to time). International consultants will include (i) water resources management specialist and deputy team leader (6 person-months), (ii) water resources economist (3 person-months), (iii) urban development specialist (1.5 person-months), and (iv) watershed ecosystem management specialist (1.5 person-months). National consultants will include (i) water resources policy specialist and team leader (7 person-months), (ii) water resources planning specialist (3 person-months), (iii) water resources economist (3 person-months), (iv) agricultural irrigation specialist (3 person-months), (v) urban water supply and demand management specialist (3 person-months), (vi) water pollution control specialist (3 person-months), (vii) ecosystem management specialist (3 person-months), (viii) water–energy nexus specialist (3 person-months), (ix) climate change adaptation specialist (3 person-months), and (x) groundwater management specialist (2 person-months).

2. **Team leader.** The national water resources policy specialist (hired by a firm) and team leader will (i) have overall substantive and administrative responsibility for the effective and timely implementation of the TA; (ii) lead the team, foster close coordination between international and national consultants (including coordination of inputs, quality control of reports, financial management, and technical guidance), and coordinate with the executing agency, other related government agencies, the Asian Development Bank (ADB), and international organizations undertaking related work in partnership with ADB; (iii) periodically report progress to the executing agency and ADB and submit high-quality, consolidated reports to ADB as specified in the terms of reference. The specialist should have a master's degree in natural resources management, water, or a related field. At least 15 years of relevant experience in water resources management may be considered in lieu of a master's degree.

3. **Deputy team leader.** The deputy team leader and water resources management specialist (hired as an individual) will work closely with the team leader and team members, and (i) support the team leader in preparing and finalizing the detailed TA methodology and work plan; (ii) support, review, edit, and finalize inception, interim, and final reports; (iii) review the thematic reports prepared by the ADB team and synthesize them into the final report; and (iv) prepare the related international experience reports, and ensure that these reports can be fully integrated in the interim, draft final, and final reports. The specialist will have a master's degree related to water resources management, environmental science or environmental engineering; at least 15 years of work experience in water resources planning, water resources policy development, water pollution control, or lake and river ecosystem management; and work experience on projects financed by international organizations, and preferably with project-related experience in the People's Republic of China (PRC).

4. **Team members.** The team members will each have a master's degree or higher and work experience related to their respective assignments. At least 15 years of relevant experience in water resource management may be considered in lieu of a master's degree. The team leader will be responsible for allocating detailed task assignments and deliverables to each consultant during the inception stage. The table below indicates the TA team's responsibilities by output.

Responsibilities of Consultants by Output

Consultant	Output 1				Output 2	Output 3
	Output 1.1	Output 1.2	Output 1.3	Output 1.4		
International						
Water resources management specialist, deputy team leader	✓	✓	✓	✓	✓	✓
Water resources economist	✓	✓	✓	✓		✓
Urban development specialist		✓	✓	✓		✓
Watershed ecosystem management specialist		✓	✓	✓		✓
National						
Water resources policy specialist, team leader	✓		✓	✓	✓	✓
Water resources planning specialist	✓		✓	✓		✓
Water resources economist	✓		✓	✓		✓
Agricultural irrigation specialist			✓	✓		✓
Urban water supply and demand management specialist			✓	✓		✓
Water pollution control specialist			✓	✓		✓
Ecosystem management specialist			✓	✓		✓
Water–energy nexus specialist			✓	✓		✓
Climate change adaptation specialist			✓	✓		✓
Groundwater management specialist			✓	✓		✓

Note: output 1: country water assessment completed: output 1.1: water resources profile, output 1.2: international best practices and implications for PRC's water management, output 1.3: assessment of water security risks and identification of options, and output 1.4: water management strategy for green economy to 2030; output 2: potential assistance to the government for its 13th Five-Year Plan delineated (as inputs to the upcoming Asian Development Bank's country partnership strategy); and output 3: stakeholder engagement mechanism established.
Source: Asian Development Bank.

A. Country Water Assessment[1]

5. **Water resources profile** (current and projected). The national and international water resources economists will

(i) prepare a current water resources profile for the PRC and project water supply and demand to 2030, incorporating climate change and urban, industrial, energy, and agricultural development;

(ii) correlate the economic and water use structure in the PRC (from 2000 to present) using gross domestic product (GDP), or GDP per capita, against total water use (or total water use per capita) by province; and historical change in the water use structure by sector (agriculture, industry, and resident) and by provinces;

(iii) examine the status quo and historical changes in water security since 2000 in the PRC, particularly for (a) urban water security, including access to piped water supply (%), wastewater treatment rate, and urban drainage system (kilometer per

[1] High quality knowledge product and policy brief geared for high-level decision-makers and international audiences will be produced using staff time.

10,000 population); (b) economic water security, including water use per GDP, industrial water use per CNY10,000 industrial added value, domestic water use per resident, and agricultural water use per hectare; (c) environmental water security, including watershed disturbance, ambient water quality in key river basins, groundwater stress, and biotic factors; (d) resilience to water-related disasters: exposure, basic population vulnerability, hard coping capacity (e.g., telecommunications development), and soft coping capacity (e.g., literacy rate); and (e) water governance: awareness enhancement, institutional reforms, information disclosure and capacity building, and investment and financial mechanism.

6. The national water resources planning specialist, ecosystem management specialist, and water pollution control specialist will support the international and national water resources economists to (i) provide an assessment of water resources and water supply and demand by province and river basin; (ii) analyze the water resources status quo in terms of water quality and water quality by key river basins, and analyze the trends for water use competition among different sectors (agriculture, energy, and residents); and (iii) review the current distribution of water resources and water-related infrastructure, and examine the potential gaps.

7. With support from other national specialists, the water resources economists will (i) analyze the implications of rapid urbanization, agricultural modernization, industrialization, diversified energy development, and climate change on water use, wastewater discharge, and water-related disaster risks; and (ii) review the existing projections for population and economic development and conduct projections of water supply and demand, water pollution loading (e.g., chemical oxygen demand and ammonia), and flood and drought risks in 2030.

8. **International best practices and implications for water management** (in the PRC). With support from the national water resources policy specialist, international urban development specialist, international water resources economist, and international watershed ecosystem specialist, the international water resources management specialist and deputy team leader will

(i) apply the Asian Water Development Outlook[2] or the ADB water security index and other water governance indexes, and conduct a thorough literature review to benchmark the PRC's current water situation and water governance against selected countries (including Brazil, India, Pakistan, and the United States); including comparisons of (a) urban water security, economic water security, environmental water security, and resilience to water-related disasters; and (b) water governance indicators: progress on integrated water resources management, water use efficiency, water tariff, information development and sharing mechanism, private sector participation, and risk management system;

(ii) review and assess international best practices, from different regions including Australia, Brazil, France, India, and the United States: (a) water rights administration and water markets; (b) investing in natural infrastructure (including integrated water and ecosystem planning, rehabilitation of degraded river and ecosystems, and systemic methods to measure health of rivers and lakes); (c) public–private funding mechanisms for water cleanup; (d) financial mechanisms and private sector participation in urban–rural water supply; and (e) risk management systems for climate change; and

[2] ADB. 2013. *Asian Water Development Outlook 2013*. Manila.

(iii) prepare a report on comparative analysis on water security and water governance by river basin, and examine the existing gaps in the PRC's water management.

9. **Assessment of water security risks and identification of options.** With support from other international and national specialists, the international water resources management specialist, and national water resources policy specialist will examine potential water security risks related to urbanization, agricultural modernization, energy development, and climate change; and identify options for addressing the following risks with the following specialists:

(i) **Urban water security**. With the international urban development specialist and national urban water supply and demand management specialist, (a) review water-related chapters in the newly released national urbanization strategy (an estimated additional 300 million people will be moving to urban areas by 2030); (b) analyze the aggravation of water shortage and water use disputes due to unmatched water resources and intensified urban areas; (c) evaluate current and planned water-related infrastructure development in urban areas; (d) examine water pressures and risks of rapid urbanization on water supply, wastewater treatment, and urban floods; and (e) identify the options for addressing potential risks, which may include water-sensitive urban planning, urban water demand management options, water tariff reform, second water source development, and urban drainage system rehabilitation.

(ii) **Economic water security risks**. With the national agricultural irrigation specialist and national water–energy nexus specialist, (a) analyze the potential rising water demand from future agricultural modernization; (b) analyze water use competition between energy sector development (such as coal, shale gas) and other sectors, and analyze the potential risks of future energy development on water quantity and quality; and (c) analyze the water–food–energy nexus and examine the options for improving water productivity.

(iii) **Environmental water security risks**. With the national water pollution control specialist and national ecosystem management specialist, (a) examine potential pollution pressures on aquatic systems due to increasing urbanization, agricultural modernization, and energy development; (b) analyze options for managing increasing and unregulated nonpoint source pollution; (c) analyze climate change forecasts for water availability and quantity; (d) examine challenges and risks in maintaining basic environmental flows due to future hydropower and water-related infrastructure development; (e) analyze degradation and depletion of groundwater in the north and northeast; and (f) identify options for improving environmental water security under the PRC's eco-civilization framework.

(iv) **Water-related disaster risks**. With the national climate change adaptation specialist, (a) examine increasing flood risks in coastal cities due to rising sea level, increasing drought risks in the PRC's southwest and northeast regions due to extreme weather and other development pressures, and increasing urban flood risks due to uncontrolled urbanization and lack of appropriate drainage systems; and (b) identify options for enhancing risk management systems to adapt to climate change.

10. **Water management strategy for a green economy to 2030.** In consultation with the PRC government and support from international and national specialists, the water resources management specialist and water resources policy specialist will develop a water management strategy for a green economy to 2030, which will address (i) how the government can shift from

participant to regulator and enabler to encourage private sector participation; (ii) how the PRC can use both policy and market instruments to address current and future challenges to achieve a water-secure future; (iii) how to ensure environmental water use when the country is promoting urbanization, agricultural modernization, energy security, and addressing climate change risks; (iv) how to ensure water-related public service and security when more than 900 million live in urban areas; (v) how to revive degraded rivers and lakes, while investing in nature capital; (vi) how to develop a reliable risk management system to respond to water-related natural disasters and water pollution accidents; (vii) how to ensure sustainable rural water supply and conservation; and (viii) how to reform the water tariff, water tax, and other enabling systems that attract private sector participation.

B. Potential Assistance to the Government for the 13th Five-Year Plan

11. In consultation with the government and ADB, the team leader and deputy team leader will (i) list issues where the government needs additional foreign aid, particularly identifying and prioritizing any issue that has the most potential to help the government improve water security; (ii) among the prioritized issues, evaluate ADB's comparative advantage in helping the government; review past ADB practice, based on country assistance program evaluation, portfolio review, project completion reports, and other relevant sources; (iii) consult with the government on how ADB could be involved in supporting the given plan; and (iv) describe how ADB should be involved in helping the government with issues where ADB has a comparative advantage. Describe what ADB should continue to do, what it should do differently, and what new things it could do. Suggest the kind of program that could be developed. Recommend types of loans and how to involve the private sector, and explore cofinancing. Recommend the types of TA, and how to improve TA effectiveness. Discuss how to introduce new knowledge (ideas and practices) through ADB programs.

C. Stakeholder Engagement Mechanism

12. The executing agency will establish a cross-agency expert panel to ensure institutional coordination and quality of the CWA preparation. The team leader and deputy team leader will organize inception, interim, and final workshops for the executing agency, ADB, and stakeholders to review the consultant team’s outputs. Four stakeholder consultations on urban water security, economic water security, environmental water security, and resilience to climate change will be conducted. The firm will submit to the executing agency and ADB an electronic copy and a hard copy (both in English and Chinese) of the inception (month 2), interim (month 10), final reports (month 16), and each subreport. The draft knowledge product will be submitted in month 14 and the final knowledge product in month 16. The delivery schedule is tentative and will be confirmed in the firm’s work plan to be prepared in month 1.