TERMS OF REFERENCE FOR CONSULTANTS

A. Introduction

1. The Asian Development Bank (ADB) will engage individual consultants using the individual consultant selection method. It is estimated that the technical assistance (TA) will require 21 person-months of consulting services, comprising at least two international and nine national consultants. The proposed positions require specialized terms of references, as flash flood modeling in un-gauged river basins, flash flood forecasting using hydrometeorological data, use of satellite-based information, and development of community-based early warning systems are still emerging issues in the People’s Republic of China (PRC). Because it is difficult to find experts in different sectors related to localized flash flood early warning in a single consulting firm, ADB will engage the consultants through the individual consultant selection method following the ADB Procurement Policy (2017, as amended from time to time) and its associated project administration instructions and/or staff instructions.

B. Terms of Reference

2. Water resources policy specialist and team leader (National, 4 person-months). The national water resources policy specialist and team leader will: (i) have overall substantive and administrative responsibility for the effective and timely implementation of the TA; (ii) lead the team including both international and national consultants, 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 implementing agency, the ADB, and agencies undertaking related work in partnership with ADB; (iii) coordinate with provincial governments in the Yellow River basin and engage them in the decision making process; (iv) provide guidance; and (iv) periodically report progress to the executing agency and ADB and submit high-quality, consolidated reports to ADB. The team leader will be responsible for allocating detailed task assignments and deliverables to each consultant during the implementation stage. The specialist and team leader should have: (a) a master’s degree in natural resources management, water, or a related field; (b) at least 15 years of relevant experience in water resources management; and (c) team leadership in more than three water resources planning and management projects or programs. Good English communication skill is required.

3. Water resources planning specialist and deputy team leader (National, 3 person-months). The specialist will perform designated tasks working with a team of national specialists and other international specialists. The specialist will: (i) work as a deputy team leader to coordinate with international and national consultants; (ii) assist to liaise with the Yellow River Conservancy Commission (YRCC) and other relevant government agencies for detailed implementation of the TA; (iii) assist the team leader in developing the detailed study framework in consultation with the YRCC and other experts; (iv) benchmark the Yellow River basin’s current water situation and water governance against selected countries, review and assess international best practices for water resources management, carry out comparative analysis, and prepare a report to document best practice and implications for water management and water governance in the PRC and Yellow River basin; (v) propose water governance goals, strategies and countermeasures toward 2030; (vi) examine potential water security risks, and identify challenges and options for addressing water security risks; (vii) propose water management strategy for a green economy to 2030; (viii) propose recommendations to the ADB and YRCC/Ministry of Water Resources, including options in water resources management and water governance, water resources lending and non-lending projects, and water resources programs for capacity building.
in Yellow River basin; (ix) propose priority areas of cooperation between ADB and the Yellow River basin’s water sector; (x) develop the policy recommendation for water management and water governance in specific to Yellow River basin, withdrawing lessons from Yangtze River Economic Belt (YREB); (xi) contribute to workshops, seminars, and reports; and (xii) prepare reports of the TA in coordination with other consultants. The specialist/deputy team leader should have (i) a master’s degree in natural resources management, water, or a related field; (ii) at least 15 years of relevant experience in water resources management; and (iii) team leadership in more than three water resources planning and management projects or programs.

4. **Water Resources Economist (International, 1 person-month and National, 2 person-month).** The specialist will perform designated tasks working with a team of national specialists and international specialist. The specialist will: (i) assist the team leader and deputy team leader in benchmarking the Yellow River basin’s current water situation and water governance against national standard, reviewing best practices for water management including lessons from YREB, carrying out comparative analysis, and preparing a report to document YREB best practice and implications for water management and water governance in the Yellow River basin; (ii) integrate review on development process of the Yellow River basin’s water sector, and summarize successful experiences and practices; (iii) analyze status quo, existing problems, and historical changes of economy and water use structure since 2000, and integrate analysis on status quo and historical changes of Yellow River basin’s water sector since 2000; (iv) undertake forecasting analysis on water supply and demand, water pollution loading, and flood and drought risks in 2030; (v) integrate analysis on water resources profile, and integrate analysis on challenges facing the Yellow River basin’s water sector under changing environment; (vi) assist in examining potential economic water security risks, and identifying challenges and options for addressing these risks; (vii) assist in proposing water management strategy for a green economy to 2030; (viii) assist in proposing recommendations to the PRC government and ADB, referring to water economy regulation and actions, including options for addressing economic water security risks, proposing priority areas of cooperation between ADB and the Yellow River basin’s water sector on the aspect of economic water security in Yellow River basin; (x) develop the policy recommendation for water economy regulation as well as find the gaps in existing policy or challenges in implementing those policies, including with the lessons from YREB; and (x) contribute to surveys, workshops, seminars, and reports. The economist should preferably have (a) a master’s degree in economics; (b) at least 10 years of experience in water resources or environmental economics, or other related fields; and (c) at least seven years of relevant experience in project design for water economic analysis, pricing, and demand and supply analysis.

5. **Hydrologist and geographical information system (GIS) specialist (National, 2 person-months).** The specialist will perform designated tasks working with a team of national and international specialists. The specialist will: (i) under the guidance of the team leader, lead the modeling activities and provide training and support to the YRCC staff; (ii) review and assess Yellow River basin’s existing hydrologic, hydraulic, and water resources management modeling capabilities with particular emphasis on capacity to simulate hydrology and water resources on the basis of climate change projections; (iii) conduct quick river basin modelling or review existing models to generate data and information to support the sector assessment as needed; (iv) provide recommendations for improving national water resources modeling capacity to enable decision support to the water sector, inclusive of domestic water supply, irrigation, hydropower generation, and environmental flow requirements; and of water-related hazards, in the face of climate change at the scale appropriate for the basin; (v) use suitable mathematical models capable of simulating: (a) physical hydrology, (b) flood hydrology and hydraulics, (c) water resources management and allocation at a river basin scale under current conditions and projected climate change; and (d) present the result in GIS platform. His/her GIS related inputs
includes but not limited to (i) obtain or generate GIS compatible data on Yellow River basin systems, surface and ground water resources, water infrastructure, topography, land use, population and residential areas, major businesses and enterprises; (ii) analyze and determine how best the information can be displayed in the GIS system; (iii) process the information and data, and produce initial versions of GIS maps and other attributed data; and revise the maps and other relevant information at late stage; (v) provide training on spatial data processing and spatial data analysis techniques, including use of satellite images and remote sensing to the YRCC and Ministry of Water Resources staff; and (vi) contribute to the presentation of prioritized investment proposals and prepare infographics as needed. The hydrologist should preferably have (a) a PhD degree in hydrology; and (b) at least 10 years of experience in river basin modelling with the aid of GIS.

6. **Flood risk management specialist (National, 2 person-months).** The specialist will: (i) assess the water related disaster risk with priority on flood risk in Yellow River basin considering hazard, exposure, and vulnerability at different levels; (ii) assess hydrological and hydraulic data of the river and also evaluate river aggradation, erosion, sedimentation issues, which are critical in Yellow River basin; (iii) collect relevant plans and information from different entities; (iv) identify critical gaps on flood and drought risk management and river restoration from the review of plans and field survey as needed, and assist in the preparation of the projects and plans that will be implemented in line with national priority; (v) develop the policy recommendation for flood risk management and water governance; and (vi) contribute to surveys, workshops, seminars, and reports. Assist in itemizing key tasks for project implementation and identifying the resources and schedules required, supporting. The specialist should preferably have: (a) a master's degree in water resources or disaster risk management or related fields; (b) at least seven years of experience in flood and drought risk management; and (c) at least seven years of relevant experience in project design.

7. **Agricultural and irrigation specialist (National, 2 person-months).** The specialist will (i) benchmark the Yellow River basin’s current irrigation situation against other basins; (ii) assess the agricultural practices, drought risk, and irrigation water demand in Yellow River basin and evaluate such both in current and projected scenarios; (iii) discuss with the provincial governments and identify the irrigation gap and potential areas of support that the local government needs to modernize the irrigation system; (iv) explore the gaps and opportunities to introduce high efficiency irrigation systems, including incorporation of innovative high efficiency irrigation and water supply technologies (e.g., high efficiency pumps; efficient pipe networks; and water saving irrigation technologies such as drip or micro irrigation etc.) in designs of pumps, canals, pipes, terminal tanks, etc.; (v) develop the policy recommendation for irrigation water management and water governance; and (vi) contribute to surveys, workshops, seminars, and reports. The specialist should preferably have: (a) a master’s degree in irrigation engineering or other related fields; and (b) at least seven years of relevant experience in the fields of design and operation of irrigation systems, and sustainable land and water management.

8. **Urban water supply and demand management specialist (National, 2 person-months).** The specialist will (i) benchmark the Yellow River basin’s current urban water security situation and urban water governance against other basins, review the national and international best practices for urban water management, carry out comparative analysis of urban water security; (ii) conduct literature review on advanced research and practices of the urban water development and management aspect of water sector development relevant to Yellow River basin contexts; (iii) assist in examining potential urban water security risks, and identifying challenges and options for addressing these risks; (iv) assist in proposing water management strategy for a green economy to 2030; (v) assist in proposing recommendations to the PRC government and ADB, referring to urban water regulation and actions, including options for addressing urban water
security risks, proposing priority areas of cooperation between ADB and the PRC in urban water security in Yellow River basin; (vi) develop the policy recommendation for urban water management and water governance; and (vii) contribute to surveys, workshops, seminars, and reports. The specialist should preferably have (i) a master’s degree in water supply or other related field; and (ii) at least 10 years of experience in design of urban water supply projects, operation of urban water supply facilities, and water demand management.

9. **Watershed management specialist (National, 1 person-month).** The specialist will: (i) conduct literature review on advanced research and practices of the ecological and environment aspect of water sector development including soil and water conservation; (ii) benchmark the Yellow River basin’s current environmental water security situation and water governance on eco-environmental aspects against other basins; (iii) assist in examining potential environmental water security risks, and identifying challenges and options for addressing these risks; (iv) assist in proposing water management strategy for a green economy to 2030; (v) assist in proposing recommendations to the PRC government and ADB, referring to water regulation and actions on eco-environmental aspects, including options for addressing environmental water security risks, proposing priority areas of cooperation between ADB and the PRC’s water sector on the aspect of environmental water security; (vi) develop the policy recommendation for eco-environmental water management and water governance; (vii) review best practices including from YREB on eco-environmental water management, carry out comparative analysis of environmental water security, and assist team leaders in preparing a report to document best practice and implications, focusing on eco-environmental water management and water governance in the PRC and in the Yellow River basin; and (ix) contribute to surveys, workshops, seminars, and reports. The specialist should preferably have (a) a master’s degree in ecosystem or environment management, or other related field; (b) at least seven years of experience in ecosystem and environmental management; and (c) experience in eco-service policy study and program design is expected.

10. **Climate change adaptation specialist (National, 1 person-month).** The specialist will (i) assess the impact of climate change in Yellow River basin and select best mitigation and adaptation strategies and program in close coordination with local governments, (ii) assess the climate change adaptation in water sector investment, (iii) collect relevant plans and information from different entities, (iv) identify critical gaps on climate change mitigation and adaptation relevant to water sector development, and assist in the preparation of the projects and plans that will be implemented in line with national priority; (v) develop the policy recommendation for climate change adaptation and water governance in Yellow River basin; and (vi) contribute to surveys, workshops, seminars, and reports. Assist in itemizing key tasks for project implementation and identifying the resources and schedules required. The specialist should preferably have (a) a master’s degree or relevant qualification in climate change or environmental science, or other related fields; and (b) at least seven years of relevant experience in climate change studies and assessment, in particular relating to water risk assessment and adaption management.

11. **Water resources management (International, 1 person-month).** The international water resources specialist will work closely with the team leader and will (i) help compare Yellow River basin water issues with national and international situations, (ii) provide inputs on international best practices and know-how in drafting the recommendations, (iii) review the report and help improve the content and readability; and (iv) help team leader draft the short policy note based on the technical report. The specialist should have (a) a master’s degree in water resources management, or related field; (b) at least 15 years of relevant experience in water resources management; (c) water resources planning and management projects or programs; and (d) publication.
12. The specialist, with extensive experience in water sector reform and familiar with Yellow River basin, will provide advices and inputs to the project team leader and the team members to deliver on the results of the project. S/he will maximize efforts to achieve expected project results, by providing strategic guidance for the implementation of activities in accordance with the water sector reform roadmap, and as well as other relevant national plans and decisions. Specifically, the Policy Advisor will carry out following duties and responsibilities. The incumbent will provide policy advice to the project team in IWRM and institutional reform implementation in the water sector and improvements in the legal framework and institutional strengthening. He/she will also (i) prepare policy discussion notes on issues arising and provision of strategic guidance; (ii) support to design national policies and regulatory frameworks for advancing IWRM and dialogue on water issues; (iii) ensure good planning and organization of the Yellow River policy dialogue; (iv) guide the team on yellow river water sector assessment as per ADB’s guidelines (Asian Water Development Outlook 2020) or modify the guidelines to fit the local needs; (v) share the experience from other river basins water sector assessment; (vi) develop a communication and dissemination strategy for the recommendations made through the project; and (vii) help maintain project communication with ADB through the team leader in a regular basis.

C. TA Implementation Arrangement

13. The TA will be implemented by the YRCC under the Ministry of Water Resources, the PRC. YRCC will also host the technical panel, represented by Ministry of Finance, National Development and Reform Commission, relevant ministries, local government including provincial as well as key municipalities and city governments.

D. Reporting

14. The project consultant team will submit the following reports, together with (i) succinct report, including references and data summary tables in excel format, as well as supporting data tables as appropriate; (ii) PowerPoint presentations; and (iii) reports will be delivered in a format agreed with the user. Delivery of the final report will be subject to written acceptance by the use and such acceptance will be at his/her reasonable.

(i) Quarterly progress reports
(ii) Draft final and final reports by November and December 2021 respectively
(iii) Yellow River basin water resources assessment report (following ADB’s Asian Water Development Outlook’s Guidelines 2020);
(iv) Strategic recommendations to the Yellow River basin development plan;
(v) Road mapping for ADB’s support by 2025 that include strategic projects (proposed by local i.e., provincial and county/city and national governments that follow the strategic directions). Brief outline of the project including location, responsible agency (executing and implementing agencies), expected ADB’s value addition, size and scale of the project, financing need, implementation timeline of the roadmap etc.
(vi) Draft policy brief and two additional knowledge products on technical and institutional matters.

15. The TA will also deliver three national workshops involving relevant ministries, local governments (provincial/cities/counties), Ministry of Finance and National Development and Reform Commission.