China, People’s Republic of: Risk Mitigation and Strengthening of Endangered Reservoirs in Shandong Province Project

Project Name | Risk Mitigation and Strengthening of Endangered Reservoirs in Shandong Province Project
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Project Number | 40683-013
Country | China, People’s Republic of
Project Status | Closed
Project Type / Modality of Assistance | Loan
Source of Funding / Amount | Loan 2700-PRC: Risk Mitigation and Strengthening of Endangered Reservoirs in Shandong Province Project

- Ordinary capital resources: US$ 29.80 million
- Technical Assistance Special Fund: US$ 300,000.00
- Multi-Donor Trust Fund under the Water Financing Partnership Facility: US$ 200,000.00

Strategic Agendas:
- Environmentally sustainable growth
- Inclusive economic growth

Drivers of Change:
- Agriculture, natural resources and rural development
- Irrigation
- Rural flood protection
- Rural water policy, institutional and capacity development
- Rural water supply services
- Water-based natural resources management
- Water and other urban infrastructure and services
- Urban water supply

Gender Equity and Mainstreaming:
- Some gender elements

Description:
The project seeks methodologies and sought methodologies for reservoir rehabilitation as well as the importance of managing the rehabilitated reservoirs properly to be able to use the reservoirs safely and effectively for economic development, but was facing technological and financing difficulties. The Shandong provincial government recognized the urgent need otherwise, the rehabilitation would have been futile. To address these issues, sustainable reservoir rehabilitation and management models needed to be prepared in October 2007 specifically for 6,240 reservoirs, including those uncompleted in the second phase. The National Reservoir Strengthening Program was completed during the 11th Five-Year Plan period (2006-2010). But reservoir rehabilitation will continue beyond the program. Many unsafe reservoirs still have to be rehabilitated, and class I and II reservoirs, which were not part of the program, are foreseen to deteriorate and need rehabilitation. In addition, reservoirs rehabilitated under the program must be properly operated, maintained, and managed for safety and effective use; otherwise, the rehabilitation would have been futile. To address these issues, sustainable reservoir rehabilitation and management models needed to be established in a province where reservoir safety was a serious issue, and successful models needed to be replicated throughout the PRC. Reservoir safety is of great concern to Shandong Province, among other provinces in the PRC. The Shandong provincial government recognized the urgent need for reservoir rehabilitation as well as the importance of managing the rehabilitated reservoirs properly to be able to use the reservoirs safely and effectively for economic development, but was facing technological and financing difficulties.

Project Rationale and Strategy:
Rapid economic growth of the PRC has depended in part on reservoirs, which have been important in flood control, irrigation, hydropower generation, and water supply. The PRC has about 90,000 reservoirs. About 90% were built during the period of the Great Leap Forward and the Cultural Revolution (1958-1976), using outdated and low technical standards and inadequate plans, surveys, designs, and construction. Most of these reservoirs had been used for 30-50 years, and many of the dams and equipment were damaged and needed to be repaired and strengthened. Many of the reservoirs did not meet modern safety standards. The PRC has three safety classes of reservoirs. In the class III (most unsafe) category were 37,032 reservoirs, 43% of the total. The potential failure of class III reservoirs threatened lives and property downstream. The storage water level of many reservoirs was originally designed to match the hydrometeorological features of the watershed and downstream water demand. However, many endangered reservoirs did not store water up to the design level because of water leakage, instability of water-retaining dams, and inadequate spillway capacity for emergency discharge of rapidly rising floodwaters. As a result, these endangered reservoirs could not control floods, supply irrigation water, generate hydropower, or provide household water year-round to users. It was expected that strengthening these reservoirs would increase water supply at a lower cost and with less adverse impact on the environment and people than building new reservoirs, and would also have potentially positive benefits downstream, especially on the environment, by increasing reservoir releases for environmental flow. The government had given high priority to strengthening endangered reservoirs. The Ministry of Water Resources set up the National Reservoir Strengthening Program in 2001, with financial assistance from the government. The first phase of this program was successfully completed, and 1,346 reservoirs are now operating at design capacity. The second phase, involving the strengthening of 2,112 class III reservoirs, began in 2003. To speed up the rehabilitation of unsafe reservoirs, the third phase of the program was prepared in October 2007 specifically for 6,240 reservoirs, including those uncompleted in the second phase. The National Reservoir Strengthening Program was completed during the 11th Five-Year Plan period (2006-2010). But reservoir rehabilitation will continue beyond the program. Many unsafe reservoirs still have to be rehabilitated, and class I and II reservoirs, which were not part of the program, are foreseen to deteriorate and need rehabilitation. In addition, reservoirs rehabilitated under the program must be properly operated, maintained, and managed for safety and effective use; otherwise, the rehabilitation would have been futile. To address these issues, sustainable reservoir rehabilitation and management models needed to be established in a province where reservoir safety was a serious issue, and successful models needed to be replicated throughout the PRC. Reservoir safety is of great concern to Shandong Province, among other provinces in the PRC. The Shandong provincial government recognized the urgent need for reservoir rehabilitation as well as the importance of managing the rehabilitated reservoirs properly to be able to use the reservoirs safely and effectively for economic development, but was facing technological and financing difficulties.

Impact:
Improved economic development in areas downstream of reservoirs

Description of Outcome:
Sustainable rehabilitation and management of reservoirs
Two model reservoirs were withdrawn from the project. Rehabilitation of the seven model reservoirs has been almost completed. The threat of reservoir failure has been reduced and the threat of flood damage has been mitigated for the areas downstream of the reservoirs.

Irrigation area was increased from 27,300 ha in 2009 to 35,263 ha in 2014, in the areas downstream of the nine model reservoirs. Models established under the project are (i) reservoir rehabilitation technical guidelines, (ii) a manual for dam failure modeling and methodologies for risk estimation of dam failure, (iii) a manual for risk-based methodology for reservoir rehabilitation planning, (iv) a framework and a manual for construction of reservoir portfolio database, (v) a report on prepared management measures, and (vi) manuals for practical reservoir safety management. These models are being used by SPWRD, administration offices of model reservoirs, provincial design institute, and local design institutes in the project area. Models will be disseminated to other local governments including water resources bureau, reservoir administration offices, and local design institutes, as necessary.

Under the piggybacked technical assistance, plans were formulated for a model river basin for (i) integrated water use, (ii) integrated flood management, and (iii) greater environmental benefits downstream, being guided by the principles of integrated water resources management.

### Implementation Progress

#### Description of Project Outputs

- Rehabilitation of model reservoirs

#### Status of Implementation Progress (Outputs, Activities, and Issues)

- Two model reservoirs were withdrawn from the project. Rehabilitation of the seven model reservoirs has been almost completed.

#### Geographical Location

- Huacun Reservoir, Laiyang Shi, Linqu Xian, Longwantao, Muyu Shuiku, Pingyi Xian, Qiangkuang Shuiku, Qingzhou Shi, Renhe, Shizuizi, Songshan Shuiku

### Safeguard Categories

- Environment: B
- Involuntary Resettlement: B
- Indigenous Peoples: C

### Summary of Environmental and Social Aspects

#### Environmental Aspects

The project was in environmental category B, according to ADB’s Safeguard Policy Statement. An environmental assessment of the project conforming to the PRC regulatory framework and ADB’s Environmental Assessment Guidelines (2003) was carried out. The initial environmental examination report summarized the findings of the environmental assessment reports on the nine subprojects and the due diligence review of the associated facilities.

#### Involuntary Resettlement

- 6 of the 7 subprojects required land acquisition or household relocation, but the impact was not significant. The project was in category B for involuntary resettlement, according to ADB’s Safeguard Policy Statement (2009).

#### Indigenous Peoples

- There are no indigenous peoples within the project locations; the project was therefore in category C in this regard.

### Stakeholder Communication, Participation, and Consultation

#### During Project Design

- The design of the project was carried out by design institutes, which engaged in extensive consultations with stakeholders, beneficiaries, and project-affected people. A participatory and consultative methodology was adopted for the social and poverty analysis during project preparation.

#### During Project Implementation

- The C&P plan was prepared and used before and during project implementation, monitoring, and evaluation.

### Business Opportunities

#### Consulting Services

The project will require consulting services for (i) the establishment of a sustainable reservoir rehabilitation and management model; and (ii) project management support. These consulting services will be financed by the ADB loan and the consultants will be recruited by the PPMO according to ADB’s Guidelines on the Use of Consultants. The establishment of a sustainable reservoir rehabilitation and management model will require a total of 19.5 person-months (pm) of international consulting services and 73.0 pm of national consulting services which will be provided by a team of consultants engaged through a firm. The consulting firm will be selected by (i) inviting simplified technical proposals; and (ii) using the quality- and cost-based selection method, with a quality cost weighting ratio of 80:20. The project management support will require a total of 12.0 pm of national consulting services. The consultants will be engaged based on individual selection method, since (i) the number of the national consultants is only three; and (ii) the project management support will be provided independently by the three national consultants and the assignments are straightforward. In addition to these consultants, ADB will recruit other consultants for an associated TA, the LPMOs will engage national consultants for engineering and construction supervision and quality inspection using counterpart funds, and the PPMO will also engage an independent agency acceptable to ADB for external resettlement monitoring and evaluation using counterpart funds.
All procurement of goods and works will be carried out in accordance with ADB’s Procurement Guidelines (2010, as amended from time to time). Contracts for goods estimated to cost $1.0 million and above and contracts for works estimated to cost $10.0 million and above shall be procured using international competitive bidding (ICB) procedures. Contracts for goods estimated to cost less than the above ICB value but equal to $100,000 and above will be procured through national competitive bidding (NCB) procedures. Contracts for works estimated to cost less than the above ICB value but equal to $200,000 and above will also be procured through NCB procedures. NCB will be conducted in accordance with the PRC Tendering and Bidding Law (1999), subject to modifications agreed with ADB. Contracts for goods and works estimated to cost less than the above NCB values will be procured using shopping procedures. The relevant sections of ADB’s Anti-Corruption Policy (1998, as amended from time to time) will be included in all procurement documents and contracts. Before the start of any procurement, ADB and the government will review the public procurement laws of the central and state governments to ensure consistency with ADB’s Procurement Guidelines. An assessment of the procurement capacity of the executing and implementing agencies has confirmed that these agencies, acting through a procurement agency and with the assistance of ADB and the consultants, would capably conduct procurement, including advance contracting, meeting ADB’s requirements. A procurement agency that is familiar with ADB’s procurement procedures was hired by the SPG in March 2010 to procure all works and goods under the project on behalf of the executing and implementing agencies.
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