



China, People's Republic of: Piloting Innovative Flash Flood Early Warning Systems in Selected River Basins

Project Name	Piloting Innovative Flash Flood Early Warning Systems in Selected River Basins	
Project Number	51428-001	
Country / Economy	China, People's Republic of	
Project Status	Closed	
Project Type / Modality of Assistance	Technical Assistance	
Source of Funding / Amount	TA 9566-PRC: Piloting Innovative Flash Flood Early Warning Systems in Selected River Basins	
	Technical Assistance Special Fund	US\$ 400,000.00
Strategic Agendas	Environmentally sustainable growth Inclusive economic growth	
Drivers of Change	Gender Equity and Mainstreaming Governance and capacity development Knowledge solutions	
Sector / Subsector	Agriculture, natural resources and rural development / Rural flood protection - Rural water policy, institutional and capacity development - Water-based natural resources management	
Gender	Some gender elements	
Description	<p>The outcome of the TA is efficient and effective flash flood preparedness and emergency response in the Yangtze River Economic Belt enhanced. The TA will have the following impact: flood risk management capacity in the Yangtze River Economic Belt improved. The TA will have the following outputs: (i) Flash flood early warning in selected river sub-basins upgraded; (ii) Capacity development for flash flood emergency response at local level enhanced; and (iii) Knowledge on flash flood early warning system disseminated.</p>	
Project Rationale and Linkage to Country/Regional Strategy	<p>Floods, together with storms, account for 76% of natural hazards that have occurred globally and caused 87% of economic loss due to such disasters from 2006 to 2015. Water crisis, climate change, and extreme weather events are identified as the top three global threats over the next 10 years. Historically, floods are the costliest natural hazard-induced disaster in the PRC. Annual economic loss due to floods in the PRC is estimated at about \$20 billion, and the loss trend has been escalating by 7% since 1990. From 1980 to 2016, the PRC suffered from flood events that resulted in an annual average of 1,500 deaths and affected about 66 million people. Frequent flood disasters throughout history have setback the socioeconomic development of the PRC and now hinder the achievement of the sustainable development goals. An important lesson learned from recent flood events in 2016 and 2017, particularly along the Yangtze river basin, is that majority of flood damage does not come from the main stem river but from small-to-moderate sized river sub-basins and mostly associated with flash flood events. Rapid urbanization of small villages and towns in these sub-basins has triggered flash floods and landslides; these disaster events are not regarded as among the government's priorities in the past. Throughout the middle and lower Yangtze river basin, flood emergencies rose at more than 3,300 locations during the 2016 floods, resulting to over \$40 billion in economic loss. Of those, over 3,200 flash flood events were reported to occur on small tributaries which are generally provided with lower standards of flood protection or where standards have not kept pace with the rapid rate of development. The excessive damage was attributed to the lack of spatial or temporal coverage of, and the gaps in end-to-end early warning system that involves six interactive elements: (i) risk knowledge; (ii) monitoring and data acquisition; (iii) forecasting and warning; (iv) dissemination and communication; (v) information type and reliability; and (vi) response capacity. In 2006, the State Council of the PRC launched the national flash flood disaster prevention plan with different targets including strengthening the monitoring and early warning system and enhancing the preparedness and emergency response capacity at national and local levels. The government has invested about CNY22.5 billion in national flash flood disaster prevention and mitigation projects during 2006-2015. As a result, the average annual flash flood disaster-related fatalities have remarkably been reduced from 1,100 to 400 persons during 1990-2015. The efforts to further reduce human casualties and economic loss due to flash floods in the PRC should consider a variety of factors including land use changes; flood exposures; climate change; uncertainty of temporal and spatial distribution of flash floods; and accuracy in early warning and localization of early warning system for emergency response with community empowerment. Forecasting and early warning is considered the most effective measure to save lives and reduce the damage from flash floods. While the PRC is pioneering flood preventive measures, the forecasting and early warning system in the PRC in general, is still at its primary stage of development. The challenges in establishing a reliable flash flood early warning system in the PRC are: (i) the national program is being implemented in a coarse spatial scale and has not yet been specialized for a large number of small river sub-basins, and scattered villages or towns in remote geographical settings; (ii) weather forecasts are becoming more detailed and accurate and yet to be employed to increase lead-time in flood early warning; (iii) a large number of small sub-basins are not being monitored by hydrological and meteorological stations, which made it difficult to develop a reliable localized flash flood early warning system; (iv) self-help and mutual-help conditions are yet to be promoted with awareness campaign and capacity building activities at grassroot communities to improve the effectiveness of the early warning system; and (v) institutional capacity in flood forecasting and early warning at local governments is not sufficient. Rapid socioeconomic development on the flash flood prone areas have called for a reliable flash flood forecasting and early warning system with strong engagement of the local communities. In December 2017, the Ministry of Water Resources issued the National Flash Flood Disaster Prevention Project Implementation Plan (2017-2020), which prioritizes flash flood monitoring and warning provisions nationwide, reflecting the lessons learned from the recent disasters. The government has requested ADB for a technical assistance in piloting a standalone flash flood early warning system suitable for small river sub-basins to be a benchmark for future investment under the national plan. The TA aims to pilot a standalone end-to-end flash flood early warning system, which is compatible to small sub-basins. The TA will demonstrate new approach, methodology, and technology to (i) increase warning accuracy and its effectiveness in evacuation and emergency response; (ii) extend the lead time of warning to provide more time to local residents to save valuables and their own lives; (iii) support the local governments and communities through the establishment of decision support system in emergency response; and (iv) improve information dissemination, and promote community-based early warning. The pilots will be implemented in Xinyu City in Jiangxi Province and Luanchuan County in Henan Province, both suffered serious flash floods in the past. More than 100 villages in the mountains of Luanchuan County in Henan Province heavily suffered flash floods in 2016. These villages are in the corridor of Yangtze River. During the past flash flood events in the pilot areas, centralized early warning information could not reach all the communities in a reliable manner; the early warning information given to the public was too coarse as there are no hydro-meteorological observation stations, it was difficult to make evacuation order; the time available to the communities for evacuation was too short, people either did not evacuate or have been mistakenly evacuated; and communities did not know when and how to evacuate, resulting in huge loss and damage. The TA will help upgrade and strengthen the application of flash flood early warning system in the PRC, mainly in many isolated or remote small villages, which have not benefitted from the centralized early warning system.</p>	
Impact	Flood risk management capacity in the Yangtze River Economic Belt improved	
Project Outcome		

Description of Outcome	Efficient and effective flash flood preparedness and emergency response in the YREB enhanced
Progress Toward Outcome	
Implementation Progress	
Description of Project Outputs	Flash flood early warning in selected river sub-basins upgraded Capacity development for flash flood emergency response at local level enhanced Knowledge on flash flood early warning system disseminated
Status of Implementation Progress (Outputs, Activities, and Issues)	The executing agency has completed the procurement and installation of (i) rainfall monitoring and alarming equipment and automatic water level station in Laoguan River Basin, (ii) forecasting and early warning software for Xixia County in Henan Province and Xinyu City in Jiangxi Province, and (iii) wireless early warning broadcast transmitter including wireless early warning terminals. The TA was extended to 31 December 2020 in order to complete the following activities: (i) remaining installation of flash flood disaster forecast and early warning system in Xixia County in Henan Province and Xinyu City in Jiangxi Province and the conduct of related community-based flash flood disaster awareness campaigns; (ii) preparation of the final report; (iii) conduct of national technical training and workshop in flash flood early warning system; and (iv) conduct of the final workshop.
Geographical Location	Nation-wide, Yangtze River

Summary of Environmental and Social Aspects	
Environmental Aspects	
Involuntary Resettlement	
Indigenous Peoples	
Stakeholder Communication, Participation, and Consultation	
During Project Design	
During Project Implementation	

Business Opportunities	
Consulting Services	The TA will require 1.5 person-months of international (flash flood management specialist) and 17.5 person-months of national (flood disaster risk mitigation specialist/team leader, flood forecasting and early warning specialist, and community-based disaster mitigation specialists).

Responsible ADB Officer	Osti, Rabindra P.
Responsible ADB Department	East Asia Department
Responsible ADB Division	Environment, Natural Resources & Agriculture Division, EARD
Executing Agencies	Ministry of Water Resources

Timetable	
Concept Clearance	12 Apr 2018
Fact Finding	-
MRM	-
Approval	20 Aug 2018
Last Review Mission	-
Last PDS Update	28 Sep 2020

TA 9566-PRC

Milestones					
Approval	Signing Date	Effectivity Date	Closing		
			Original	Revised	Actual
20 Aug 2018	12 Sep 2018	12 Sep 2018	29 Feb 2020	31 Dec 2020	15 Mar 2021

Financing Plan/TA Utilization						Cumulative Disbursements		
ADB	Cofinancing	Counterpart				Total	Date	Amount
		Gov	Beneficiaries	Project Sponsor	Others			
400,000.00	0.00	0.00	0.00	0.00	0.00	400,000.00	17 Jun 2022	286,158.60

Project Page	https://www.adb.org/projects/51428-001/main
Request for Information	http://www.adb.org/forms/request-information-form?subject=51428-001
Date Generated	05 October 2023

ADB provides the information contained in this project data sheet (PDS) solely as a resource for its users without any form of assurance. Whilst ADB tries to provide high quality content, the information are provided "as is" without warranty of any kind, either express or implied, including without limitation warranties of merchantability, fitness for a particular purpose, and non-infringement.

ADB specifically does not make any warranties or representations as to the accuracy or completeness of any such information.