PROJECT INFORMATION DOCUMENT (PID)
IDENTIFICATION/CONCEPT STAGE

Report No.: PIDC20466

Project Name	Bhutan Weather and Disaster Improvement Regional Project
Region	SOUTH ASIA
Country	Bhutan
Sector(s)	General public administration sector (50%), General water, sanitation and flood protection sector (50%)
Theme(s)	Regional integration (10%), Natural disaster management (60%), Climate change (30%)
Lending Instrument	Lending Instrument
Project ID	P154477
Borrower Name	Department of Public Accounts
Implementing Agency	Department of Disaster Management, Department of Hydromet Services
Environment Category	B - Partial Assessment
Date PID Prepared	26-Nov-2015
Estimated Date of Approval	15-Mar-2016
Initiation Note Review Decision	The review did authorize the preparation to continue

I. Introduction and Context

Country Context

The South Asia Region (SAR) is highly prone to water related hazards such as floods, drought, tropical cyclones and thunderstorms that frequently cut across national borders. Some parts of the eight countries of this region - Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka - are hit every year by one or more disasters, taking a heavy toll on life and property and causing enormous suffering and distress to thousands of people. In the past 2 decades, over 50% of South Asians, i.e, more than 750 million people have been affected by at least one natural disaster. Between 1970 and 2010, floods and cyclones together constituted almost 79% of all recorded natural disaster events. The trans-boundary monsoon system influences key productive sectors in the entire region and small variations in the timing and quantity of rainfall can have profound consequences on water availability, agricultural productivity and food security. The social and economic costs of such hazards estimated at 2-6% of SAR's GDP, can jeopardize efforts to end extreme poverty and boost shared prosperity and reverse hard-won development gains.

The vulnerability to hydro-meteorological hazards is clearly illustrated in the case of landlocked and mountainous Bhutan, located at the foothills of the Himalayan mountain range. Bhutan is highly exposed to weather and water related hazards such as glacial lake outburst floods (GLOFs), flash floods, riverine floods, landslides, landslide dam outburst floods (LDOFs), cloudbursts, windstorms and river erosion making it one of the most disaster-prone countries in SAR. The 1994 GLOF event was one of the most devastating, causing enormous damage to property and loss of life

in the Punakha-Wangdue valley. In the mid-mountains, landslides triggered by cloudbursts are frequent, and recent occurrences of LDOFs have resulted in major destruction in low-lying areas, including the Thimphu valley. Bhutan is also at risk to tropical cyclones as seen during the 2009 Cyclone Aila which resulted in damages of approximately USD 17 million (approximately 1.7% of Bhutan's GDP in 2009). Flash floods are a recurrent phenomenon, particularly in the eastern and southern regions and in 2013, they resulted in extensive damage to infrastructure (over 14 acres of agricultural land filled with debris, culvert bridge over Jichurongchu washed away and Punakha-Gasa highway blocked, irrigation channels washed away and farm roads damaged) in Gasa Dzongkhag (district) and downstream in Punakha and Wangdue Dzongkhags. Most of the infrastructure (hydropower plants, roads, airports, etc.), fertile agricultural land, and over 70 percent of the settlements are located along the main drainage basins which puts them at high risk due to flooding. Between 1994-2011, approximately 87,369 people were affected and 304 deaths occurred due to natural disasters in Bhutan. With climate change, the frequency and intensity of extreme events are expected to increase.

In the past decade, Bhutan has demonstrated steady and pro-poor economic growth and a strong commitment to peace and democratic governance. It is a (lower) middle income country with a per capita income of US$ 2400 and expected annual increase in GDP of about 8% in the next 5 years. The 2014 Poverty Assessment shows that the % of people living below the national poverty line was effectively reduced by 50 percent, from 23.2% in 2007 to 12% in 2012. Extreme poverty has been almost eradicated, while multi-dimensional poverty indices that include other parameters such as education and health also include a decline from 30 to 10%. For Bhutan to maintain and build on these development gains and economic reforms, strengthening preparedness to weather extremes and natural disasters is critical.

Recognizing the importance of such risks, the Royal Government of Bhutan (RGOB) has been making investments in this area. However, delivery of basic weather forecasting and of weather and water related information services to key economic sectors is extremely limited and needs to be strengthened. Moreover, while national level strengthening of hydro-meteorological services and disaster preparedness at the national level is a necessary first step, it is also critical to strengthen regional collaboration. First, weather patterns such a s tropical cyclones, monsoons and severe thunderstorms impacting Bhutan are trans-boundary and best monitored, understood and predicted by taking a sub-regional and global perspective. Second, there is a demand in Bhutan for regional information on weather (such as tropical cyclone forecasts over the Bay of Bengal or regional drought forecasts) and a demand from regional centers--for example, from the Regional Specialized Meteorology Center (RSMC) located at the Indian Meteorological Department (IMD)--for weather and climate information (such as for atmospheric observations over Bhutan) to enable them to make improved forecasts of regional and sub-regional weather phenomenon (such as severe thunderstorms) that can benefit all affected countries. Regional collaboration can help facilitate this exchange. Third, there are economies of scale in regional collaboration. For instance, at present, Bhutan does not have the capacity to forecast extreme events such as cyclones, thunderstorms and flash floods with sufficient lead time and accuracy, or the capacity for long term climate monitoring and prediction. Regional collaboration can allow the country to build on information products and forecasts already being produced by regional entities rather than investing in developing such capacity from the start.

Sectoral and Institutional Context

South Asia Regional Initiatives

The Hyogo Framework for Action 2005-2015, which has been adopted by most South Asian countries, provides a global blueprint for disaster risk reduction and identifies the need to cooperate regionally and internationally. Lately, there has been an encouraging shift in the willingness of the South Asian countries to take forward the regional cooperation agenda facilitated by regional organizations such as the South Asia Association for Regional Cooperation (SAARC) – a key organization in SAR for facilitating regional cooperation. Acknowledging the fact that many of the hydro-meteorological hazards in SAR are trans-boundary in nature, SAARC has reiterated the need to strengthen and intensify regional cooperation "to address the challenges posed by climate change and natural disasters". During the SAARC Heads of State Summit held in November 2014 in Kathmandu, members agreed to establish a SAARC Environment and Disaster Management Center (SEDMC) to support cross-border information sharing and regional cooperation mechanism to fight climate change and to minimize the risks of natural disasters. Despite these initiatives, countries in South Asia still struggle to find suitable arrangements for regional cooperation.

Bhutan Country Context

In Bhutan, the Department of Hydromet Services (DHMS) under the Ministry of Economic Affairs (MoEA) is the agency mandated to provide reliable and timely weather, water and climate information services to user agencies and the public. However, at present, DHMS only provides 24-hour subjective weather forecasts and has limited capability to provide accurate forecasts with longer lead times. It issues flood warnings but does not have the capacity to issue flood forecasts. With support from development partners, particularly UNDP, DHMS is in the process of upgrading its ground monitoring network whereby about a tenth of the monitoring stations needed in the country will be put in place. In selected river basins, namely the Mangde chhu and Chamkhar chhu river basins, it is working with JICA to improve flood and GLOF related early warning systems and community based disaster risk management (DRM). However, there still remain major gaps in the existing infrastructure, monitoring and forecasting capacity of DHMS such as limited access to high speed Internet, lack of upper air observations, limited capacity for weather and hydrological forecasting and delivery of sector specific services. In some sectors such as aviation, targeted improvements in monitoring systems can contribute significantly to aviation safety. For instance, observing systems at the Paro International Airport lack cloud height and visibility sensors and are not equipped to provide pilots with information about wind speed and direction, limiting their capacity to fly safely. The weather dependent and economically significant agriculture sector is the source of livelihood for over half the population in Bhutan. DHMS however, does not yet have the capacity to provide tailored weather or climate related services to the agriculture sector. The Department of Disaster Management is also a major user of DHMS's services. However it receives little advance information about extreme weather events such as cyclones or floods that it can use to issue early warnings or alerts to users and communities. Technical capacity of DHMS staff in managing a modern weather and flood forecasting service is also very limited and needs to be strengthened. Bhutan has a long standing collaboration with India through which it shares water level data on key trans-boundary rivers with India. By strengthening its own national capacity, Bhutan can also benefit from data and information available regionally and in the public domain.

One of the main beneficiaries of DHMS's services is the Department of Disaster Management (DDM) under the Ministry of Home & Cultural Affairs (MoHCA). It is the national coordinating agency for disaster management and serves as the Secretariat and executive arm of the National Disaster Management Authority (NDMA)--the highest decision making body for DRM related

activities in Bhutan. DDM's activities are guided by the Disaster Management Act of Bhutan 2013 (DM Act), Disaster Management Rules and Regulations 2014, Disaster Management & Contingency Planning Guidelines, and the School Disaster Management Planning Guidelines. In addition, DDM has successfully drafted the Disaster Management Strategic Policy Framework which awaits adoption in 2015. Despite a strong policy framework, DDM faces challenges in implementing its priorities. It is mandated to develop, maintain and update Disaster Management Information System (DMIS) in coordination with relevant agencies as per section 60 (g) of the DM Act 2013. However, at present, a multi hazard risk information system, including information about past disasters, multi-hazard zonation and vulnerability maps/information etc. to support planning for disaster preparedness and also broader development activities is not in place. Further, despite the incidence of disasters, there is no national Emergency Operation Center at the national and sub-national levels in Bhutan. Moreover, DDM also needs to strengthen its capacity in disaster preparedness and response related activities.

Strengthening the capacity of DHMS and DDM will have benefits both at national and regional levels. National benefits include improved weather and climate services and disaster early warning systems. Improved hydromet services can benefit in a wide range of sectors such as infrastructure, civil aviation, disaster risk management, agriculture and water resources management. Improved monitoring, collection and digitization of weather and climate data shared through WMO Global Telecommunications System (GTS) will also enable improved forecasting and prediction of regional and trans-boundary phenomenon (such as cyclones, drought, thunderstorms, floods etc) which at present is not fully possible. Having a DMIS in place will help improve preparedness and response.

World Bank Regional Program to Strengthen Disaster Risk Management

The World Bank Group’s strategy for supporting South Asian countries to build resilience to risks from weather and water related disasters is embedded in the conceptual shift from management of water related disasters to management of risks. The Bank’s Regional Program for strengthening resilience builds on weather, climate and disaster improvement projects carried out at national levels and follows a dual approach: (i) strengthening regional collaboration with respect to DRM and climate resilience; and (ii) enhance national capacity for the same. A cross-border information sharing and regional cooperation mechanism can only function if the inputs from national systems are robust. The following projects – most within national borders but with vital relevance for regional cooperation– are now at varying stages of development and implementation:

Active Projects

The South Asia Regional Hydromet Program (Programmatic Approach: P146222) is a Bank executed program that seeks to strengthen the capacity of participating countries for improved understanding of hydromet hazards and risks through a program of technical assistance and regional dialogue. Under this PA, sub-activity (P148430) has supported preparation, publication and dissemination of technical assistance " Modernizing Weather, Water and Climate Services: A Road Map for Bhutan" and provided the analytic basis for this proposed activity.

The Nepal Building Resilience to Climate Related Hazards (BRCH) project (P127508) under implementation, is supporting multi-hazard information and early warning systems, upgrading the existing hydro-meteorological system and agricultural management information system, and enhancing capacity.

Pipeline Projects

The proposedBhutan Weather and Disaster Improvement Regional Project (P154477) is considered as part of a "Series of Projects" in South Asia. The approach is to start from the bottom up and strengthen national capacity for weather and disaster risk management which are required for sub-regional and regional level collaboration. Countries in the region like Bhutan, Nepal and Bangladesh, have inadequate monitoring, forecasting systems which makes them unable to fully meet their national mandates for delivering weather and disaster early warning services. Such national level, bottom up capacity strengthening will support national development goals, and also help implement key Regional Agreements relating to environment, disaster and climate resilience reflected in the 18th SAARC Summit Kathmandu Declaration.

The Nepal Building Resilience to Climate Related Hazards project (P127508), which supports similar objectives and investment activities, is the first project in the series. The IDA funded Bangladesh Weather and Climate Services Regional Project (P150220) under preparation (Appraisal scheduled for December 2015) is considered the second. The Bhutan Weather and Disaster Improvement Regional Project (P154477), requested by the RGoB will be the third in line. Since all these projects have similar objectives and contribute to national and regional capacity development for disaster and climate resilience, it makes sense to have a common framework and sequence them as part of a Series. Each project will have a 3-6 year time frame (depending on complexity and size) for implementation. Overall regional program is expected to take place over 5-8 years. During the course of the implementation of these series of projects, collaboration with the IMD, which is the World Meteorological Organization (WMO) designated Regional Specialized Meteorological Center (RSMC) for SAR, is expected to be strengthened. At present, the main focus of consultations is at a sub-regional level. Sub-regional consultations hosted by the World Bank are planned for FY 2016. Other countries such as Afghanistan have also expressed interest in linking up with the regional hydromet and resilience program.

Relationship to CAS/CPS/CPF

The project is fully aligned with key priorities outlined in the RGoB’s national development plans. Strengthening resilience to hydro-meteorological hazards, climate change and variability, and improving disaster resilience and management have been identified as national key result areas for the RGOB’s 11th Five Year Plan (2013–18). Furthermore, the World Bank’s Country Partnership Strategy (CPS) for Bhutan for FY 2015-2019 also acknowledges that strengthened resilience to climate change and disaster risk is central to supporting green development which is a key result area for World Bank engagement with the RGoB. The proposed project is fully consistent with the World Bank’s South Asia Regional Strategy which highlights disaster and climate resilience as a key priority area. The proposed project also conforms to the World Bank’s twin goals of reducing poverty and enhancing shared prosperity.

II. Project Development Objective(s)

Proposed Development Objective(s)

The main objective of the proposed activity is to strengthen the Royal Government of Bhutan's capacity for improved weather and hydrological forecasting and disaster related early warning systems.

Key Results

The following results, with their indicators are expected from the project:

i. Improved capacity for hydromet monitoring for primary sectors such as the aviation sector (percentage of capacity/infrastructure in place)
ii. Established and functioning DMIS for improved disaster preparedness (User satisfaction with DMIS)
iii. Staff trained in weather monitoring and forecasting, disaster preparedness and response (number of staff)

III. Preliminary Description

Concept Description

The project has 2 Components:

Component A: Strengthening Weather and hydrological forecasting and Services (USD 1.30 million)
The main objective of this component is to strengthen the capacity of DHMS to provide more accurate and timely weather services. It will be implemented by the DHMS and will have 3 sub-components as follows:

Sub-component A1: Strengthening meteorological and hydrological forecasting (USD 0.90 million)
This component will finance procurement of priority monitoring systems (such as low level wind shear alert systems and ceilometers, glacier monitoring), weather and flood forecasting through acquisition of hardware (e.g. workstations), infrastructure, software, and upgrading the ICT network. It will also support development of a Common Alert Protocol for weather and water related disasters.

Sub-component A2: Demand Assessment and Dzongkhag level Service Delivery (USD 0.2 million)
This component will finance design and implementation of a user needs survey for weather, water and climate services at the national level. It will also fund design of an agromet decision support system, generate agromet information products and dissemination to two Dzongkhags.
A brief case study will be produced from this pilot activity.

Sub-component A3: Institutional Capacity Strengthening, Project Management, Regional Collaboration and Monitoring and Evaluation (M&E) (USD 0.2 million)
This component will support institutional capacity building of DHMS in areas such as emergency management, hydrological and flood forecasting, use and calibration of hydrological models, winter weather and related topics. It will also support regional collaboration to facilitate in avaiiling trainings and exchange of data for improved forecasting. Funds will also be used to support project management including M&E activities to track implementation progress.

Component B: Strengthening Disaster Preparedness (USD 1.00 million)
The objective of this component is to strengthen disaster preparedness and response through improved disaster management information system. It will be implemented by DDM. It will have three sub-components as follows:

Sub-component B1: Developing a Disaster Management Information System (USD 0.4 million)
This component will finance activities to put together a robust disaster risk management information

system which will house all relevant data from across sectors in the country. Funds will be used to procure hardware, software and consultancy services to develop and use targeted hazard and risk information. Hands on trainings for relevant staff will also be provided for sustaining the system.

Sub-component B2: Community based disaster risk management (CBDRM) and response capacity (USD 0.3 million)
This component will support formulation of contingency plans and disaster management plans in selected thromdes (municipalities) and dzongkhags and conduct mock drills to strengthen CBDRM. This component will also support establishment of urban search and rescue (SAR) teams in four thromdes and strengthen the capacity of SAR teams at the national and local levels. Funds will be used to carry out workshops and discussions, procure SAR equipment and conduct SAR trainings.

Sub-component B3: Institutional Capacity Strengthening, Regional Collaboration, Project Management and M&E (USD 0.3 million)
This component will support the institutionalization of committees and task forces for disaster management in the country at the national and local levels as per the DM Act 2013. Funds will also support training and capacity building of officials from both national and local levels related to topics such as Disaster Preparedness and Response Planning, Disaster Information Management Systems and Information Dissemination, Mainstreaming Disaster Risk Management in Development Processes, EOC Management Training, Disaster Risk Management Planning and implementation, CBDRM, etc. Detailed design and costs of EOCs at the national and local levels will also be supported through this sub-component. The design will provide technical details of the infrastructure, ICT and equipment. Proper details will also be provided to link the disaster management information system developed through sub-component B1 to the EOCs. Project management including M&E activities for the project will be supported under this component.

IV. Safeguard Policies that Might Apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
Environmental Assessment OP/BP 4.01	×		
Natural Habitats OP/BP 4.04		×	
Forests OP/BP 4.36		×	
Pest Management OP 4.09		×	
Physical Cultural Resources OP/BP 4.11		×	
Indigenous Peoples OP/BP 4.10		×	
Involuntary Resettlement OP/BP 4.12			×
Safety of Dams OP/BP 4.37		×	
Projects on International Waterways OP/BP 7.50		×	
Projects in Disputed Areas OP/BP 7.60		×	

V. Financing *(in USD Million)*

Total Project Cost:	2.3	Total Bank Financing:	0
Financing Gap:	0		

Financing Source	Amount
Global Facility for Disaster Reduction and Recovery	1.8

South Asia Water Initiative (SAWI)	0.5

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