

CREWS Pipeline Countries 2019 – 2020

Proposed Amendment to the CREWS Investment Plan 2016 - 2020

1. At the 5th Meeting of the CREWS Steering Committee, the CREWS Secretariat was requested to “consult with the Implementing Partners to propose a revised list of the CREWS Pipeline Countries for the 6th Meeting of the CREWS Steering Committee, based on an updated mapping of the level of demand, risk and leveraging potential”.
2. The modalities for programming and the criteria for developing country pipelines are contained in the *CREWS Operational Procedures Note N°1* adopted by the Steering Committee on 9 November 2016; and the *CREWS Investment Plan 2016 – 2020* adopted by the Steering Committee on 12 September 2016 and revised on 6 September 2017.
3. The Secretariat updated the map on the status of early warning systems in Least Developed Countries (LDCs) and Small Island Developing States (SIDS). The table with the updated information is available at (<https://www.crews-initiative.org/en/impacts>). It includes the capacity status of NMHSs, the level of risk and demand as reflected in National Determined Contributions (NDCs) and other national development framework and/or by direct country requests for support.
4. In consultation with the Implementing Partners and based on a review of ongoing projects, potential for leveraging and influencing other related investments; as well as contacts with World Bank country teams, a proposed draft of pipeline countries is provided for consultation and approval to the 6th Meeting of the CREWS Steering Committee.
5. Pipeline 1 list (see Annex 1) is the list of countries where projects would be initiated and presented to the CREWS Steering Committee for approval as funds become available over the period 2019 – 2020. It is based on a projection of incoming funds to the CREWS Trust Fund over the same period, carried out by the CREWS Secretariat.
6. Pipeline 2 list (see Annex 2) are countries that meet all the criteria for CREWS investments and that will be prioritize upon the availability of additional funds through the participation of potential additional contributing partners in the Steering Committee.
7. Annex 3 provides Briefs for the proposed pipeline 1 countries to assist the Steering Committee in its deliberations.
8. The Steering Committee is invited, at the 6th Meeting, under agenda item 5, to review and approve the list of Pipeline 1 and Pipeline 2 countries that will be reflected as an amendment to the CREWS Investment Plan 2016 – 2020.

ANNEX ONE – Pipeline 1 countries

Country/Region (in alphabetic order)	Indicative portfolio in US\$ million	Proposed Partnership
Afghanistan	3.0	(WB/GFDRR, WMO)
Benin	3.0	(WB/GFDRR; WMO)
Bhutan	3.5	(WB/GFDRR; WMO)
Chad	3.0	(WB/GFDRR; WMO)
Curaçao incl. St Maarten and Aruba	1.65	(WMO;WB/GFDRR)
Ethiopia	3.0	(WB/GFDRR; WMO)
Indian Ocean region	2.5	(WMO; WB/GFDRR; UNISDR)
Madagascar	3.0	WB/GFDRR; WMO)
Togo	2.25	(WB/GFDRR; WMO)

ANNEX TWO - Pipeline 2 Countries

Africa

Cabo Verde
Comoros
Djibouti
Guinea Bissau
Malawi
Mauritius
Mozambique
Rwanda
Seychelles
Tanzania
Zambia

Asia

Lao
Maldives
Myanmar
Nepal

Caribbean

Haiti
Suriname(South America)
Regional (Phase 2)

Pacific

Regional (Phase 2)

ANNEX 3 - Pipeline 1 Countries' Briefs

Country/Region	Afghanistan							
LDC or SIDS Profile	Level of Disaster Risk	High ¹	Average annual loss to disasters	Average annual damages by flooding is 54 M USD. An extreme drought could cause up to 3 B USD agricultural losses. 5 million people are exposed to either landslide or avalanche hazard ¹	Access to information & communications (ICT index)	Ranked 159 th in the ITU's ICT Development Index 2017 ²	Capacity of NMHS	Low ³
	Status of hydromet and EWS	None to Basic ³	Disaster loss and risk data to inform early warning	Limited ⁴	Demand/Priority	High ³	Leveraging potential	Medium
Context	<p>Hydro-meteorological ("hydromet") disasters are a significant threat in Afghanistan. Droughts affect a large portion of the population (6,510,000 out of 9,275,327 people affected) whereas floods cause the most economic damage (US\$396 million out of US\$597 million lost)⁵. The climate change will increase the incidence of extreme weather events, including heat waves, floods, and droughts as well as climate-induced disasters such as Glacial Lake Outburst Floods, avalanches and rainfall-induced landslides. Establishing accurate and timely climate and hydromet early warning information services is urgently needed in Afghanistan to minimize human and economic losses to such disasters. However, decades of conflict have undermined Afghanistan's coping mechanisms and protective capacity. In spite of recurring hazard events, the country lacks adequate mechanisms for early warning, response, recovery and building resilience, putting lives and livelihoods at risk. Furthermore, managing crisis situations is particularly challenging in Afghanistan given ongoing</p>							

¹ GFDRR and World Bank (2017), Disaster Risk Profile, Afghanistan.

² <http://www.itu.int/net4/ITU-D/idi/2017/>

³ Water for Life, GFDRR and World Bank (2017), Technical Assessment Report, Roadmap for designing an effective EWS and strengthening hydromet services in Afghanistan.

⁴ Deltares, GFDRR and World Bank et al. (2016), Afghanistan – Multi-hazard risk assessment, cost-benefit analysis, and resilient design recommendations; final report.

⁵ Based on Emergency Events Database (EM-DAT), compiled <http://www.itu.int/net4/ITU-D/idi/2017/> by the Centre for Research on the Epidemiology of Disasters (CRED)

	<p>instability and insecurity, as well as limited access to remote settlements and poor transport connectivity. While the country had relatively capable hydromet institutions in the 70's and early 80's, years of conflict, including the Taliban period, has substantially degraded its capacity. Afghanistan is slowly moving again on the hard road of rebuilding its hydromet and EW institutions through assistance from WMO/USAID, the World Bank, and other development partners such as JICA. These assistances have successfully built some of the key basic building blocks for climate early warning systems within Afghanistan Meteorological Department (AMD) under the Afghanistan Civil Aviation Authority (ACAA) and the Ministry of Water and Energy (MEW)'s Water Resources Directorate (WRD), which are Afghanistan's National Meteorological and Hydrological Services. However, a large gap exists in AMD and MEW/WRD's capacity to develop and deliver services, and coordination between hydromet agencies and key stakeholders including the DRM agency and other weather dependent user sectors such as agriculture, transport, energy and rural development. The World Bank technical assistance (TA) will be shortly finalizing the roadmap for strengthening climate, hydromet and early warning services in Afghanistan, in close collaboration with AMD, MEW/WRD and other key government stakeholders as well the World Meteorological Organization (WMO). The roadmap has identified low-cost, high-priority activities to address the gap and to achieve critical minimal capabilities to provide weather, climate and hydrological services and early warning services in Afghanistan. In addition, there is a strong demand expressed by the Government of Afghanistan for a flood early warning system along the Panj River, a transboundary river flows in Afghanistan and Tajikistan.</p> <p>The CREWS funding would help leverage additional funds for modernization, by potentially mobilizing resources from IDA , GCF and/or ARTF (Afghan Reconstruction TF). The project will also seek synergies with various investments in Tajikistan on the transboundary issues on the Panj River.</p>
Priority Needs	<p>High priority needs include improving basic public services and early warning services based on strengthening MEW and AMD's capacity in the use and interpretation of available and accessible tools and technologies, introducing basic affordable new technologies, strengthening coordination with the Afghanistan National Disaster Management Authority (ANDMA) and other key user sector stakeholders as well as Tajik hydromet services for transboundary issues, and enhancing the provision of weather information services to communities using community based organization as dissemination mechanisms of high climate and disaster risks in a gender inclusive manner. These will be supported by training; developing a Concept of Operations (CONOPS) for modernization of hydromet and EW systems; developing and implementing a service delivery strategy; accessing and full usage of NWP data and products from other centers (regional and global); enhanced use of remote sensing products for hydromet and climate services; initiating basic long-range forecasting and hydrological forecasting; revising seasonal river forecast methods; establishing a technical working group to improve coordination among service providers and users for responsive product development and service delivery, as well as to strengthen regional collaboration in Asia, including participation in regional and knowledge transfer activities. .</p>
Overall Budget	3.0 M USD
Timeframe	2019 – 2022
Partners	World Bank (lead), WMO

Country/Region	Benin							
LDC or SIDS Profile	Level of Disaster Risk	Medium ⁶	Average annual loss to disasters	Data not fully available.	Access to information & communications (ICT index)	Ranked 161 th in the ITU's ICT Development Index 2017 ⁷	Capacity of NMHS	Moderate
	Status of hydromet and EWS	Moderate	Disaster loss and risk data to inform early warning	Data not fully available.	Demand/Priority	High	Leveraging potential	High Potential IDA operation is planned
Context	<p>Floods and droughts are the most important and recurring adverse natural events in Benin. Benin would be significantly affected by climate change: medium-term climate projections indicate the rise of climate-related risks due to increasing temperatures, insufficient levels of rain, increased evapotranspiration and increased rainfall variability. Droughts are likely to become more frequent and intensive and could affect the ability of already stressed land and water resources to provide a secure stream of ecosystem services necessary for poverty alleviation. In Benin, half the country's population (over 3 million inhabitants) lives on the coastal areas and most of them in the city of Cotonou, in the Gulf of Guinea. The coastal region is vulnerable to sea-level rise, which could potentially have catastrophic impacts on the economy, the population and natural systems. Coastal erosion and the sea level rise exacerbated by human activity have medium- and long-term consequences that are already threatening vulnerable communities and disrupting the least-protected and sensitive ecosystems.⁸ These could include changes in the length and duration of the growing season, and changes in crop quality and yields having negative effects in agricultural production (around 25% of GDP).</p> <p>In 2010, Benin faced one of the most destructive floods in its history. Over 680,000 people were affected and 46 people lost their lives. Areas that were not considered flood prone were devastated with entire villages being wiped out and damages totaled up to US\$260 million (around 4% of GDP). The World Bank provided financial support from the Global Facility for Disaster Reduction and Recovery (GFDRR) to carry out the Post Disaster Needs Assessment (PDNA). Following the floods, the Government of Benin decided to undertake a comprehensive assessment to identify the structural causes of the disaster, and to develop medium and long-term strategy to reduce the flood risk in the country. A key finding of the assessment was that the existing disaster response communication system was insufficient to reach the large portion of the population. The GoB undertook a detailed assessment of the alerts communications chain and protocols, identifying roles and responsibilities, as well as defining how early warning messages should be more effectively shared.⁹ Based on this assessment and with the support of United Nations Development Program (UNDP) and the Global Environmental Fund (GEF) for a total of USD\$18 million, the first Early Warning System in the country was officially</p>							

⁶ INFORM, index for risk management (2018), Benin ranks 74th

⁷ <http://www.itu.int/net4/ITU-D/idi/2017/>

⁸ Climate Change Adaptation, UNDP

⁹ ReliefWeb, Establishing Emergency Flood Warnings in Benin, (2016)

	<p>launched on January 15th, 2013. Twenty meteorological stations and three oceanographic stations were installed and implemented; a standard communication operating procedure was completed; trainings were provided to main stakeholders working at the national and departmental levels; five visualization platforms were installed among other achievements. The country issued early warnings for flood events through a multi-agency committee in 2014 and 2015. The country has adopted a Standard Operating Procedure for the diffusion of alerts through the National Disaster Management Agency.¹⁰ The lessons learned of these projects could serve as a starting point to continue the strengthening of the EWS in Benin. Benin has started to build the technical and institutional frameworks to reduce the impact of climate-related events in the country. A potential IDA-funded project will support the country in consolidating these efforts and increasing the capacity of the country to produce, manage and build reliable hydro-meteorological services. CREWS would allow the Bank to provide continuous technical assistance and advice for the implementation of the potential IDA-funded project for advancing the modernization of hydromet and climate services and early warning systems.</p>
Priority Needs	<p>Benin's priority needs are focused on strengthening and modernizing its hydro-meteorological and climate services system in terms of basic infrastructure and network for monitoring and forecast and improve climate services with reliable information. For this, the country needs to enhance technical capacity to manage, operate and maintain the Hydromet network and expand their early alert system. The country has had little success to date in successfully packaging relevant information to end-users including the private sector. The country has also gaps in their legal framework to expand the coverage of its early warning system.</p> <p>To help the country modernize its Hydromet and climate service system and continue building resilience to disaster and climate-related risks, the following needs have been identified:</p> <ul style="list-style-type: none"> - Enhancing provision of reliable and accessible weather and climate services based on better Hydromet data, knowledge and tools; - Expanding hydro-meteorological services, both for early warning systems tied to food security, but also to complement agricultural extensions and production services; - Tailoring Hydromet information packages to decision makers across a wider series of sectors, such as health, energy and water resources management; - Increasing productivity and improved drought resilience of the agricultural sector through the provision of better agro-meteorological information and services; - Strengthening institutional arrangements and standard operating procedures for the expansion of EWS of weather and climate-related hazards; - Establish a legal framework to improve coverage of EWS including the private sector telecommunications providers and broadcasters; and, - Support of gender mainstreaming in IDA-funded Hydromet project particularly through the dissemination of the Hydromet information in gender sensitive, informed and open way and the inclusion of women in all aspects of activity implementation and dissemination of EWS information (SCD refers to this as gender-responsive disaster preparedness efforts)
Overall Budget	US\$3.0m
Timeframe	2019-2022
Partners	World Bank (lead), WMO

Country/Region	Bhutan							
LDC or SIDS Profile	Level of Disaster Risk	High ¹⁶	Average annual loss to disasters	Limited information on disaster losses. Estimate of losses due to natural disasters – \$12m (8 yr mov. Avg. 2005-13). Extreme events such as cyclone Aila or GLOF have significant damages on economy.	Access to information & communications (ICT index)	Ranked 121 th in the ITU's ICT Development Index 2017 ¹⁷	Capacity of NMHS	Low
	Status of hydromet and EWS	Very basic ¹⁸	Disaster loss and risk data to inform early warning	Highly Limited ³	Demand/Priority	High ³	Leveraging potential	Medium-High ¹⁹
Context	<p>Bhutan is a small landlocked country nestled in the eastern Himalayas between China and India with the population slightly over 808,000 in 2017. Bhutan is highly vulnerable due to its fragile geological conditions, vulnerable ecosystems, and climatic conditions. Hydro-meteorological disasters are frequent and include riverine and flash flooding, landslides, Glacier Lake Outburst Floods (GLOF), cloudbursts, windstorms, and river erosion. The country ranks fourth highest in the Asia-Pacific region in terms of relative exposure to flood risk as a percentage of population, with 1.7% of its total population exposed to such risks (UNESCAP and UNISDR 2010). It has been afflicted by several significant disasters such as the 1994 Glacier Lake Outburst Flood, windstorms in 2011 and 2013, and the 2009 cyclone Aila. The combination of the 2009 earthquake and cyclone Alia cost 5.7% of its GDP. This is in addition to the chronic losses faced from landslides and flooding every monsoon. Between 1994 and 2011, some 87,000 people were affected and over 380 deaths occurred due to natural disasters in Bhutan (floods, windstorms, earthquakes, and GLOFs).</p>							

¹⁶ GFDRR and World Bank (2017), Disaster Risk Profile, Bhutan

¹⁷ <http://www.itu.int/net4/ITU-D/idi/2017/>

¹⁸ Modernizing Weather, Water, and Climate Services : A Road Map for Bhutan - <https://openknowledge.worldbank.org/handle/10986/22480>

¹⁹ https://www.climateinvestmentfunds.org/sites/default/files/meeting-documents/ppcr_21_4_strategic_program_for_climate_resilience_for_bhutan_final.pdf

	<p>With climate change, the frequency and intensity of extreme weather-related events are expected to increase; it is observed that cyclone-induced heavy rains and flash-floods, windstorms and hailstorms are becoming much more frequent. These negatively impact food security/food self-sufficiency, damaging scarce 2.75% of cultivable farm land, and threaten downstream critical infrastructure, human settlements, while destabilizing bio-diverse ecosystems. Damaged farm roads and national highways repeatedly cut-off vital transport routes between the highlands, inner central valleys, and southern townships adversely impacting food supplies, access to vital health and energy services and economic development. The Royal Government of Bhutan (RGOB) is a global standout in this dialogue; acting as a net sink for Greenhouse gases (GHGs) and ad a Nationally Determined Contribution (NDC) that is tagged as being one of the most ambitious. Bhutan is embarking on its 12th Five Year Plan with a strong focus on climate resilience.</p> <p>A Roadmap for Modernizing Weather Water and Climate Services in Bhutan was developed in 2015 with close collaboration between the World Bank and RGOB. In 2016, the Bhutan Hydromet Services and Disaster Resilience Regional Project (HDSRRP) was approved by the World Bank, providing grant funding (from SAWI and GFDRR). One of the three implementing agencies receiving support from this project in the amount of US\$1.6 million is the National Center for Hydrology and Meteorology (NCHM) (formerly the Department of Hydromet Services, DHS). The objective of the project is to strengthen Bhutan’s capacity for hydromet services and disaster preparedness, with outcomes related to strengthening the provision of hydromet services, both public weather services and early warning as well as sector related services, such as to civil aviation and agriculture. As NCHM is transitioning into an autonomous center, it is developing a strategic plan for hydromet modernization. CREWS support will build on this initial phase and also contribute to the implementation of RGOB’s strategic plan while operationalizing the investments made (through the HDSRRP) to establish a National Emergency Operational Centre.</p>
Priority Needs	<p>RGOB is in the initial phase of modernizing its hydromet observation systems based on the Roadmap developed (noted above) and while there have been some prior investments with support from development partners in GLOF Risk assessments and Early Warning, there is insufficient support to flood EWS. Priorities include establishing end-to-end EWS in key flood affected dzongkhags in an inclusive and gender sensitive way. This includes improvements of basic weather forecasting and hydrological and flood forecasting, enhanced quality, availability, and transfer of real time climate data in all Dzongkhags, strengthening of hazard and risk assessments, and improving collaboration between the National Center for Hydrology and Meteorology (NCHM), Department of Disaster Management (DDM), Department of Geology and Mines (DGM) and the Flood Engineering and Management division (FEMD) to develop and update vulnerability mapping, improve communication of warnings to communities, and strengthen communities’ capacity to respond to warnings in a gender inclusive manner. In addition, a key issue that is affecting NCHM’s ability to deliver EW and climate services has been its reliance on grant funding from many different sources that has resulted in multiple systems and models with little interoperability and its low capacity in managing its systems. Through CREWS support, end-to-end EWS would be piloted in selected hotspot areas that could be scaled up with leveraged funding from other sources (WB, JICA, GCF etc.). Support would be provided to strengthen capacity of the key stakeholder agencies (NCHM, DDM and FEMD), enhance interoperability of its monitoring systems, improve forecasting capacity and flood risk knowledge, and ensure dissemination and communication to affected Dzonkhags and Geogs, through the NEOC, DEOCs and other channels.</p>
Overall Budget	3.5 M USD

Timeframe	2019 – 2022
Partners	World Bank (lead), WMO

Country/Region	Chad							
LDC or SIDS Profile	Level of Disaster Risk	Very High ²⁰	Average annual loss to disasters	Data not fully available	Access to information & communications (ICT index)	Ranked 174 th in the ITU's ICT Development Index 2017 ²¹	Capacity of NMHS	Low
	Status of Hydromet and EWS	Poor	Disaster loss and risk data to inform early warning	Data not fully available.	Demand/Priority	High	Leveraging potential	High
Context	<p>Chad is a vast landlocked country in Central Africa, ranked 186 out of 188 on the 2016 Human Development Index. The country is faced with growing challenges to its development. One of the major sectors of the economy is agriculture, which employs more than 80% of the workforce and accounts for 52% of the GDP. However, agriculture in Chad remains traditional, constrained by natural climatic conditions - rainfalls and land degradation. Over the recent years, rainfalls have decreased while temperatures have been rising. Lake Chad has been decreasing rapidly from 25,000 sq. km in 1963 to less than 2,500 in 2007. Weak capacity to forecast rains, droughts, and temperatures is a major limiting factor to agricultural productivity in the country.</p> <p>The National Development Plan (PND 2013-2015), highlights the challenges and issues related to climate change adaptation and build resilience to adverse natural events in the country. The 2016-2020 five-year development plan from Vision 2030 considers adaptation to climate change to be a high priority for the country. In April 2013, through the National Meteorological Structure and in collaboration with WMO, Chad launched the National Framework for Climate Services (NFCS) to promote the development of modern climate services to contribute to decision-making and effective interventions. The NFCS implementation plan was developed to consolidate and promote the production, provision, access and effective application of relevant and easily understandable meteorological and climatological information services for optimal use by different users and decision-makers.</p> <p>However, the agencies responsible for managing hydrological and meteorological services face critical weaknesses and limitations: low funding from the government for the maintenance and operation of infrastructures, observing systems, forecasting tools and</p>							

²⁰ INFORM, index for risk management (2018), Chad ranks 3rd

²¹ <http://www.itu.int/net4/ITU-D/idi/2017/>

	<p>service delivery mechanisms, lack of adequate and permanently trained staff, limited cooperation between the organizations involved in alert processes, and limited recognition of the socioeconomic value of these services as well as lack of a well-established early warning systems with effective communication channels.</p> <p>Additionally, there exist important inequalities in Chad between men and women in access to Hydromet services and particularly EWS for hydrometeorological events. Chadian women have a limited participation and involvement in the operation and management of existing EWS and do not intervene in decision making level even if they are the main beneficiaries of these services. Women in Chad are less trained or not educated to understand Hydromet information, and often don't have access to these information and services.</p> <p>Given Chad's recognition of Hydromet services as key public services for sustainable development and disaster and climate-related risk management, CREWS project will allow to mobilize technical support and will leverage a WB IDA-funded operation for approximate US\$24.5m with the objective of supporting the country on advancing the modernization of Hydromet and climate-related services as well as early warning systems to increase resilience to disaster and climate-related risks in the country.</p>
<p>Priority Needs</p>	<p>Priority needs are institutional capacity building, development of the concept of operations and service delivery strategy, identification, development and operationalization of priority services, improvement of the communication link between the providers and the local users, the tailoring of the service to users to enable them to understand and utilize climate and hydrological information products, and the use of Hydromet early warning information for decision making at various levels. Modernizing hydrological and meteorological services with a clear focus on hydrometeorological and climate-related services - such as seasonal rainfall forecasting and early warning systems, with benefits accruing to farmers and the Civil Protection respectively - will help the country on his efforts to build resilience to adverse natural. This will be attained through:</p> <ul style="list-style-type: none"> - Technical support to Government agencies during implementation of WB-funded Hydromet project <ul style="list-style-type: none"> o Support the Government in preparing detailed technical specifications, adequate dimensioning, costing and location of Hydromet infrastructures to be acquired, guidance on the design and integration of ICT processing infrastructure, o Support the development of adequate and tailored services produced by meteorological and hydrological services, o Increase technical capacity of Hydromet agencies for building information packages to deliver targeted services, o Knowledge exchange and collaboration with countries working in this region, - Increase productivity and improve drought resilience of the agricultural sector through the provision of better agro-meteorological information and services, - Improve agrometeorological information about the optimal date for cropping and about the most profitable crops - Integrate climate-related considerations into development planning efforts and reduce the vulnerability of communities over the long term, - Improve flood Early Warning System and improve Food Security Early Warning System (SISAAP) to mitigate physical and human losses, - Tailor Hydromet information to decision makers across a wider series of sectors, such as health, energy and water resources management,
	<ul style="list-style-type: none"> - Strengthen institutional arrangements and standard operating procedures for managing risks from climate-related hazards - Support gender mainstreaming in Hydromet project and in Government monitoring and evaluation systems through the

	<p>integration of the following aspects in the project:</p> <ul style="list-style-type: none"> ○ Dissemination of the Hydromet information in gender sensitive, informed and open way, ○ Inclusion of women in all aspects of activity implementation and dissemination of EWS information, ○ Use of community input and feedback, use of evening radio broadcasts (which based on evidence, is assessible to women), ○ Development of indicators to monitor the content and effectiveness of EWS, the number of people with improved HydroMet services access and in particular, number of females with improved HydroMet access, the percentage of female beneficiaries from the project or proportion of female population satisfied with improved HydroMet services, the number of women involved of Hydromet activities, the numbers/percentages of representation of women, including in leadership roles, on community-based Hydromet boards or Hydromet user associations, numbers/percentages of men and women represented in technical and/or management positions in Hydromet organizations at the policy and/or the operational level, and the percentage of women in Hydromet-related employment, such as in a utility company or a selected ministry.
Overall Budget	\$ 3.0 million
Timeframe	2019-2022
Partners	World Bank (lead), WMO

Country/Region	Curaçao, Sint Maarten and Aruba							
LDC or SIDS Profile	Level of Disaster Risk	St Maarten: high Curaçao and Aruba: medium	Average annual loss to disasters		Access to information & communications (ICT index)	Medium	Capacity of NMHS	Medium
	Status of hydromet and EWS	Medium	Disaster loss and risk data to inform early warning		Demand/Priority	High	Leveraging potential	Medium

<p>Context</p>	<p>This project covers the three islands of Curaçao, Aruba and Sint Maarten, constituent countries within the Kingdom of the Netherlands. Since October 2010, Curaçao and Sint Maarten constitute a single group membership as a WMO member territory.</p> <p>Sint Maarten in the north-eastern Caribbean, is located well within the hurricane belt and tropical cyclones make landfall on average every 4-5 years. In September 2017, Sint Maarten was severely hit by Hurricane Irma, causing extensive damage to communication systems, roads, power grid and housing²². The damage assessment taking place shortly after reported 39% of building completely destroyed or highly damaged. Only 9% of buildings were not affected (Reliefweb).</p> <p>The islands of Aruba and Curaçao in the southern Caribbean are on the southern fringes of the hurricane belt and the occurrence of tropical cyclones is lower. However, In 2004 Aruba experienced severe flash floods caused by a very active spiral band of Hurricane Ivan (300mm in 6 hours). Tropical Storm Omar in 2008 caused coastal flooding and damage to beach facilities on both islands and Tropical Storm Tomás in 2010 caused significant damage and two deaths due to severe flash floods (350 mm in 5 hours) in Curaçao. The proposed project aims at strengthening the warning capabilities of the National Meteorological Services of Curaçao, Sint Maarten and Aruba to deliver tailored services to their communities</p>
<p>Priority Needs</p>	<p>High priority needs to improve EWS in Curaçao, Aruba and Sint Maarten include:</p> <ul style="list-style-type: none"> - Flash flood guidance system - to develop a flash flood model for the islands, including mapping of vulnerable areas - Coastal inundation forecasting - impact based coastal inundation forecasting, identifying vulnerable areas and disseminating timely warnings for inundation events; - Product development - review the current warning bulletins and information material, using the guidelines of the WMO, regarding impact based forecasts and warnings. This should result in the development of an improvement of the warning capabilities of the NMSs. - Product generator - to develop an automated product generator of warning messages for the islands that can be used to take the necessary action, in case of severe weather events. - Automated dissemination generator - develop an automated dissemination generator to disseminate warning messages in a timely manner for the islands that can be used to take the necessary action, in case of severe weather events
<p>Overall Budget</p>	<p>USD 1,650,000</p>
<p>Timeframe</p>	<p>Q3 2017- Q2 2020</p>
<p>Partners</p>	<p>WMO (lead) World Bank Finnish Meteorological Institute (FMI) Royal Netherlands Meteorological Institute (KNMI)</p>

²²https://www.cia.gov/library/publications/the-world-factbook/geos/print_sk.html

Country/Region	Ethiopia							
LDC or SIDS Profile	Level of Disaster Risk	High	Average annual loss to disasters	Data not fully available.	Access to information & communications (ICT index)	Ranked 170 th in the ITU's ICT Development Index 2017 ²³	Capacity of NMHS	Low ²⁴
	Status of hydromet and EWS	Low	Disaster loss and risk data to inform early warning	400+ Disaster Risk Profiles conducted of the total 800+ Woredas/Districts in the country.	Demand/Priority	High	Leveraging potential	High
Context	<p>The climate of Ethiopia is complex and vulnerable to changes in the El Niño Southern Oscillation (ENSO) which can cause erratic or complete failure of seasonal rainfall. Contrary to model projections, observations have shown that droughts and heavy rainfall/flooding have been experienced more frequently during the last 30 to 60 years in East Africa, both of which have led to significant displacement of people. Erratic rainfall, combined with the projected 2°C increase above pre-industrial temperatures by 2050 will lead to further heat waves, droughts and floods which would exacerbate crop failure, land degradation, diseases and poor human health, reinforcing the cycle of poverty in both rural and urban areas.</p> <p>Ethiopia is one of the poorest countries in the world, with 46% of the population being undernourished and the average number of Ethiopians requiring food aid growing by more than half a million per year (Regassa et al. 2010). Ethiopia's economy depends largely on agriculture which employs about 80% of the country's population and contributes 47% of the country's gross national product. Most farming in Ethiopia is done on small-holdings with 87% of rural households working on less than 2 hectares of land (Regassa et al. 2010). This combination of factors means that few Ethiopian households have the opportunity to take risks and are therefore their adaptability is low and their vulnerability to hydro-meteorological hazards associated with climate change is high. In addition, Ethiopia's coffee industry is likely to be negatively affected by rising temperatures which promotes the spread of the coffee-borer beetle unless growing methods are adapted. Increasing temperatures are also likely to develop the spread of Malaria to the Ethiopian highlands, amongst other insect-transmitted diseases. The reduction in productive land is causing a steady migration of rural people into urban environments. The rapid urbanization of Ethiopia places specific pressures on cities' water, food and sanitation which will be exacerbated during periods of further climatic variability.</p> <p>The Government of Ethiopia (GoE) has acknowledged the negative impacts of climate and hydromet induced disasters and developed a range of policies and strategies that outline the need to strengthen climate risk early warning system and build a green climate resilient economy. The Growth and Transformation Plan (GTP), which is the national 5-year plan for economic development,</p>							

²³ <http://www.itu.int/net4/ITU-D/idi/2017/>

²⁴ UK Met Office, GFDRR and the World Bank (2016), Multi-Hazard Early Warning Assessment

	<p>the Climate Resilient Green Economy (CRGE) strategy and the National Disaster Risk Management policy and strategy all emphasize the importance of strengthening the early warning system and the capacity to respond to disasters.</p> <p>In Ethiopia, the National Meteorological Agency (NMA), the Hydrology and Water Quality Directorate (HWQD) of the Ministry of Water, Irrigation and Electricity (MoWIE) and River Basin Authorities (RBAs) are regarded as the providers of public hydromet services. NMA is mandated to provide early warning advice on the adverse effects of extreme weather conditions and is obliged to fulfil international obligations with regards to issues of meteorology. The Agency, since its establishment in 1980s, has developed and operated a national network of meteorological stations designed to represent various climatic regions of Ethiopia and to satisfy the needs of various national development plans and activities. However, NMA still requires a significant support with a focus on systems development, institutional capacity building and service delivery to respond adequately to growing needs for more elaborate and sophisticated information services. MoWIE/HWQD is responsible for collecting, managing and disseminating hydrology data information and services at the national level. In recent years, the legal framework for the establishment of River Basin Authorities (RBAs) has been put in place. Three out of the planned 12 RBAs have been established to date. One of the focuses of MoWIE/HWQD and RBAs is to develop customer orientated services through improved modelling, analysis, presentation, and reporting, to enable stakeholders and customers to derive greater benefit from hydrological, groundwater and water quality data and information. Currently stronger emphasis is put on data collection, on which, MoWIE/HWQD and RBAs wish to build capability to develop and delivery basic services including flood and drought forecasting and hydrological information services for better water resources management. In addition to these hydromet agencies, in Ethiopia, the National Disaster Risk Management Commission (NDRMC) is playing a key role in providing early warning services. NDRMC is currently finalizing the district level disaster profiles, which will go a long way to support the establishment of more localized risk informed early warning services.</p> <p>Given the GoE’s recognition of hydromet services as key public services for sustainable development and climate and disaster risk management, there is a good opportunity that the CREWS project would leverage additional funds from sources such as IDA and GCF for advancing the modernization of hydromet and climate services and early warning systems.</p>
<p>Priority Needs</p>	<p>The GoE has recently developed five years strategic plans for hydromet and climate services with support from WB/GFDRR, which identified the following goals:</p> <p><i>For NMA</i></p> <ul style="list-style-type: none"> • Enhance provision of reliable, co-produced and accessible weather and climate services based on better data, information, knowledge and tools that inform East African, national, regional states, zonal and woreda level policy, planning and decision-making in Ethiopia. • Engage with decision makers and the population, while ensuring a good gender balance, to ensure that they are informed and prepared to manage hydro-meteorological hazards. This will contribute to socio-economic growth and reduce the impact of weather and climate on lives and livelihoods. • Endeavour to fulfil international and regional commitments, and align with global policies to support government of Ethiopia engagement worldwide. • Strengthen research and studies for the improved provision of weather and climate operational services and applications. <p><i>For HWQD/MoWIE</i></p>

	<ul style="list-style-type: none"> • Modernize the existing monitoring, collection and archiving infrastructure, further expand the monitoring network and deliver a full data processing and management service. • Develop customer orientated services through improved modelling, analysis, presentation, and reporting, to enable stakeholders and customers to derive greater benefit from hydrological, groundwater and water quality data and information. • Improve the ability of communities to manage hydro-meteorological hazards, through enhancing capabilities in flood forecasting and early warning, flood control and drought analysis by working and collaborating with partners (RBA's, NMA, NDRMC, etc.) • Strengthen national oversight role through improving the national water quality supervision and control system. • Support capacity building within HWQD and RBAs by enhancing opportunities for the professional development of hydrology in Ethiopia at all levels. <p>While it is expected that fund to be leveraged will be invested towards achieving these goals, key priority actions to make such an integrated modernization more effective, thus considered as priority needs, would include institutional capacity building, development of the concept of operations and service delivery strategy, identification, development and operationalization of priority services, strengthen the communication link between the providers and the local users, enhancement of the capacity of users to understand and utilize climate and hydrological information products in a gender inclusive manner, and the use of hydromet early warning information for decision making at different levels.</p>
Overall Budget	\$ 3.0 million
Timeframe	2019-2022
Partners	World Bank (lead), WMO

Country/Region	Indian Ocean SIDS (Mauritius, Seychelles and Comoros)							
LDC or SIDS Profile	Level of Disaster Risk	High	Average annual loss to disasters (from earthquakes, floods and tropical cyclone – drought is not taken into account)	Seychelles USD 2,8 Mn ¹ Mauritius USD 110 Mn ² Comoros USD 5,7 Mn ³ Madagascar USD 100 Mn ⁴	Access to information & communications (ICT index)	Seychelles: 6.46 Mauritius: 7.04 Comoros: 2.59 Madagascar: 2.29 ⁵ (scale 1-10)	Capacity of NMHS	Seychelles: Mauritius: Comoros: Madagascar: Low
	Status of hydromet and EWS	Low	Disaster loss and risk data to inform early warning	Limited	Demand/Priority	High	Leveraging potential	High
Context	<p>This project will be implemented as a regional project implemented by WMO in partnership with the Indian Ocean Commission (IOC) (French: Commission de l'Océan Indien, COI) and benefiting all LDCs and SIDS within the IOC. The IOC is an intergovernmental organization composed of five African Indian Ocean nations: Comoros, Madagascar, Mauritius, La Réunion (an overseas region of France), and Seychelles. Within the IOC, Mauritius and Seychelles are SIDS, Madagascar is a LDC and Comoros is both SIDS and LDC.</p> <p>Due to their geographic situation and topography, the Indian Ocean LDCs and SIDS are particularly vulnerable to the extreme weather events, including tropical cyclones, climate events such as droughts, and climate variability and change. A large percentage of the population live in coastal areas where tropical cyclones generating wind, flood and storm surges constitute a significant threat. At the same time, the investment in hydrometeorological services and early warning systems remains low.</p> <p>A number of activities are either in pipeline (yet to be funded), ongoing or on hold at the IOC and in the IOC countries:</p> <ul style="list-style-type: none"> - The SADC Severe Weather Forecasting Demonstration Project (SWFDP – ongoing underfunded) operates since 2006 with no external funding in Comoros, Mauritius, Seychelles and Madagascar. The project would benefit from updating technical 							

² <https://www.gfdr.org/sites/default/files/mauritius.pdf>

³ <https://www.gfdr.org/sites/default/files/comoros.pdf>

⁴ <https://www.gfdr.org/sites/default/files/madagascar.pdf>

⁵ <https://knoema.com/MISR2018/measuring-the-information-society-report-2017>

	<p>requirements from NMHSs and civil protection institutions, as well as from enhanced interfaces to enable easier use of SWFDP products as inputs for national extreme weather forecast bulletins;</p> <ul style="list-style-type: none"> - The IOC Hydrological Cycle Observing System (HYCOS – pipeline unfunded) project is still in pipeline. Priority needs for investments and technical assistance for improving water monitoring and data management systems have been agreed upon on May 31st, 2018 by all IOC Member States; - The RA I Tropical Cyclone Committee for the Southwest Indian Ocean developed some specific recommendations to improve the lead time, accuracy and reliability of tropical cyclone forecasting, and to better anticipate storm surge impacts in the region; - The Southwest Indian Ocean Risk Assessment and Financing Initiative (SWIO-RAFI - closed), co-financed by the ACP-EU NDRR Program and the ACP-EU Africa Disaster Risk Financing (ADRF), developed country risk profiles to improve the understanding of disaster risks and risk financing solutions for Comoros, Madagascar, Mauritius and Seychelles; - The ACP-EU Climate Services Grant to the IOC (pipeline with €6 million funding confirmed) will reinforce the capacity of the Regional Climate Centre to deliver climate services to end beneficiaries (private sector, policy makers, farmer associations, universities, etc.) through National Meteorological and Hydrological Services (NMHSs). The field of intervention is exclusively climate services and the results expected are: (i) interaction between the users, researchers and climate services providers through User Interface Platforms; (ii) access to climate services at regional and national level; (iii) capacity to generate and apply climate information and products is enhanced; - The French Development Agency (AFD) is currently preparing a concept note for the Green Climate Fund to provide investment resources for the IOC Member States, and invited WMO to provide guidance in this endeavor; The United Nations Development Program is currently preparing a concept note for the Green Climate Fund to provide investment resources to Madagascar, and invited WMO to provide guidance in this endeavor.
<p>Priority Needs</p>	<p>The priority needs for the Indian Ocean LDCs and SIDS to be covered by CREWS would include:</p> <ul style="list-style-type: none"> - Strengthening the governance of NMHS, ensuring that the necessary strategic and legal frameworks and standard operating procedures are in place both for long term development of NMHS basic capacities and collaboration with EWS stakeholders in line with clear understanding of user requirements (civil protection, food security, water and sanitation authorities, municipalities, etc.) - Training of NMHS staff, including some joint training with civil protection and food security staff; - Support harmonized support to national hydrological services in line with HYCOS; - Enhance the regional cooperation as part of the RA I Tropical Cyclone Committee for the Southwest Indian Ocean, specifically to improve the lead time, accuracy and reliability of tropical cyclone forecasting, and to better anticipate storm surge impacts in the region; - Use SWIO-RAFI country risk profiles to improve impact-based forecasting and anticipate priority needs for emergency response preparedness; - Strengthen the existing Severe Weather Forecasting Demonstration Project (SWFDP) to improve lead-time, accuracy, reliability and dissemination of forecasts and warnings for high-impact events; - Develop specific agro-meteorological early warning services

	<p>building upon the drought monitoring and forecasting capacities developed under the ACP-EU climate services project;</p> <ul style="list-style-type: none"> - Support identification of gender-disaggregated user requirements and development of gender-disaggregated warnings in the IOC region. <p>A CREWS project for the IOC would therefore enable provision of technical assistance from WMO to ensure optimal use of investment resources taking into account comparative advantages of partners and enabling balanced investments and technical assistance to key elements of EWS, in relation with 3 key investments from IOC (ACP-EU), UNDP (GCF) and AFD (GCF).</p>
Overall Budget	USD 2,500,000
Timeframe	2018-2021
Partners	WMO (lead) Indian Ocean Commission

²⁵ https://www.preventionweb.net/files/52196_seychelles.pdf

²⁶ <https://www.gfdr.org/sites/default/files/mauritiu.pdf>

²⁷ https://www.gfdr.org/sites/default/files/publication/drp_comoros.pdf

²⁸ <http://documents.worldbank.org/curated/en/262521494235299571/pdf/114366-FRENCH-WP-PUBLIC-drp-madagascar-fr.pdf>

²⁹ <https://knoema.com/MISR2018/measuring-the-information-society-report-2017>

³⁰ <http://commissionoceanindien.org/a-propos/qui-sommes-nous/>

³¹ <https://www.gfdr.org/sites/default/files/mauritiu.pdf>

Country/Region	Madagascar							
LDC or SIDS Profile	Level of Disaster Risk	High	Average annual loss to disasters	US\$ 100 million	Access to information & communications (ICT index)	Ranked 169 th in the ITU's ICT Development Index 2017	Capacity of NMHS	Low ³³

	Status of hydromet and EWS	Low	Disaster loss and risk data to inform early warning	National-level disaster risk assessment completed and published ³⁴	Demand/Priority	High	Leveraging potential	Medium Leveraging will be sought from regional and national IDA allocations, and the Green Climate Fund.
Context	<p>Madagascar is a mountainous island nation with unparalleled biodiversity and significant natural wealth, which serve as great resources for the country's economy. Agriculture, including fishing and forestry, employs roughly 80% of Madagascar's work force and accounts for more than 25 percent of the country's GDP. Due to its location, topography and socioeconomic conditions, Madagascar is one of the world's most exposed and vulnerable countries to climate change and extreme weather events, with the most likely risks involving cyclones, flooding, and drought. A disaster risk modeling study completed at the end of 2016 shows that Madagascar faces Average Annual Losses (AAL) of US\$100 million (or more than 1% of GDP) for all combined hazards (cyclone, flood and earthquake). From 1990 to 2015, at least 65 major climate-related disasters were recorded in Madagascar, with more than 50 cyclones. The country's resilience is constrained by the pre-existing vulnerability of the population and the weakness of the public infrastructure and services.</p> <p>Effective management of weather-related disasters is limited by weak hydrological and meteorological capacities. Observations in Madagascar started in 1897. The number of operating surface meteorological observing stations, however, is limited to 23. Out of the current twenty-three operating stations, nineteen are operated by the Directorate General of Meteorology (DGM) and four by</p>							

³² <http://documents.worldbank.org/curated/en/262521494235299571/pdf/114366-FRENCH-WP-PUBLIC-drp-madagascar-fr.pdf>

³³ GFDRR, 2017. Madagascar: Assessment On The State Of Hydrometeorological Services And Recommendations For Their Improvement

³⁴ <https://www.gfdr.org/en/publication/disaster-risk-profile-madagascar>

	<p>ASECNA. Most of these stations are manual using old technology, and observed data are stored on paper records. The DGM field meteorologists can produce adequate METAR and SPECI aviation reports, however they need capacity building and appropriate hardware and software to improve their current meteorological aviation reports and to be able to produce other reports such as the TAF and SIGMAT. There are no maritime weather monitoring stations in Madagascar. The existing climatological and rainfall monitoring networks are far from adequate. More than 80% of the climatological stations were abandoned, only twelve stations are currently operational compared to around 140 stations in 1960. Similarly, there were more than 350 operating rainfall stations in 1960, with only 52 currently active as most of the stations were abandoned over the years.</p> <p>In addition, the capacity to manage hydro-meteorological data is weak. There is a lack of centralized information systems for adequate production and distribution of finalized products and services to users. The high percentage of missing data indicates an urgent need to improve data processing, checking and validation operations. The DGM has a large amount of meteorological and hydrological data in hard paper.</p> <p>The current weather forecasting service at the DGM provides only basic qualitative weather forecast such as strong wind, low temperature, high chance of rainfall, low visibility etc. The DGM has no weather forecasting system specifically developed for Madagascar. Capacity development of the weather forecasting and service delivery staff is required to produce reliable weather forecasting and early warning services for disaster reduction and recovery given the high vulnerability of Madagascar to hurricanes and tropical cyclones. In addition, there are only weak synergy between the weather forecasting and hydrological forecasting operations for flood forecasting and early warning services.</p> <p>The Government of Madagascar is aware of the important role of hydrometeorological services in sustainable development, agriculture and disaster risk management. As such, there is a good opportunity that the CREWS project would leverage additional funds from sources such as IDA and GCF for advancing the modernization of hydrometeorological services.</p>
<p>Priority Needs</p>	<p>High priority needs include improvements in basic public services, including the capacity to optimally utilize current equipment and to transition to new technologies and expanded networks. In addition, coordination between agencies and communication with the public need further improvement. To address the limitations of hydrometeorological services in Madagascar, an integrated approach of technical assistance and investments in equipment are needed. With support from GFDRR, an assessment of the hydrometeorological system was conducted in 2016. The assessment has led to the identification of a number of key priorities. On the technical assistance side, priority activities would include:</p> <ul style="list-style-type: none"> ● Align the services of the DGM with the sector users’ needs and build its capacity to make the transition from data providers to data and information services providers. ● Understand and harmonize the Hydrometeorology monitoring networks density to cover ungauged areas and meet the sector

	<p>users' needs.</p> <ul style="list-style-type: none"> ● Harmonize installation, operation, and maintenance procedures. ● Develop capacity of field meteorologists and hydrologists in data collection and maintenance of modern monitoring systems and transmission technologies. ● Improve the weather forecasting hardware and software and support the development of a weather forecasting model tailored to Madagascar's meteorological conditions. ● Strengthen synergy between the weather forecasting and hydrological forecasting operations for improved flood forecasting and early warning services. ● Strengthen the capacity in SIOMA³⁵, integrated aeronautical meteorological observation system. ● Build capacity in accessing, processing, and analysing weather satellite data and information. ● Progressively establish a routine upper air/atmospheric monitoring network under DGM. ● Strengthen capacity to improve the aviation sector level of satisfaction for METAR and SPECI and build capacity to develop skills for the preparation of TAF and SIGMAT. ● Progressively establish a routine marine weather monitoring network under DGM. ● Strengthen and modernize Flood forecasting and service delivery service in collaboration with the National Disaster Management Agency (<i>Bureau National de la Gestion des Risques et Catastrophes – BNGRC, Ministry of Interior</i>), Emergency Management and Prevention Unit (<i>Cellule de Prévention et Gestion des Urgences – CPGU, Prime Minister's Office</i>), Civil Protection Corps (<i>Corps de Protection Civile - CPC, Ministry of Defense</i>), and other relevant entities. ● Ensure that early warning information is disseminated in a gender-sensitive way, so that improved early warning systems will directly address women's vulnerabilities and exposure to disaster risk. <p>Funding from CREWS would be instrumental in starting to address the technical and institutional capacity priorities. In parallel, national and regional IDA as well as GCF funding would be sought to address investment needs in observation and monitoring equipment.</p>
Overall Budget	\$ 3.0 million
Timeframe	2019-2021

³⁵ Système intégré d'observation météorologique aéronautique

Partners	World Bank (lead), with WMO, SECNA, and AFD
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Country/Region	Togo							
LDC or SIDS Profile	Level of Disaster Risk	High	Average annual loss to disasters	Data not fully available.	Access to information & communications (ICT index)	Ranked 156 th in the ITU's ICT Development Index 2017 ³⁶	Capacity of NMHS	Low
	Status of hydromet and EWS	Low	Disaster loss and risk data to inform early warning	Data not fully available.	Demand/Priority	High	Leveraging potential	High
Context	<p>Togo is frequently affected by a range of hydro-meteorological and climatological disasters, notably floods and droughts (including poor distribution of rains, late rains). In terms of the total number of people affected, droughts still remain the most severe disaster. From a user perspective, currently the country's early warning system can be improved in many ways. For the moment, the country does not issue any official severe weather warnings. Flood forecasting is currently being conducted in a pilot stage for the Oti River (FEWS Oti) and for the Mono River (FUNES). However, more can be done, which leaves enormous potential for diminishing the loss of lives, livelihoods and assets. Similarly, seasonal forecasts and planting and harvesting advisories could be significantly improved to enhance the productivity of farmers. A food security system in the country does exist, and already functions well, however, it could also be improved significantly.</p> <p>Togo's providers for climate, weather and water services are the Directorate General for National Meteorology (DGMN³⁷) and the Directorate for Water Resources (DRE). DGMN is responsible among others (i) to manage and develop the national weather observation network, (ii) to provide information and weather services and promote their use in the various socio-economic sectors, (iii) participate in studies and weather and climate research related to its mission and (iv) to follow and implement measures related to Togo's international commitments in the field of meteorology and climate. DRE has the objective (i) to develop national policies, directives, standards related to water resources and their implementation, (ii) to implement and manage national hydrometric networks and piezometric, (iii) to perform the hydrological and hydrogeological surveys necessary for the development of water resources, (iv) to review applications operating and development of water resources, (v) to collect basic data on water resources and set up a database, (vi) to promote the integrated water resources management (IWRM) and the Organization and</p>							

³⁶ <http://www.itu.int/net4/ITU-D/idi/2017/>

³⁷ Integral part of the Ministry of Infrastructure and Transport.

	<p>coordination of its implementation, (vii) to develop regional and international cooperation for the management of the water resources and (viii) to ensure the administration and management of the Integrated Water Resources Information System. Moreover, with the recent establishment of the National Civil Protection Agency (<i>Agence Nationale de la Protection Civile</i>, ANPC) in 2017 the government tries to improve the coordination among different agencies and stakeholders responsible for disaster risk management in the country by putting all functions related to disaster risk management “under one roof”.³⁸</p> <p>Several technical assistance activities have been rolled out in support of flood management and early warning systems, such as Strengthening Flood Management downstream Nangbeto Dam on the Mono river using the algorithmically-based forecast model (FUNES) and in the Volta Basin project, which supports a trans-border early warning system for the Oti River in Ghana and Togo (FEWS Oti). This dialogue with the government of Togo pointed out that a more comprehensive engagement for modernizing Togo’s Hydromet services would be required addressing at the same time Hydromet observation infrastructure, ICT and data management, as well as better service provision to communities, businesses and the public. IDLM, FUNES and FEWS Oti introduced the technical capabilities and opportunities as well as technical requirements and institutional arrangements, which would be scaled up and mainstreamed in a dedicated Hydromet modernization project to ensure their sustainable operation.</p> <p>Togo has requested Bank support to mobilize financing to invest in modernizing its hydromet system and services. In response, the World Bank is preparing a US\$24 million IDA financed hydromet operation, which may be expanded with GCF resources to reach approximately US\$50 million.³⁹ There is therefore an excellent opportunity that the CREWS resources would help inform the technical design of how these other IDA investment resources are applied, leverage additional funds from GCF, and to build capacity with involved Togolese agencies to take full advantage of system improvements that will be financed from the investment operation. The combination of technical assistance resources with investment resources increases the chances for Togo to make significant advances in the modernization of Hydromet and climate services and early warning systems.</p>
<p>Priority Needs</p>	<p>With GFDRR Integrated Disaster and Land Management (IDLM) project, hydrometeorology needs assessment for the whole country was done in 2014 and the project provided about 10% of the country equipment needs in 2016 at the end of the project. The World Bank which support the country in implementing the IDLM project also lead the preparation of the current proposal.</p> <p>The main constraints for the modernization and improvement of the Hydromet services in Togo are related to institutional challenges. National civil protection agency (ANPC) has been assigned to lead the preparation of the investment project “Strengthening Hydromet Services in Togo”, while only being established very recently with limited staff and capacity. The priority needs are:</p> <p><i>Capacity building and institutional support.</i></p> <ul style="list-style-type: none"> • Training and capacity building for improved Hydromet services: as training in numerical weather prediction and

³⁸ ANPC is an agency under the Ministry of Security and Civil Protection (*Ministere de la Securite et de la Protection Civile*, MSPC).

³⁹ In January 2017, the Government of Togo requested support from the World Bank for the preparation of a concept note and funding proposal to the Green Climate Fund in the context of the Africa Hydromet Program Initiative. The allocation of IDA resources for co-financing the operation has already been agreed upon.

	<p>forecasting, flood modeling and emergency operations management</p> <ul style="list-style-type: none"> • Strategic planning and institutional support to Hydromet services: supporting efforts of DGNM to become an independent agency and accordingly mobilize a more diverse portfolio of revenues • Revitalize the National platform for disaster risk reduction, whose chairmanship and Technical secretariat are transferred from the Ministry of the environment and forest resources to the Ministry of security and civil protection since the ANPC was created. The National platform brings together all the agencies, including government agencies, institutions for research, NGOs, involved in disaster prevention, preparedness and management. • Assessments of institutional capacities of General directorate of Meteo and National directorate of water resources, user needs, on-going and planned programs and socio-economic benefits of Hydromet services and early warning systems • Long-term development plans for General directorate of Meteo and National directorate of water resources • Preparedness and response plans with operational procedures for effective early warning dissemination, readiness to act with regular simulation exercises • Targeted education and public awareness programs for warning systems and related public action • Capacity development of field meteorologists and hydrologists in data collection and transmission • Synergy strengthening between the weather forecasting and hydrological forecasting operations to improve flood forecasting and early warning services. • Strategy for gender inclusion in all aspects of activity implementation and dissemination of EWS information • Develop tools to monitor the number of people with improved hydromet services access, number of females with improved hydromet access, the percentage of female beneficiaries from the project or proportion of female population satisfied with improved hydromet services, the number of women involved of Hydromet activities.
Overall Budget	\$ 2.250 million
Timeframe	2019-2022
Partners	World Bank (lead), WMO