

## **CREWS Investment Plan 2016-2020**

Adopted by the CREWS Steering Committee on 12 September 2016.

An amendment to Annex 1 adopted by the CREWS Steering Committee on 6 September 2017.

The objective of the CREWS initiative is to significantly increase the capacity to generate and communicate effective impact-based, multi-hazard, gender-informed, early warnings and risk information to protect lives, livelihoods, and assets in Least Developed Countries (LDCs) and small island developing States (SIDS).

### CREWS Members



Australia



France (Chair)



Germany



Luxembourg



Netherlands

### CREWS Observers



Canada



Japan



New Zealand



Norway



Switzerland



USAID



ACP

### CREWS Implementing Partners



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## Executive Summary

The Climate Risk and Early Warning Systems (CREWS) initiative was launched at the twenty-first session of the United Nations Framework Convention on Climate Change Conference of the Parties in Paris in December 2015 (Paris Conference), as part of the UN Secretary-General's Initiative on Climate Resilience to strengthen climate action following the Paris Conference. CREWS is also an initiative that responds to the Sendai Framework for Disaster Risk Reduction 2015-2030, the 2030 Sustainable Development Agenda and the Addis Ababa Action Agenda on Financing for Development.

The rationale for CREWS is the recognition that the casualty risk for hydrometeorological hazards<sup>1</sup>—that is the number of people at risk of losing their lives—is increasing in Least Developed Countries (LDCs) and Small Island Developing States (SIDS). It is a trend that is both unacceptable and reversible. In most developed countries, the number of lives lost to hydrometeorological events is trending down<sup>2</sup> due to progress in reducing the risk associated with disasters through enhanced capacity to predict extreme events and to alert exposed populations. A compounding factor is the high exposure of LDCs and SIDS to climate change impacts and the related increase in the intensity and frequency of extreme events.<sup>3</sup>

Reversing the trend in LDCs and SIDS requires increased investment in preparedness and risk reduction. Underpinning CREWS is a multi-donor trust-funded instrument that will support this work in LDCs and SIDS. CREWS aims are to increase international financial and technical support to these countries and improve the efficiency and effectiveness of existing hydrometeorological investments. Countries and international partners have been calling for better exchange of information, longer term and integrated planning around early warning systems, as well as the alignment of efforts to measure the impacts of coordination and investments, in this area of work, based on a common set of indicators.

The first CREWS Investment Plan proposes a programme of work for 2016-2020, an indicative list of countries for initial support with an outline of the expected results. The Investment Plan provides a list of pipeline countries, with high risk, limited capacity to predict disaster and generate warnings, for which priority investment would be required in the future.

The proposed project countries are Burkina Faso, Democratic Republic of the Congo, Mali, Niger, Papua New Guinea and a regional focus on Pacific SIDS. These countries meet the criteria for accelerated action to strengthen their hydrometeorological capacities, their ability to identify vulnerable populations, to generate warnings and prepare and respond when disasters occur. CREWS will focus on leveraging other existing resources and funding streams, as well as plan for longer term financing sustainability to support early warning systems. The funding target for the initial five years of CREWS is US\$ 100 million.

To maximize efficiency and reduce overhead costs, CREWS draws on the existing partnerships' networks and expertise, as well as the coordination, operational and financial management capacities of its three Implementing Partners: World Meteorological Organization (WMO), World Bank and its Global Facility for Disaster Reduction and Recovery (GFDRR) and the United Nations Office for Disaster Risk Reduction (UNISDR).

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<sup>1</sup> UNISDR 2015. *Global Assessment Report (GAR)*. World Bank 2013. *Strong, Safe, and Resilient: A Strategic Policy Guide for Disaster Risk Management in East Asia and the Pacific*.

<sup>2</sup> GAR

<sup>3</sup> Intergovernmental Panel on Climate Change 2015. *Fifth Assessment Report*.

# 1. CREWS Programming Framework

The CREWS Programming Framework identifies crucial programmatic areas for effective early warning systems and promotes better programme integration of CREWS projects with other initiatives. It guides the development of projects by Implementing Partners and assists the development of the monitoring and evaluation framework.

## Objective of CREWS

To significantly increase the capacity to generate and communicate effective, impact-based multi-hazard, gender-informed, early warning systems and risk information to protect lives, livelihoods, and assets in Least Developed Countries (LDCs) and Small Island Developing States (SIDS).

### 1. CREWS Country Portfolio

- a) **Project Countries** are countries in which CREWS has initiated investments through its Implementing Partners and Work Programme.
- b) **Pipeline Countries** are countries for which projects could be developed based on prioritization by the Steering Committee.

#### Outputs of Country Projects

- 1.1 Assessments of institutional capacities of National Meteorological and Hydrological Services (NMHSs), user needs, on-going and planned programmes and socio-economic benefits of hydromet services and early warning systems.
- 1.2 Hazard and risk information, gender disaggregated, of exposed populations and assets to guide early warning systems and climate and weather services.
- 1.3 NMHSs' service delivery improved including development of impact-based, gender balanced, capacity and tailored information for risk management.
- 1.4 Long-term development plans for NMHSs, including the need for system interoperability at the national and regional levels.
- 1.5 High priority and high impact small scale investments, including supply of critical observation and ICT equipment.
- 1.6 Preparedness and response plans with operational procedures for effective early warning dissemination, readiness to act with regular simulation exercises.
- 1.7 Targeted, gender-informed, education and public awareness programmes, addressing linguistic diversity, available for warning systems and public action.
- 1.8 Greater inter-operability between existing risk-related safety-nets and risk sharing initiatives and hydromet services and early warning systems.

### 2. CREWS Regional Support

Programmes supporting the forecasting and early warning capacity with a geographic focus on CREWS Project Countries.

#### Outputs of regional support projects

- 2.1 Regionalized (cascading) weather and climate monitoring and prediction products with facilitated access for CREWS Project Countries.
- 2.2 Pooled (regional), gender-balanced, trainings for high impact sectors (disaster risk management, health, agriculture)
- 2.3 Regional monitoring, forecasting and warning products for extreme events (flood, drought, extreme heat, other weather events).
- 2.4 Regional, gender-disaggregated, risk analysis products and monitoring of high risk countries, cities and vulnerable populations.
- 2.5 Regional inter-governmental organizations strengthened to support NMHSs and early warning capacities.

### 3. CREWS Global Coherence and Advocacy Support

#### Outputs of global coherence and advocacy support projects

- 3.1 Standards and systems in place to monitor early warning trends, needs, gaps and capacity to drive investments and measure progress against the 2030 Sustainable Development Agenda, the Sendai Framework and the UNFCCC agenda.
- 3.2 Donor investments are increased to address the service delivery gap in LDCs and SIDS and are better coordinated through common programming and reporting protocols.
- 3.3 Demand-driven knowledge products are compiled and applied for technical guidance for early warning service delivery in countries and cities.
- 3.4 Networks of early warning system practitioners strengthened and broadened.

## 2. CREWS Investment Plan 2016-2020

Pending the establishment of the CREWS Trust Fund, the adoption of the CREWS Governance Document through the Steering Committee and the availability of funds in the CREWS Trust Fund, the CREWS Investment Plan identifies funding flows, project countries and programmatic areas for the development of CREWS Projects. The Investment Plan provides an overall distribution of resources. Decisions on fund allocations are made subsequently based on the approval, by the Steering Committee, of Projects submitted by Implementing Partners and pending availability of funds in the CREWS Trust Fund.

The main principles driving the CREWS programming process are country ownership, addressing lifesaving needs, leveraging resources and integrated and inclusive approaches to programming.

The following steps were taken to develop the first CREWS Investment Plan.

### 2.1 Prioritizing Resources

The Investment Plan responds to two interrelated and equally important levels of prioritization.

First, to prioritize countries to channel its investments, based on an ongoing mapping of LDCs and SIDS capacities and needs and the potential for leveraging additional resources.

Second, to respond to priority activities articulated by countries, based on established relationships of the three Implementing Partners, through their portfolio of ongoing projects and contacts with national institutions.

The mapping of LDCs and SIDS served as the basis for identifying the Project Countries for initial CREWS allocations and Pipeline Countries for future allocations. Criteria for the mapping fell into three categories:

1. **Exposure to risk and institutional capacity for early warning**
  - Capacity of NMHSs and disaster management institutions
  - Projected average annual loss to disaster (projected cost of disasters for the country's economy per year)
  - Casualty loss risk (where available)
  - Access to information and communication technology
2. **Level of priority given to early warning systems by countries**
  - Requests for support by country
  - Identification of early warning systems as a priority in Intended Nationally Determined Contributions (INDCs) and national development and poverty reduction plans
3. **Potential for leveraging additional resources and aligning programmes**
  - Potential to leverage investments from other mechanisms such as the Green Climate Fund (GCF), the World Bank Group's International Development Association (IDA) and the Global Environment Fund (GEF)
  - Ongoing or planned national and regional programmes related to the objectives of CREWS

In 2016-2017, CREWS will support LDCs and SIDS to monitor the status of their early warning systems and related institutional capacity in a more robust and systematic manner. The resulting surveys will facilitate the prioritization of national and international hydrometeorological investments, as well as provide a baseline against which to monitor progress.

It is also expected that the Steering Committee, at its regular meetings, will review the list of CREWS Project and Pipeline Countries, based on the ongoing monitoring of the countries' status and needs.

## **2.2 Integrated and Inclusive Programming**

A key value-add of the CREWS set-up is the programmatic alignment between the Implementing Partners and their respective expertise, networks of partners and ongoing programmes and operations.

At the stage of the development of the Investment Plan, an ad-hoc Programming Group composed of staff from WMO, World Bank/GFDRR and UNISDR, carried out a mapping of LDCs and SIDS, reviewed ongoing programmes and initiated initial project outlines in consultations with partners.

Following the review and adoption by the Steering Committee of the Investment Plan, projects will be finalized based on joint country consultations. The format of the consultations will be light and adapted to each country context (either workshops, contributions to ongoing consultations or expert inputs). The consultation will include national counterparts and organizations, including civil society organizations, as well as regional and international partners to align and prioritize existing programmes and initiatives, review budgets and identify a lead implementing partner for each project.

In systematizing its programming processes, CREWS is building an implementation feedback into the design of its country projects. This is expected to create a cycle of improvement in outcomes with each iteration. This, in-turn, provides an environment where successes in programming are more easily scaled-up and replicated globally.

## **2.3 Leveraging Investments**

By providing longer term investments targeting improvements in policies, institutions, and programme design in countries, it is estimated that CREWS can potentially influence hundreds of millions USD in existing portfolios on hydrometeorological services and early warning systems.

By working upstream with countries on policies, strategies and institutional arrangements and capacities for effective early warning systems—and building on, and contributing to, existing initiatives—the contribution of CREWS is expected to be relevant beyond the influence of its own portfolio of country projects.

## **2.4 Highlights of Country and Regional Support Projects**

The following countries have been identified for CREWS investment starting in 2016. Budgets are indicative and based on current pledges. Actual programming and commitment of funds will be based on funds available in the CREWS Trust Fund.

## 2.4.1 Burkina Faso

Level of disaster risk <sup>4</sup>	38 out of 191 countries	Average annual loss to disasters <sup>5</sup> (USD million)	25.04	Access to information and communications (ICT index) <sup>6</sup>	159 out of 167 countries
Capacity of NMHS	Low monitoring coverage, low resolution weather forecasts and seasonal forecasts	Status of hydromet and early warning services	Agrometeorological bulletin every 10-days	Disaster loss and risk data to inform early warnings	Low (disaster loss database under development)
Demand/priority	High	Leveraging potential	High		

**Timeline** 4 years

**Budget (USD million)** 2.2

### Context

Institutions in Burkina Faso are producing weather and climate information for farmers and other decision makers at national level but important improvements are still needed on observations and modelling and an efficient broadcast system to reach smallholder farmers. This project will provide: improved weather and climate observations; climate data management of historical data; soil moisture observations for drought and flood monitoring; state-of-the-art daily to seasonal forecasting coupled with drought monitoring and crop modelling; weather and climate hazards monitoring and more efficient distribution of alerts and information suitable for agricultural decision making at a national and local level.

### Key deliverables

- Climate and hydrometeorological database management and improvements including update, data rescue and upgrades;
- Improved agricultural monitoring capabilities, including rainfall daily totals, vegetation status, soil moisture by better observation networks, improved modelling capabilities and better use of remote sensing products;
- Review of drought indexes to be used in agriculture, bush/forest management, livestock or pastoralist and river/lake artisanal fisheries;
- Assessing the performance of forecasts with lead times from 5 to 40 days using the S2S forecast archive, with focus on daily weather characteristics including rain-day frequency, heavy rainfall events, dry spells and monsoon onset/cessation dates, with relevance to agriculture and water resources;
- Development of an early warning system with community early warning systems to communicate site and crop specific advisories, with lead times from two weeks to a season for weather and climate hazards relevant to agriculture;

<sup>4</sup> Descending ranking of risk based on the INFORM Index.

<sup>5</sup> Average annual loss (AAL) projected cost of disasters for the country's economy per year

<sup>6</sup> Ascending ranking of country's access to information and communications based on ICT Development Index 2015.



- Improved process of co-production of agro-climate advisories for farmers between climate forecasters and agricultural experts at national level, strengthening the Multi-disciplinary Working Groups (*Groupes de Travail Pluridisciplinaire*);
- Strengthening the existing Regional Climate Outlook Forum with new products and increased interactions with users, and support to strengthen Burkina’s National Outlook Forum process.

## Partners

World Bank/GFDRR, WMO, National Meteorological Service of Burkina Faso, Conseil National de Secours d'Urgence et de Réhabilitation, Ministère de l'Action Sociale et de la Solidarité National (CONASUR), ministries in charge of agriculture and livestock, food security organizations in Burkina Faso, media, private telecom companies and rural radio networks, National Research Institutes (Ouaga University, INERA, etc), AGRHYMET Regional Centre, African Center of Meteorological Application for Development (ACMAD), UNISDR, George Mason University, Global Water Partnership West Africa.

### 2.4.2 Mali

Level of disaster risk	27 out of 191 countries	Average annual loss to disasters (USD million)	56	Access to information and communications (ICT index)	145 out of 167 countries
Capacity of NMHS	Low	Status of hydromet and early warning services	Weak	Disaster loss and risk data to inform early warnings	Projects on-hold, lack of institutionalization
Demand/priority	High	Leveraging potential	High		

**Timeline** 4 years

**Budget (USD million)** 2.69

## Context

Mali is vulnerable to several climate-related hazards, including flooding and drought, and is already experiencing the impacts of climate change. Mali needs additional concessional support for strengthening the scientific base for generating climate and weather information to inform climate-resilient development pathways.

Improved weather and climate information and warning services are required from the national level down to the household level. Overall, the national observation and forecasting system is in weak condition and basic services are lacking for users such as aviation, civil protection, agriculture, food security, and the general public.

There are a number of international programmes contributing to improvement of hydromet and climate services. The largest contributions include the World Bank, GCF and GFDRR, which fund “Strengthening Climate Resilience in Sub-Saharan Africa - Mali Country Project”, in pipeline. The proposed grant is expected to be closely aligned with this project, including support for preparation of the detailed design of the project and operationally support stakeholder coordination.

## Key deliverables

- Support a detailed design document for the GCF and GFDRR project “Strengthening Climate Resilience in Sub-Saharan Africa - Mali Country Project”.
- Support for institutional coordination between hydrology, meteorology, humanitarian, civil protection and food security services, including development of regulatory documents, standard operating procedures for early warning systems, protocols of information exchange, building capacity of staff, and operational training.
- Delivery of basic, more accurate, timely and relevant warnings and information to users and decision-makers. It is expected that these activities will contribute to improvement of capacity of civil protection and food security services to fulfil their responsibilities with regards to dissemination of early warning services and official response to such warnings, with specific focus on climate-dependent sectors and specific at-risk areas.
- “Cascading” forecasting and other global WMO initiatives will be piloted.

## Partners

World Bank/GFDRR, WMO, African Development Bank Group (AfDB), the Government of Mali.

### 2.4.3 Niger

Level of disaster risk	25 out of 191 countries	Average annual loss to disasters (USD million)	24.43	Access to information and communications (ICT index)	159 out of 167 countries
Capacity of NMHS	Low	Status of hydromet and early warning services	Very Weak	Disaster loss and risk data to inform early warning	Low (National disaster loss database developed, limited risk information)
Demand/priority	High	Leveraging potential	Medium		

**Timeline** 5 years

**Budget (USD million)** 2.49

## Context

The overall status of hydromet and early warning system in Niger remains poor. Several agencies of the Ministry for Interior, Ministry of Transportation, Ministry of Water Resources, all coordinated by the Prime Minister’s National Cell for Disaster Prevention and Response (DNPGCCA), have institutional responsibility to deliver hydromet and early warning services. Institutions mostly have limited human and financial resources and have outdated infrastructure. Overall, the national observation and forecasting system is weak and there is a lack of basic services to main users such as aviation, civil protection, agriculture, food security, and the general public. There are international programs contributing to improvement of hydromet and climate services. The largest contributions include the World Bank “Disaster Risk Management and Urban Development Project,” ongoing since 2014; and the AfDB Climate Information Development and Forecasting Project (PDIPC), ongoing since 2012. The proposed project will be aligned with these initiatives and operationally support stakeholder coordination.

### Key deliverables

- Improved accuracy and dissemination of severe hydrological and meteorological bulletins;
- Operational functioning of early warning system in 12 pilot urban areas supported by the *Disaster Risk Management and Urban Development Project* for the Republic of Niger which is providing disaster risk management interventions in cities and strengthening the Government's capacity to respond to emergencies;
- Coordination between hydrological, meteorological, civil protection, humanitarian and disaster risk management agencies.

### Partners

World Bank/GFDRR, WMO, the Government of the Niger, AfDB, and UNISDR.

### 2.4.4 Democratic Republic of the Congo

Level of disaster risk	8 out of 191 countries	Average annual loss to disasters (USD million)	67.5	Access to information and communications (ICT index)	160 out of 167 countries
Capacity of NMHS	Low	Status of hydromet and early warning services	Very Weak	Disaster loss and risk data to inform early warning	No national disaster loss database and limited risk information
Demand/priority	High	Leveraging potential	High		

**Timeline** 5 years

**Budget (US \$ million)** 3,09

### Context

In the Democratic Republic of the Congo several agencies of the Ministry for Transport and Communication Channels (e.g. MettelSat) and the Ministry of Interior have institutional responsibility to deliver hydromet and early warning services. All institutions have limited human and financial resources. Overall, the national observation and forecasting system remains weak and there is a lack of even basic services to main users such as aviation, civil protection, agriculture, food security, and the general public. A new programme, “Strengthening Hydro-Meteorological and Climate Services,” supported by the GEF Least Developed Countries Fund and GFDRR will be launched in 2016. The proposed project is expected to be aligned with this programme and operationally support it.

### Key deliverables

- Better coordination between hydromet and disaster risk management agencies, with institutions strengthened regarding the development of national strategies, regulatory documents, standard operating procedures (SOPs), protocols for information exchange for NMHS and relevant institutions;
- Capacity building provided for staff, operational training and other complementary activities;

- Operational functioning of early warning system in a pilot region or urban area, with the delivery of basic, more accurate, timely and relevant warnings and information to users and decision-makers;
- Improved accuracy of basic hydrological and meteorological forecasts, piloting of cascading forecasting and other global WMO initiatives at the appropriate scale and higher coverage of hydrometeorological stations.

#### Partners

World Bank/GFDRR, WMO, Ministry for Transport and Communication Channels and the Ministry of Interior, UNISDR.

### 2.4.5 Pacific Region – Covering Fiji, Kiribati, Marshall Islands, Solomon Islands, Tuvalu and Vanuatu

Level of disaster risk	Most disaster stricken region in the world <sup>7</sup>	Casualty Loss Risk	Varies: average to very high	Access to information and communications (ICT Index)	Data available for Fiji (101), Solomon Islands (139) and Marshall Islands (125)
Capacity of NMHSs	Variable	Status of hydromet and early warning services	Weak	Disaster loss and risk data to inform early warning	Medium
Demand/priority	High	Leveraging potential	Medium		

**Timeline** 5 years

**Budget (US \$ million)** 3.5

#### Context

The capacity of the Regional Specialized Meteorological Centre (RSMC), Nadi, Fiji, to provide high-resolution numerical model guidance to the Pacific Island Countries (PICs) is limited, impeding PICs' ability to take full advantage of the WMO Global Data-processing and Forecasting System and advances in multi-hazard impact-based forecast and warning services (WMO 2015).

Regional cooperation in the Pacific is strong and the role of regional centres particularly important for operational support to PICs and for technical assistance. The strategy of the Secretariat of the Pacific Regional Environmental Programme (SPREP) aims to enhance and build capacity for applied research, foster meteorological and oceanic observation and monitoring programmes to improve understanding, and develop targeted responses to climate change and related disaster risk reduction (SPREP 2011, 2012).

Currently, there is no exchange of weather warnings between the PICs NMHSs' beyond the regional tropical cyclone warnings issued by the RSMC. The installation of MeteoAlarm will allow for the

<sup>7</sup> World Bank 2013. *Strong, Safe, and Resilient: A Strategic Policy Guide for Disaster Risk Management in East Asia and the Pacific*.

exchange of weather warnings between the RSMC and the PICs NMHSs to improve multi-hazard early warning systems at the community, national, and regional level in the Pacific. Within the context of the WMO Tropical Cyclone Committee, the countries have agreed upon a common set of warning criteria and warning procedures.

Under the Finnish-Pacific project on reduced vulnerability of the Pacific island country villagers' livelihoods to the effects of climate change, SPREP and WMO worked with experts from the Finnish Meteorological Institute (FMI) to collect some initial information on the production of weather and climate warnings issued by the NMHSs. The installation of technical solutions adapted to the national context will provide the necessary environment to host this regional warning platform in the region.

Several development partner initiatives are currently in the implementation or preparation stage. Within the World Bank, the Pacific Resilience Program (PREP) is in phase I of implementation focusing on strengthening the capabilities of Tonga and Samoa. PREP phase II is in preparation, which will extend modernisation support to additional PICs. The proposed project will complement existing programmes and enable PREP countries to maximize the benefits of their national modernisation efforts.

### Key deliverables

- Established integrated information technology platform networks to facilitate the exchange of weather information in order to generate and disseminate meteorological and hydrological early warning data and information alerts, both within and amongst the participating countries;
- Improved NMHS technical (systems and software) and institutional (guidelines and SOPs) capacity to manage and maintain observation and alert networks for multi-hazard early warning systems;
- Strengthened information technology infrastructure to enable the delivery of products and services for multi-hazard early warning systems;
- Regional and national long-term multi-hazard early warning systems.

### Partners

World Bank/GFDRR, WMO, NMHSs, national disaster management offices and emergency services from participating countries, FMI, UNISDR, National Oceanic and Atmospheric Administration (NOAA), Bureau of Meteorology (BOM), SPREP, The Pacific Community (SPC), National Institute of Water and Atmospheric Research (NIWA), Commonwealth Scientific and Industrial Research Organisation (CSIRO).

### 2.4.6 Papua New Guinea

Level of disaster risk	30 out of 191 countries	Average annual loss to disasters (USD million)	162	Access to information and communications (ICT index)	Low (less than 50 people per 100 habitants had mobile-cellular subscriptions in 2014)
Capacity of NMHS	Low	Status of hydromet and early warning services	Weak	Disaster loss and risk data to inform early warning	Medium
Demand/priority	High	Leveraging potential	Medium		

**Timeline** 4 years

**Budget (US \$ million)** 1.65

### **Context**

The project will address improved weather observations, climate data management of historical data, soil moisture observations for drought/flood monitoring and early warning systems, state-of-the-art daily to seasonal forecasting coupled with drought/flood monitoring and frost advisories, weather and climate hazards monitoring, and more efficient distribution of alerts and information suitable for decision making at national and local levels. It will contribute to the regional project Climate Data for the Environment (CliDE) Management System.

### **Key deliverables**

- Revision of NMHS' operational and strategic plans for climate database management and improvements, including update, data rescue and upgrades;
- Development of seasonal forecasts in conjunction with weather forecasts tailored to various economic sectors, including improved El Niño-based seasonal forecasts;
- Development of an early warning system with lead times from two weeks to a season for weather and climate hazards relevant to the various sectors;
- Support accessibility of drought warnings, including advice to communities on actions to be taken for agriculture, bush/forest management, livestock or pastoralism and river/lake artisanal fisheries;
- Assess the performance of forecasts with lead times of 5 to 40 days using the S2S forecast archive, with focus on daily weather characteristics, including rain-day frequency, heavy rainfall events, dry spells and monsoon onset/cessation dates, with relevance to agriculture and water resources.

### **Partners**

World Bank/GFDRR, WMO, Papua New Guinea National Weather Service, Department of Transport and Infrastructure, Department of Environment and Conservation, Department of Agriculture and Livestock, Department of Forestry, Department of Commerce and Industry, Australia Bureau of Meteorology, Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES).

## **2.5 Highlights of Global Projects**

Global Projects are proposed based on their relevance to the CREWS objective and the need for coherence and effectiveness in the support provided to LDCs and SIDS.

### **2.5.1 Monitor and survey of multi-hazard early warning systems for LDCs and SIDS**

**Timeline** 2 year

**Budget (USD million)** 0.56

The project will provide capacity and guidance support to LDCs and SIDS to generate, collect, report and analyse relevant data to measure the status and effectiveness of respective multi-hazard early warning systems as part of national efforts to manage disaster risk and adapt to climate change. It will contribute to WMO's country profile database and UNISDR's Sendai Framework Monitor.

### **Key deliverables**

- Capacity and guidance for LDCs and SIDS to measure the effectiveness of multi-hazard early warning systems, aligned with global practice, standards, targets and indicators;

- Survey of multi-hazard early warning system capacity, needs and gaps for LDCs and SIDS.

#### Partners

UNISDR, WMO, GFDRR, relevant UN agencies, regional organizations.

## 2.5.2 International Early Warning Conference

**Timeline** 1 year

**Budget (US \$ million)** 0.28

The International Conference on Multi-Hazard Early Warning Systems, provisionally planned for March 2017, aims to demonstrate to countries how they can improve the availability of, and their communities' access to, multi-hazard early warning, risk information and assessment. The conference will focus on gaps in providing early warnings, especially in reaching the 'last mile'—the most vulnerable and exposed populations.

#### Key deliverables

- Support provided for the participation of key decision makers from CREWS Project Countries, SIDS and LDCs with a focus on NMHSs, institutions responsible for early warning communication and community action;
- Review progress by countries' in establishing early warning systems against the Sendai Framework, the 2030 Sustainable Development Agenda, and the Paris Agreement on Climate Change;
- Learn from, exchange information on, and promote the replication of good practices in early warning systems.

#### Partners

WMO, UNISDR, practitioners and Government counterparts from LDCs and SIDS, United Nations agencies, funds and programmes, regional inter-governmental organizations, research institutions.

## 2.6 Status of Pledges as of July 2016

Country	Financial year**					Pledged
	2017	2018	2019	2020	2021	
<b>Australia</b>	AUD 2 million (USD 1,460,000)	AUD 1 million (USD 730,000)	AUD 1 million (USD 730,000)	AUD 1 million (USD 730,000)		<b>AUD 5 million (USD 3,650,000)</b>
<b>Canada</b>	CAD 2 million (USD 1,556,000)	CAD 2 million (USD 1,556,000)	CAD 2 million (USD 1,556,000)	CAD 2 million (USD 1,556,000)	CAD 2 million (USD 1,556,000)	<b>CAD 10 million*** (USD 7,780,000)</b>
<b>France</b>	EUR 5 million (USD 5,600,000)	EUR 5 million (USD 5,600,000)				<b>EUR 10 million (USD 11,200,000)</b>
<b>Germany</b>	EUR 3 million (USD 3,370,000)					<b>EUR 3 million (USD 3,370,000)</b>
<b>Luxembourg</b>	EUR 1 million (USD 1,120,000)					<b>EUR 1 million (USD 1,120,000)</b>
<b>Netherlands</b>	EUR 0.6 million (USD 674,000)	EUR 0.6 million (USD 674,000)	EUR 0.6 million (USD 674,000)	EUR 0.6 million (USD 674,000)	EUR 0.6 million (USD 674,000)	<b>EUR 3 million (USD 3,370,000)</b>
<b>Total in USD*</b>	<b>13,780,000</b>	<b>8,560,000</b>	<b>2,960,000</b>	<b>2,960,000</b>	<b>2,230,000</b>	<b>30,490,000</b>

\* Pledges indicatively reflected in USD based on exchange rate of 1 May 2016.

\*\* CREWS' financial year runs from 1 July to 30 June, i.e. financial year 2017 means 1 July 2016 to 30 June 2017.

\*\*\* Contribution made directly to WMO.

## 2.7 Resource Allocations

Coverage	Projects	Lead Implementing Partner(s)	Partners	2016 allocation (multi-year) USD million	Timeline
Sahel	<b>Burkina Faso</b>	Projects to be finalized and lead Implementing Partners to be determined.	World Bank/GFDRR, WMO, National Meteorological Service of Burkina Faso, CONASUR, ministries in charge of agriculture and livestock, food security organizations, media, private telecom companies and rural radio networks, national research institutes (Ouaga University, INERA, etc), AGRHYMET, ACMAD, George Mason University, Global Water Partnership West Africa	<b>2.2</b>	4 years
	<b>Mali</b>	Projects to be finalized and lead Implementing Partners to be determined.	World Bank/GFDRR, WMO, AfDB, the Government of Mali, UNISDR	<b>2.69</b>	5 years
	<b>Republic of Niger</b>	Projects to be finalized and lead Implementing Partners to be determined.	World Bank/GFDRR, WMO, DNPGCCA, DGMN, the hydrological service (DRE), the civil protection agency (DGPC), WMO, AfDB, UNISDR Regional Office for Africa	<b>2.49</b>	5 years
Central Africa	<b>Democratic Republic of The Congo</b>	Projects to be finalized and lead Implementing Partners to be determined.	World Bank/GFDRR, WMO, UNISDR Regional Office for Africa	<b>3.09</b>	5 years
Pacific	<b>Regional proposal covering Fiji, Kiribati, Papua New Guinea, Solomon Islands, Tuvalu, Vanuatu, and Marshall Islands</b>	Projects to be finalized and lead Implementing Partners to be determined.	World Bank/GFDRR, WMO, NMHSs, national disaster management offices and emergency services from participating countries, FMI, UNISDR, NOAA, BOM, SPREP, SPC, NIWA, CISRO	<b>3.5</b>	5 years



	<b>Papua New Guinea</b>	Projects to be finalized and lead Implementing Partners to be determined.	World Bank/GFDRR, WMO, Papua New Guinea National Weather Service, Department of Transport and Infrastructure, Department of Environment and Conservation, Department of Agriculture and Livestock, Department of Forestry, Department of Commerce and Industry, Australia Bureau of Meteorology, RIMES	<b>1.65</b>	4 years
Global	<b>Global monitor and survey of multi-hazard early warning systems</b>	UNISDR	WMO, World Bank/GFDRR, relevant UN agencies, regional organizations	<b>0.56</b>	2 year
	<b>International Early Warning Conference</b>	WMO	UNISDR, practitioners from LDCs and SIDS, United Nations agencies, funds and programmes, World Bank/GFDRR, regional inter-governmental organizations, research institutions	<b>0.28</b>	1 year
				<b>Total for Projects</b>	<b>16.46</b>
<b>Administrative Costs</b>	FY17 costs of the CREWS Secretariat and the Trustee			<b>0.628</b>	
				<b>Total</b>	<b>17.088</b>

## 2.8 Pipeline Countries

These are countries for which projects could be developed in the future based on prioritization by the Steering Committee.

Country	Average annual loss (USD million)	Status of hydromet and early warning services	Disaster loss and risk data to inform early warnings	Access to information and communications (ICT Index)	Leveraging potential
<b>Chad</b>	49.83	Weak	-	167 out of 167	High
<b>Ethiopia</b>	88.66	Medium	On-hold, revamping using ACP-EU project 2016/17	165 out of 167 countries	High
<b>Madagascar</b>	264.26	Weak	Yes – coverage 1982 - 2015	164 out of 167 countries	High
<b>Myanmar</b>	2,030.22	Weak	Low	142 out of 167 countries	Medium
<b>Senegal</b>	14.88	Medium-Weak	On-hold, lack of institutionalization	132 out of 167 countries	High
<b>Uganda</b>	50.54	Medium-Weak	On-hold, revamping using an ACP-EU project 2016/17	149 out of 167 countries	High

### 3. Partnerships and Networks

The nature of effective early warning systems requires close partnerships between many and varied organizations involved in hazard monitoring, dissemination of predictions, issuance of warnings and disaster management.

Relevant organizations, including national and regional institutions, non-governmental organizations, the private sector and the CREWS contributing countries, through for example their NMHSs, will be invited by the Implementing Partners on a case-by-case basis, to contribute to project implementation.

CREWS will conduct its outreach, partnerships, mobilization of resources and its technical and operational collaboration by building on, and leveraging, the existing resources and capacities of its three Implementing Partners—WMO, World Bank/GFDRR and UNISDR.

To ensure coherence in its programming with partners, CREWS will build on three groups of institutions and practitioners:

First, the expert, knowledge and practice networks and commissions related to WMO's membership of NMHSs. Of particular relevance to the effectiveness of CREWS are the Global Framework for Climate Services (GFCS) and the International Network for Multi-Hazard Early Warning Systems.

Second, the disaster risk management institutions, international, regional and other stakeholders (local authorities, private sector and parliamentarians) that convene around the Sendai Framework for Disaster Risk Reduction and are supported by UNISDR and the GFDRR. Key mechanisms include the National, Regional and Global Platforms for Disaster Risk Reduction and the Understanding Risk Forums.

Third, CREWS recognizes the role and importance of agencies of the United Nations system, in addition to WMO and UNISDR, regarding all the components of an effective early warning system.

### 4. Measuring Results

CREWS will monitor its results and report regularly to its donors and partner countries. The roles and responsibilities for the monitoring, evaluating and reporting on CREWS, and the frequency and modalities for reporting are set-out in the draft CREWS Governance Document and the draft CREWS Operational Manual (under development).

A Results Framework will present the results chains that CREWS will monitor, evaluate and report on at the impact, outcome, output and activity levels.

Progress by CREWS will be measured against Targets (a) and (g) of the Sendai Framework for Disaster Risk Reduction: (a) *Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality rate in the decade 2020-2030 compared to the period 2005-2015*; and (g) *Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030*.

Ultimately, the CREWS results will be measured against the Sustainable Development Goals (SDGs) and the adaptation goal of the Paris Agreement on Climate Change. In particular, SDG Target 1.5: *By 2030 build the resilience of the poor and those in vulnerable situations, and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters*. Two additional SDGs have targets that specifically refer to early warning—Goal 3, Good Health and Well-being and Goal 13, Climate Action).

## Annex 1: Caribbean and Western Africa Support Projects Amendments

At its third meeting on 29 June 2017, the Steering Committee approved the Caribbean Region (Decision 3) and Western Africa Region (Decision 4) support projects to be included as amendments in the Investment Plan.

### Caribbean Region

Level of disaster risk	On average very high.	Average annual loss to disasters (USD million)	776	Access to information and communications (ICT index)	Average rank 96 out of 175 countries
Capacity of NMHS	Varied, with a number of low capacity countries	Status of hydromet and EW services	Varied, with a number of low capacity countries	Disaster loss and risk data to inform early warning	Requires strengthening
Capacity of regional organizations	Good capacity is available in the Caribbean Institute for Meteorology and Hydrology (CIMH) and the Caribbean Disaster Emergency Management Agency (CDEMA) to support regional programmes.				
Demand/priority	High	Leveraging Potential	Varied		

**Timeline** 3 years (2018-2020)

**Budget (US \$ million)** 5.5 (regional and country projects)

#### Context

States/territories in the Caribbean and regional institutions have experience and expertise in relation to many aspects of multi-hazard early warning systems, and cooperation is ongoing between countries and technical organisations in the region. The needs to ensure critical minimal capabilities to provide hydrological, weather and climate services, however, exceed the resources currently available in the region, in light of socio-economic patterns in Caribbean states/territories and changing climate projections.

In particular, NMHS capacity in the region remains varied with regard to both weather and climate services, with a small number of countries requiring long term engagement and support.

The capacity to communicate and disseminate early warning and risk information with regard to the channels (established authoritative and official voices) and the methods (standard alerting protocols that reach the general public through media, mobile platforms and social networks) equally remains varied from one state/territory to another.

There is a need for a comprehensive, structured regional approach to strengthen early warning systems. Such an approach must contribute to donor harmonisation and address all four components of effective, integrated, risk-based, people-centred, multi-hazard early warning systems:

(1) disaster risk knowledge; (2) detection, monitoring, analysis and forecasting of the hazards and possible consequences; (3) dissemination and communication and (4) preparedness at all levels to respond to the warnings. It also needs to contribute programmatically to the disaster risk reduction pillar of the GFCS through support to the Regional Climate Center.

Opportunities exist to develop country programmes to upscale the capacities to monitor, predict climate and disaster events, and provide more effective forecasts and alerts. Three Caribbean states/territories will be pipelined for CREWS country programmes, namely Curaçao & Sint Maarten, Haiti and St. Lucia. For all three, initial assessments of needs have been carried out.

## Key Deliverables

### Regional Caribbean Project:

- Improvement of basic systems: databases containing climate data, indices of climate extremes and impacts; development/validation of forecasting capabilities; preparation of monitoring products based on satellite and in-situ observations, and existing international datasets; georeferenced risk analysis information covering relevant hazards with identified at risk populations, critical infrastructure and user needs analysis for climate services.
- Institutional strengthening: improve forecasting and delivery of warning services for severe weather in island states and territories of the Eastern Caribbean, including Members of the Caribbean Meteorological Organization (CMO); and, collaboration with regional outlook fora, regional observational data providers, NMHSs, and (regional) early warning system product users.

### Country Projects:

- Projects will build on existing assessments for Curaçao & Sint Maarten, Haiti and St. Lucia to provide investments required to achieve critical minimal capabilities to provide hydrological, weather and climate services. Specific deliverables will be adapted to each national context.

## Partners

WMO, World Bank and GFDRR, UNISDR, Caribbean Institute for Meteorology and Hydrology (CIMH), Caribbean Disaster Emergency Management Agency (CDEMA).

Other potential partners include the Association of Caribbean States (ACS), Caribbean Community Climate Change Centre (CCCCC), Royal Netherlands Meteorological Institute (KNMI), MétéoFrance, International Federation of Red Cross and Red Crescent Societies (IFRC) and International Telecommunication Union (ITU).

## Western Africa Region

Level of disaster risk	<b>BF:</b> 38 <b>Mali:</b> 27 <b>Niger:</b> 25  out of 191 countries	Average Annual Loss to disasters (USD million)	<b>BF:</b> 25.04 <b>Mali:</b> 56 <b>Niger:</b> 24.43	Access to information and communications (ICT index)	<b>BF:</b> 159 <b>Mali:</b> 145 <b>Niger:</b> 175  out of 175 countries
Capacity of NMHSs	<b>BF:</b> Low monitoring coverage, low-resolution weather forecasts and seasonal forecasts <b>Mali:</b> Low <b>Niger:</b> Low	Status of hydromet and EW services	<b>BF:</b> Agro-meteorological bulletin every 10- days <b>Mali:</b> Weak <b>Niger:</b> Very weak	Disaster loss and risk data to inform early warnings	<b>BF:</b> Low (disaster loss database under development) <b>Mali:</b> Projects on hold, lack of institutionalization <b>Niger:</b> Low (national disaster loss database developed, limited risk information)
Capacity of ACMAD <sup>8</sup>	Provision of support for national early warning services is weak due to outdated data products, and lack of technical/scientific capacity, professional staff, and data sharing arrangements				
Demand/priority	<b>BF:</b> High <b>Mali:</b> High <b>Niger:</b> High	Leveraging Potential	<b>BF:</b> High <b>Mali:</b> High <b>Niger:</b> High <b>ACMAD:</b> High		

**Timeline** 3 years (2018-2020)

**Budget (US \$ million)** 1.5

### Context

The CREWS initiative supports the national development of early warning services in three Western African LDCs: Mali, Burkina Faso and Niger. Regional support for forecasting and early warning is needed to further strengthen national capabilities. Regional centers provide support by preparing and disseminating monitoring and forecasting products, developing risk analyses and by organizing training and capacity building for NMHSs and high impact sectors. NMHSs of the Sahel region are supported by the Regional Climate Centre (RCC) at ACMAD in Niamey, and the RSMC in Dakar.

The capacity of ACMAD to deliver its climate services for disaster risk reduction and multi-hazard early warning to key users and sectors in CREWS target countries in Western Africa is limited. An assessment of the capacity needs of ACMAD recommended improvements to computer and communication infrastructure, technical and scientific skills of staff, monitoring and forecast products, and regional institutional coordination.

<sup>8</sup> WISER report: Capacity Needs Assessment of ACMAD

The aim of this project is to strengthen early warning system capacity in Western Africa by reinforcing ACMAD to function as an RCC that supports NMHSs, and to consolidate collaboration and coordination between regional centers and NMHSs. It will strengthen and complement national CREWS projects in this region.

### Key Deliverables

**Improvement of basic systems:** databases containing climate data, indices of climate extremes and impacts; development/validation of forecasting capabilities; preparation of monitoring products based on satellite and in-situ observations, and existing international datasets (e.g. Copernicus products).

**Capacity building:** training on the use and tailoring of regional EWS products; workshop to foster collaboration, coordination and raise awareness of decision and policy makers in the region in the field of early warnings; training to prepare, optimize, and disseminate EWS products tailored to user needs.

**Institutional strengthening:** collaboration with regional outlook fora, regional observational data providers, NMHSs, and (regional) EWS product users; active participation in the international RCC network.

### Partners

WMO, World Bank, KNMI, German Meteorological Service(DWD) and ACMAD.

Further collaboration with RSMC-Dakar, AGRHYMET, NMHSs in Mali, Burkina Faso and Niger, EU/Copernicus Climate Change Service, World Bank/GFDRR, and UNISDR.

KNMI, DWD and MétéoFrance are the European RCC nodes on climate data, monitoring and long-range forecasting respectively. Regional support for early warning will be organized through twinning KNMI and DWD (two European RCC-nodes) and the African RCC at ACMAD, and will be aligned to national CREWS projects in Mali, Burkina Faso (both with involvement of MétéoFrance).

## List of Acronyms

AAL	Average annual loss
ACMAD	African Center of Meteorological Application for Development
ACS	Association of Caribbean States
AfDB	African Development Bank Group
BOM	Bureau of Meteorology
CCCCC	Caribbean Community Climate Change Centre
CDEMA	Caribbean Disaster Emergency Management Agency
CIMH	Caribbean Institute for Meteorology and Hydrology
CISRO	Commonwealth Scientific and Industrial Research Organisation
ClIDE	Climate Data for the Environment
CMO	Caribbean Meteorological Organization
CONASUR	Conseil National de Secours d'Urgence et de Réhabilitation, Ministère de l'Action Sociale et de la Solidarité National
CREWS	Climate Risk and Early Warning Systems
DGMN	Niger meteorological service
DGPC	Niger civil protection
DNPGCCA	Prime Minister's National Cell for Disaster Prevention and Response
DRE	Niger hydrological service
DWD	German Meteorological Service
EWS	Early Warning System
FMI	Finnish Meteorological Institute
GAR	Global Assessment Report
GCF	Green Climate Fund
GEF	Global Environment Fund
GFCs	Global Framework for Climate Services
GFDRR	Global Facility for Disaster Reduction and Recovery
ICT	Information and Communication Technology
IDA	International Development Association
IFRC	International Federation of Red Cross and Red Crescent Societies
INDC	Intended Nationally Determined Contributions
INERA	Democratic Republic of Congo national agricultural research institute
IN-MHEWS	International Network on Multi-Hazard Early Warning Systems
ITU	International Telecommunication Union
KNMI	Royal Netherlands Meteorological Institute
LDC	Least Developed Country
NIWA	National Institute of Water and Atmospheric Research
NMHSs	National Meteorological and Hydrological Services
NOAA	National Oceanic and Atmospheric Administration
PDIPC	Africa Development Bank Climate Information Development and Forecasting Project
PIC	Pacific Island Country
PREP	Pacific Resilience Program
RCC	Regional Climate Centre
RIMES	Regional Integrated Multi-Hazard Early Warning System for Africa and Asia
RSMC	Regional Specialized Meteorological Centre
SDGs	Sustainable Development Goals
SIDS	Small Island Developing States
SOP	Standard Operating Procedure

SPC	The Pacific Community
SPREP	Secretariat of the Pacific Regional Environmental Programme
UNISDR	United Nations Office for Disaster Risk Reduction
WMO	World Meteorological Organization