

UNDRR Submission on Case Studies on Comprehensive Risk Management (CRM) Approaches

Contribution to the CRM Compendium (vol. 2)

February 2024

Issue: Comprehensive Risk Management (CRM) Approaches

Title: The Executive Committee invites relevant organizations, networks and experts to submit case studies on the application of comprehensive risk management and transformational approaches for anticipating and responding to loss and damage from the impacts of climate change including rapid onset events and slow-onset events.

I. Background

The Executive Committee (Excom) of the Warsaw International Mechanism for loss and damage (WIM) is implementing its five-year rolling workplan, of which strategic workstream (c) is to enhance cooperation and facilitation to comprehensive risk management (CRM) approaches. In fulfillment of this workplan, a CRM compendium is being produced. It will complement the two prior CRM compendiums, first produced in 2016 and subsequently updated in 2019.

This version of the compendium will explore a spectrum of CRM actions, including (i) anticipating action integrated into adaptation and disaster risk reduction, (ii) contingency measures, and (iii) short-, medium- and long-term response, rehabilitation and sustainable reconstruction.¹ The case studies will delve into how risks are assessed, explore the policy landscape for reducing, transferring and retaining risk, and spotlight post-disaster action in developing countries, among others.

II. Conceptual Framing of Comprehensive Risk Management

As inherent in its name, CRM approaches are holistic in avoiding, addressing and reducing various risks of all origin, nature and scale. It covers a wide range of risks and impact over the short- to long-terms, associated with extreme events and slow-onset events. It also fosters active collaboration among stakeholders – government institutions, non-State actors, and others at the subnational, national, regional and international levels.

CRM ensures that there is coherence and synergies across planning and implementation frameworks. This is particularly necessary when human and financial resources are limited, as it maximizes the outcome of risk reducing action and reduces the impact of hazards. Also, CRM reduces the disconnect between relevant planning instruments, sectors, entities and stakeholders.

III. CRM approaches in the global landscape

CRM has been increasingly recognized and corroborated through global multilateral processes. Directly or indirectly, CRM is reflected in the Sustainable Development Goals (SDGs), the Sendai Framework for Disaster Risk Reduction and the Paris Agreement, all of which were adopted in 2015. For example, the Paris Agreement explicitly references comprehensive risk assessment and management among areas for cooperation and facilitation to enhance understanding, action and support with respect to loss and damage. Target E of the Sendai Framework, in line with SDGs 1 (No Poverty), 11 (Sustainable Cities and Communities) and 13 (Climate Action), calls to ‘Substantially increase the number of countries with national and local disaster risk reduction strategies’, wherein promotion of policy coherence with climate change, among others, is one of the defined principles.

A few global processes which were conducted in 2023 confirmed the value of CRM, both explicitly and implicitly. Among them were the [Midterm Review](#) (MTR) of the Sendai Framework for Disaster Risk Reduction (SF), first [global stocktake](#) (GST) of the Paris Agreement, and the review of progress on the Sustainable Development Goals, articulated in the [Global Sustainable Development Report 2023](#). These processes converged and confirmed the call for reducing silos and conversely, enhancing and building synergies across policies and plans, and in financing mechanisms. The outcomes of the 28th Conference of the Parties (COP 28) to the United Nations Framework Convention on Climate Change (UNFCCC) and related meetings, beyond the GST, also concretized the CRM approach.

IV. CRM enhancing policy coherence at the national level

The United Nations Office for Disaster Risk Reduction (UNDRR) has scaled-up CRM as an approach (www.undrr.org/crm) to inform all of UNDRR’s programmes and initiatives. This is underpinned in the fact that climate and disaster risks are diverse, but interrelated, cascading and compounding.

¹ https://unfccc.int/sites/default/files/resource/WIM_TEASER_2.pdf

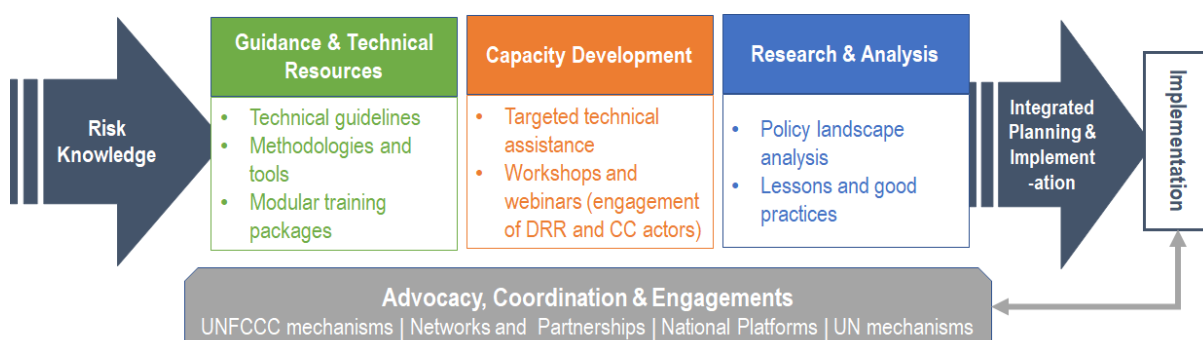
Managing risks in one area, without applying a holistic approach, has and can serve to create more risks in another area. A CRM approach, hence, enables development and implementation of integrated or synergized plans to address disaster risk and climate change, enabling collaborative actions and prevents fragmentation of resources.

There is no formal report or plan solely for loss and damage, and it is done on a voluntary, country-driven basis; countries may use nationally determined contributions (NDCs) and/or national adaptation plans (NAPs), among others, to report on and plan for action to avert, minimize and address loss and damage. As such, the CRM initiative of UNDRR has largely targeted alignment and integration of NAPs and DRR strategies.

At the beginning of 2024, 53 countries had submitted their NAPs,² while 129 countries have reported the existence of national DRR strategies.³ To build up the adaptation ambition, and scale-up actions to avert, minimize and address loss and damage, UNDRR values these existing planning frameworks as the basis to build the policy basis for CRM implementation.

In alignment with the global CRM thrust, UNDRR has been supporting, advocating for and encouraging CRM approaches at national and subnational levels, building on the pioneering work in the Pacific (see Box). This approach is embedded in a full-spectrum understanding of risk, tools and guidance for a shared understanding, research and analysis, and targeted technical assistance for the formulation and implementation of integrated plans.

Fig 1: UNDRR's CRM approach



1. Tools and knowledge products

With relevant partners, UNDRR has developed a suite of tools and products to advance the understanding of CRM as an approach for integrated planning and provide practical guidance for formulation and implementation of such plans. Some of these products have been developed as part of the work plan of the Technical Expert Group on Comprehensive Risk Management (TEG-CRM). A list of these tools and products is [annexed](#).

2. Regional consultations

UNDRR holds consultations in different regions to convene national governments represented by their ministries responsible for climate change, disaster risk management, and where possible, planning and finance. Using a methodical approach, these consultative workshops promote peer-learning, share common challenges and opportunities, and result in roadmaps suited to the region, and further contextualized to the respective countries. Such workshops have been conducted in [Africa in 2022](#) and in the [Caribbean in 2023](#) (See Box 1).

² <https://napcentral.org/submitted-naps>

³ DRR strategies are as of 31 December 2023 based on reporting in the Sendai Framework Monitor

Box 1: Promoting CRM in small island developing States

The Pacific Island Countries have been the pioneers in integrated planning - through Joint National Action Plans in countries and [Framework for Resilient Development in the Pacific](#) at the regional level. Countries like [Kiribati](#) and [Tonga](#) have submitted a joint plan for disaster risk management and climate change as NAPs. The CRM approach pursued by UNDRR draws its inspiration from such good examples.

In the Caribbean, UNDRR partnered with the Caribbean Disaster Emergency Management Agency (CDEMA), Caribbean Community Climate Change Centre (5Cs), and the government of the Republic of Trinidad and Tobago, supported by the UNFCCC Secretariat, to host a [regional workshop in the Caribbean](#) in 2023. Climate change (particularly adaptation) and DRR representations from 17 countries along with international, regional and national organizations were in attendance. Following presentations and peer-to-peer exchanges, a regional roadmap for integrated approaches was proposed. The core of the roadmap is for collaboration to strengthen national capacities for developing and implementing integrated approaches, and aligning finance accordingly. www.undrr.org/quick/79360

The Maldives, an archipelago of small islands in the Indian Ocean, faces significant challenges from climate and disaster risks and impact. Over the past few years, the country has pursuing various measure for strengthening their planning frameworks, including a Strategic National Plan for Disaster Risk Reduction and Climate Change Adaptation (SNAP), 2010-2020; and a National Spatial Plan, 2020-2040, both of which are designed to through an integrated approach.

UNDRR, UN Environment Programme (UNEP) and UN Development Programme (UNDP), alongside national partners, facilitated a scoping mission in 2020 to identify opportunities for coherence in planning and implementation frameworks. Subsequent to this, UNDRR convened a [multi-stakeholder consultation](#) in 2022, hosted by the government, that resulted in the adoption of an action plan for an integrated national disaster risk reduction and adaptation plan in the country. www.undrr.org/quick/72744

3. Targeted technical assistance

Regional consultations and workshops are followed by targeted and demand-based technical assistance to countries. For instance, followed by the Caribbean CRM workshop, Barbados, at the conclusion of its national DRR strategy in 2023, initiated a multi-stakeholder process to integrate DRR and climate action to address the climate emergency. Trinidad and Tobago, as the host country of the Caribbean CRM workshop, committed to a CRM approach, and followed this commitment by initiating a process to prepare an integrated plan for adaptation (NAP) and DRR strategies.

Similarly, after the Africa CRM workshop, the Office of the Prime Minister of [Uganda hosted a national workshop](#) to kickstart a process of integrating disaster risk reduction and climate change adaptation at the national and local levels in 2023. [Comoros](#) and Mauritania have rolled out a process to convene different ministries under a common national platform to promote CRM.

Using this approach, UNDRR has engaged or provided technical assistance to around **40 developing vulnerable countries**⁴ (mostly LDCs and SIDS) and territories to apply a CRM approach to integrated planning and implementation of DRR and climate change adaptation in 2023. Of these countries, **15 countries**⁵ have started integrating DRR and climate change (particularly adaptation) in plans and strategies.

⁴ List: Bangladesh, The Maldives, Mongolia, The Philippines, Nepal, Bhutan, Tonga , Lao PDR, Samoa, Fiji, Timor Leste Anguilla, Antigua and Barbuda, the Bahamas, Cayman Islands, the Commonwealth of Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Maarten, St. Kitts & Nevis, Saint Lucia, St. Vincent & the Grenadines, Suriname, Belize, Barbados, Trinidad & Tobago, Brazil, Comoros, Djibouti, Mauritania, Sudan, Jordan, Uganda, DRC, Tanzania, Zambia, Zimbabwe and Lesotho.

⁵ List: Bangladesh, The Maldives, Belize, Barbados, Trinidad and Tobago, Brazil, Comoros, Djibouti, Mauritania, Sudan, Uganda, DRC, Tanzania, Zambia, and Lesotho.

V. Local action and urban resilience

At the local level, UNDRR supports local authorities and cities to develop resilience action plans as part of the Making Cities Resilient 2030 ([MCR 2030](#)) initiative. Through the initiative, and collaborating with global and regional partners, UNDRR provides local governments with direct access to partners offering a range of climate and disaster risk services, while offering a ‘one stop shop’ suite of tools and resources.

In its second phase, starting 2021, MCR2030 runs as a unique cross-stakeholder initiative, delivering a 3-stage roadmap⁶ to urban resilience. This includes [tools to self-assess local resilience levels](#), including one on [climate and disaster risks](#), access to knowledge and monitoring and reporting tools, including a recent climate scorecard. A total of 418 cities from 46 countries/ territories have reached Stage B, and hence capacitated to understand their risk levels and resilience needs to be able to plan ahead. An online [dashboard](#) helps cities connect and foster exchanges and collaborations among cities and with organizations.

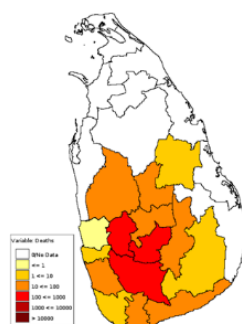
VI. Data as an enabler for CRM

Data is fundamental to successful CRM approaches. As the custodian of Sendai Framework and relevant SDG targets, UNDRR is mandated to support countries with [official reporting](#) on the 7 targets and 38 indicators of the Sendai Framework, more broadly, data on losses and damages from climatic and non-climatic hazards.

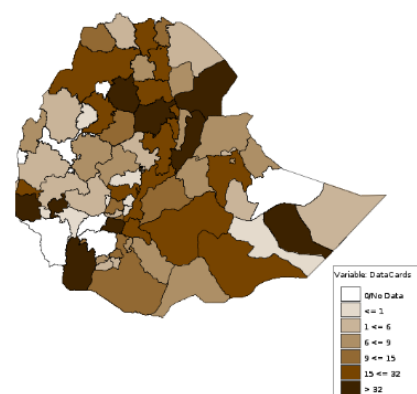
To enhance national and local capacities to assess, process, analyze and apply data on losses and damages, UNDRR supports the use of [DesInventar](#) as a nationally owned platform for managing data. A partnership among UNDRR, the World Meteorological Organization (WMO) and the UN Development Programme (UNDP), is advancing on the development of a [new tracking system for hazardous event and losses and damages](#) for a more standardized, comprehensive and interoperable tracking of impact.

Fig 2: Examples of countries maintaining and using the tracking system for losses and damages. The disaster management offices of countries collect data on impact of at all scales and for all hazards, which is helpful to understand risk at localized scales

Human mortality resulting from landslides in Sri Lanka (1974-2020)



Frequency of floods in Ethiopia (1957-2020)



Source:
[DesInventar.net](#)

The new tracking system will be based on emerging needs and use cases of CRM, and will seek to capture both extreme events and slow-onset events, as well as non-economic losses. UNDRR, with UNDP and WMO, convened an [experts' workshop on slow-onset events](#) to deep dive into the challenges and potential means to assessing resulting loss and damage.

⁶ Stage A: Enhance understanding of risk and resilience, Stage B: Plan better, Stage C: Implement better

VII. Early Warning Systems

Early warning systems (EWS) are among the loss and damage measures specifically referenced in the Paris Agreement and the Sendai Framework. Its necessity in a CRM approach has become increasingly evident, leading to the establishment of the [Early Warnings for All](#) (EW4All) initiative of the UN Secretary-General. It is designed to be a multi-hazard early warning system that reaches the last mile. A [five-year action plan](#), 2023-2027, was adopted (Figure3). The targets adopted under the Global Goal on Adaptation (GGA) at the 5th session of Parties to the Paris Agreement (CMA 5) likewise incorporated early warning systems, linked with the EW4All initiative.

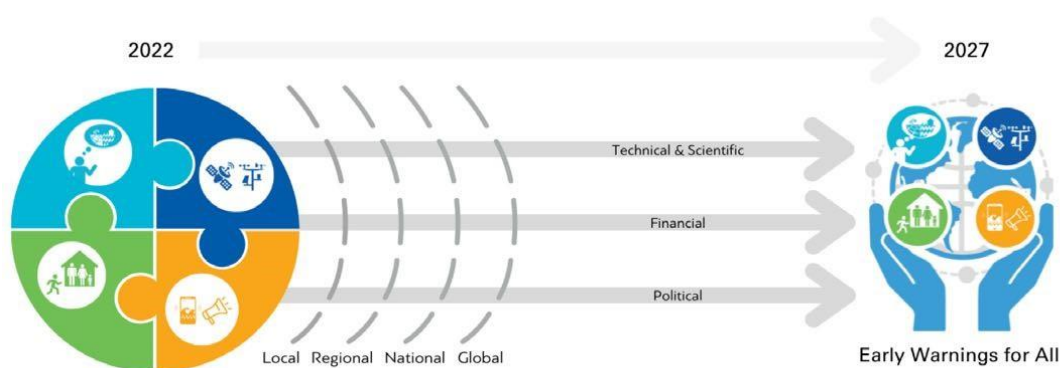


Figure 3: Architecture to achieve the five-year goal

Source: [Global Status of Multi-Hazard Early Warning Systems 2022](#)

The EW4All has four pillars, each discrete but interconnected with the others:

- Pillar 1 is disaster risk knowledge and management, designed for systematically collecting data, undertaking risk assessments and improving knowledge and information on a wide range of risks.
- Pillar 2 is detection, observations, monitoring, analysis and forecasting of hazards. This pillar will, inter alia, enhance capacities for detecting hazards, closing observation gaps and enhancing infrastructure for early warning systems.
- Pillar 3 is warning dissemination and communication that will ensure that warning information reaches those at risk, are understood, and information is usable.
- Pillar 4 is preparedness to respond that, among other things, aims to build capacities for developing and implementing response plans and ready people to respond to multiple hazards.

The [2023 Global Status of Multi-Hazard Early Warning Systems](#) (MHEWS) indicates that based on country reports, some 101 countries have MHEWS, a two-fold increase since 2015. Gaps, however, remain despite this improvement. Coverage of MHEWS was relatively low in least-developed countries (LDCs), land-locked developing countries (LLDCs), and small island developing states (SIDS). Scoring on risk knowledge remained the lowest, relative to observation and forecasting, warning dissemination and communication, and preparedness to respond.

The report also shows a high correlation between countries with DRR strategies and coverage of early warning systems. Importantly, the report also found that countries with more comprehensive DRR strategies, also have higher coverage of MHEWS, pointing to the need to adopt a CRM-based approach to early warning systems. A few case studies have been documented across the Global Status of multi-hazard early warning systems reports of [2022](#) and [2023](#). Some selected case studies have been annexed as examples.

VIII. Financing

Of note is the adoption of the decisions on the loss and damage fund (including its governing instrument) with specific areas for which the fund would support, among them are CRM activities: intermediate or long-term recovery, reconstruction or rehabilitation, and action that address slow-onset events, etc. Ahead of the adoption of this decision, UNDRR and ODI produced the [Financial Arrangements for addressing losses and damages: a disaster risk reduction primer](#). Contained in the primer are relevant case studies from selected countries that, inter alia, have been pursuing CRM through financial instruments (Box 2).

Box 2: Case Studies from L&D Primer on Financial Arrangements for addressing loss and damage

Belize:

- Impact from climate-related disaster has been significant, e.g., Hurricane Lisa in 2022 affected 43% of the population, with economic impact amounting to over 4% of GDP; Hurricane Earl in 2016 had damage and loss estimates of about 22% of GDP.
- Finance for address loss and damage in Belize includes parametric insurance through CCRIF-SPC and a debt-for-nature swap (to shore up conservation and protection of marine ecosystems), complemented by official development assistance (ODA).

Fiji:

- Severe impact of coastal resources observed, among them, coral bleaching and decline in seagrass beds, with impact also on displacement of people
- Among the financing modalities to address loss and damage observed in coral reefs is insurance, to be provided through a Partnership for Coral Reef Finance and Insurance in Asia and the Pacific initiative (in development); and for displacement, risk retention through a Trust Fund for relocation of people.

India:

- Storms, floods, drought and heatwaves are among the hazards to which India is vulnerable, e.g., probabilistic estimates suggest climate related impact from floods is over US\$11 billion, cyclones, over US\$3 billion, and drought, over US\$72 billion.
- A National Disaster Response Fund (NDRF) and State Disaster Response Funds (SDRFs) are among the instruments established to address the impact from selected hazards, including the aforementioned.

Mali:

- Exposed to severe flood and droughts, e.g., drought in 2020 and 2022 affected 6.8 million (32%) and 1.7 million (7.5%) of the population.
- Due to conflicts, access to traditional instruments was not feasible, and thus, humanitarian aid was the main source for addressing climate-related disaster impact.

Report available at: <http://www.undrr.org/quick/82169>

IX. Partnerships

Successful CRM approaches require strong partnerships to reinforce strengths and plug gaps where possible. Several coalitions or groups with relevance to CRM have emerged in the past few years, and UNDRR has been instrumental in shaping and furthering the agendas of a selected few. UNDRR, for example, co-chairs the [Comprehensive Risk Management working group in the Risk-Informed Early](#)

[Action Partnership \(REAP\)](#) (See Box 3), and co-leads the [Early Warnings for All](#) initiative⁷ as well as the [Centre of Excellence](#) for Climate and Disaster Resilience.

Box 3: CRM for Early Warning – Early Action

The Risk-informed Early Action Partnership ([REAP](#)) was established in 2019 to pursue four targets that will save lives by scaling up early action. Its Target 1 states: “By 2025, 50 countries have reviewed and integrated their crisis/disaster risk management, climate adaptation laws, policies and/or plans to ensure that they reduce climate change impacts and exposure on people and the environment.”

REAP’s Target 1 Working Group, co-chaired by UNDRR, has been undertaking an ongoing Comprehensive Risk Management mapping exercise. The results so far indicate that Partners are working in 66 countries to support governments with activities around integrating climate change and DRR strategies and laws, adaptation communications, EWS, and disaster risk finance strategies.

As underscored in REAP Target 1, a comprehensive risk management approach to integrated planning enables predictable decision-making and more efficient use of available resources. REAP’s CRM working group has helped the anticipatory action community identify existing efforts on in reviewing policies and national DRR or climate change adaptation strategies, address duplication and support greater collaboration on the ground.

X. Conclusion

Recent COP outcomes have shown the need to promote and pursue integrated approaches to be able to address the complex climate-related challenges in the world. The success of CRM is contingent on the convergence of diverse plans and tools ranging across DRR, development and adaptation to avert, minimize and address loss and damage.

The global community has strengthened the framework for CRM approaches, but there are constraints with translating this to national and subnational levels. Case studies and good practices, as presented in this submission, can enhance understanding and promote such approaches given their benefits vis-à-vis bolstered resilience to climate-related hazards.

⁷ Pillar 1 (Risk Knowledge) is led by UNDRR; Pillar 2 (Detection, observations, monitoring, analysis and forecasting of hazards) by WMO; Pillar 3 (Warning dissemination and communication) by the International Telecommunication Union (ITU); and Pillar 4 (Preparedness to respond), by the International Federation of Red Cross and Red Crescent Societies (IFRC).

Annex 1: Capacity Development Tools

UNDRR has produced a number of tools and a training course as part of a CRM approach. These were designed to target diverse audiences. For example, the thought leadership course (below) was designed with leaders and decision-makers in mind, though it is available to anyone with an interest in integrated planning and implementation.

Training Courses

- **Thought Leadership Course – Synergizing Disaster Risk Reduction and Climate Change Adaptation (UNDRR, UNSSC, 2023):** This thought leadership [module](#), developed by UNDRR and UN Staff Systems College, explores fundamental aspects of harnessing DRR and CCA synergies and the lessons learnt by those who are at the forefront of CRM activities.

Guidance Documents

- **Technical guidance on comprehensive risk assessment and planning in the context of climate change (UNDRR, GIZ, 2022):** To help decision makers and practitioners unpack the complex risk landscape, UNDRR and GIZ developed [this technical guidance](#) which offers a framework on how to apply comprehensive risk assessment and planning, acknowledging that risks in the context of climate change are complex and systemic and needs improved risk governance.
- **Technical guidance on application of climate information for comprehensive risk management (UNDRR, WMO, 2023):** The [guidance](#) provide the necessary know-how to develop and strengthen a policy basis for DRR and risk-informed development. The present guidance provides pathways for climate information that is scientifically sound and publicly available, particularly for inclusion in DRR strategies and to strengthen connections with adaptation planning.
- **Promoting synergy and alignment: between Climate Change Adaptation and Disaster Risk Reduction in the context of National Adaptation Plans (UNDRR, 2021):** Targeted at national authorities leading the process of developing and/or updating the NAP as well as other stakeholders, [this guidance](#) is a supplement to the UNFCCC NAP Technical Guidelines. It focuses on opportunities for the NAP process to integrate risk-centred approaches and in creating synergies and effective connections with disaster risk reduction efforts.
- **Words into Action: Engaging for resilience in support of the Sendai Framework for Disaster Risk Reduction 2015 – 2030 (UNDRR, 2019):** This 2019 Words into Action [guide](#) on Developing National Disaster Risk Reduction Strategies offers guidance for both policy makers and practitioners to develop national strategies that will reduce the risk and build resilience.

Other products:

- **Policy landscape analysis:** Within the CRM, UNDRR and its partners have developed a series of reports that provide an approach to assess the degree of mainstreaming of DRR and CCA policy for [the Caribbean](#), [Sub-Saharan Africa](#), [Benin](#), [Malawi](#), [Niger](#) and [Uganda](#).
- **Policy brief: Disaster risk reduction and climate change (UNDRR, 2021):** This [brief](#) explores the challenges faced in disaster risk governance in relation to the climate emergency and provides policy recommendations to galvanize political leadership and momentum and scale up comprehensive disaster and climate risk management.
- **Analysis of DRR inclusion in national climate change commitments (UNDRR, 2021):** This [study](#) reviews National Adaptation Plans (NAPs)/Nationally Determined Contributions (NDCs) and contributing documents to better understand how disaster risk management is approached in climate change documents. The study assessed the level of integration of CCA and DRR across six critical aspects – institutions, policies, operations, data management, knowledge management and finance in ten selected countries as case studies.

Annex 2: Case studies on early warning systems

In Africa – DARAJA (Developing Risk Awareness through Joint Action), is a project that focuses on enhancing the access and the use of relevant weather and climate information for the informal settlements in Dar es Salaam, Tanzania, and Nairobi, Kenya. This initiative aims to improve the climate resilience of approximately 800,000 people (i.e., 20 per cent of population) living in informal settlements and achieve a reduction of 5-10 per cent measurable avoidable losses caused by extreme weather events using climate information services in Dar es Salaam and Nairobi.

In Americas and the Caribbean - Fisheries Early Warning and Emergency Response (FEWER) System was developed by the ICT4Fisheries Consortium in collaboration with the Caribbean Regional Fisheries Mechanism (CRFM). It is an information, communication and technology (ICT) early warning system that aims to minimize the risks posed by the impacts of the climate change on the lives and livelihood of fishermen in the Caribbean region. Mobile phone applications are used to send the early warnings of the extreme weather events and sea conditions to the fishermen. Local and traditional knowledge can be shared via mobile phone application, and can be used to improve the climate-smart fisheries planning, management and decision-making.

In Asia – AHA Centre (ASEAN Coordination Centre for Humanitarian Assistance), an intergovernmental organization, aims to support and coordinate ASEAN Member States efforts to minimize disaster losses and respond to emergency events as one, as an information and learning hub. AHA Centre supports the NDMOs across ASEAN Member States through capacity building courses such as ASEAN Emergency Response and Assessment Team (ASEAN-ERAT) and AHA Centre Executive (ACE).

In Europe – Meteoalarm provides alerts in the Europe region to prepare for the impacts of the extreme weather events such as “heavy rain with risk of flooding, severe thunderstorms, gale-force winds, heat waves, forest fires, fog, snow or extreme cold with blizzards and avalanches, or severe coastal tides”. Also, European Flood Awareness Systems (EFAS) sends out notifications to the national and regional authorities to prepare for a possible flood emergencies. Probabilistic, medium-range flood forecasts, flash-flood forecasts and impact forecasts are some of the services provided by the EFAS. More than 200 flood notifications and 500 flash-flood notifications were sent out per year by the EFAS.

In Pacific – DisasterAWARE, a mobile application developed by the Pacific Disaster Centre’s (PDC), provides the global community with near real-time alerts and information on a total of 18 hazards. Scientifically verified sources automatically generate new information in the application, and where no official source of information is readily available, personnel at PDC manually update the alerts.

Cyclone Warning in Bangladesh

In 1970, the Bhola Cyclone killed more than 300,000 people (some estimate between 300,000 to 500,000 people) and affected millions of people in Bangladesh (then East Pakistan). The Cyclone Preparedness Programme (CPP) was established in 1972 by the Government of Bangladesh, Bangladesh Red Crescent Society (then Bangladesh Red Cross Society) and IFRC (then League of Red Cross Societies) to mitigate the challenges of catastrophic cyclones that frequently hit the Bangladesh coast.

The Government of Bangladesh has made significant investment in improved early warning services in the last decade. At present, an Interactive Voice Response early warning service is accessible over any of the existing mobile phone operators, with a specific number 10941, which provides information on hazards, including daily weather forecast, rainfall, cyclone, floods, and landslides. In particular, the cyclone early warnings have significantly decreased the number of cyclone related fatalities in

Bangladesh. During the Cyclone Matmo-Bulbul in 2019, less than 20 lives were lost, and 2.1 million people were safely evacuated to evacuation centres.

PhilAWARE – Using a risk intelligence platform to minimize the impacts of disasters

The [PhilAWARE system](#)⁸ is based on the [DisasterAWARE platform](#), a multi-hazard early warning, hazard monitoring and risk intelligence platform developed by the Pacific Disaster Center (PDC) to support disaster risk reduction and good practices throughout all phases of disaster risk management in the Philippines. The platform is designed to enhance hazard monitoring and early warning and enables information sharing between disaster managers and decision makers.³⁶ The system was handed over to the Philippines Office of Civil Defense (OCD) at the end of 2021 and has been put to the test several times so far.

On 10 April 2022, Tropical Storm Agaton (known internationally as Megi) made landfall, leading to flash floods in low-lying areas and rain-induced landslides. Hundreds of Philippines residents were forced to evacuate as major landslides pushed mud over villages in Leyte Province, burying more than 200 houses. Initial reports suggested that there had been 212 deaths, 132 missing and 8 injured. Despite these losses, it was reported that the outcomes of the storm could have been much worse were it not for the [fast and effective response of OCD](#), supported by the PhilAWARE system:

- The OCD Operations Center used PhilAWARE to track the storm and plot the landslide-affected areas using the system's drawing tools.
- OCD leveraged the critical lifeline data collected by project partner Humanitarian OpenStreetMap for more localized response mapping.
- The PhilAWARE system supported the coordination of OCD's response, allowing stakeholders to share important hazard information in near real time, and receive hazard update notifications via the system's SmartAlert service.

The effectiveness of the PhilAWARE system was again tested in late October 2022 when Typhoon Nalgae (locally named Paeng), swept the nation. Although stronger storms had affected the Philippines during 2022, the extreme rainfall unleashed by Nalgae spurred landslides and flooding, making it among the season's deadliest and most destructive storms to hit the island nation. The storm and the secondary hazards that arose from it (extreme flooding and landslides) were reported to have claimed the lives of more than 100 people and displaced nearly 200,000. Despite substantial losses, again, the impacts would have been more severe if disaster managers and decision makers had not been able to anticipate and prepare for the impacts of the typhoon.

Sources: Global Status of multi-hazard early warning systems reports of [2022](#) and [2023](#).

⁸ PhilAWARE, one of the case studies, was acknowledged as a contributor to the [2022 United Nations Sasakawa Award for Disaster Risk Reduction](#) to the Pacific Disaster Centre (PDC), part of the University of Hawai'i.