Disaster Risk Reduction Exemplar to the User Interface Platform of the Global Framework for Climate Services
DISASTER RISK REDUCTION EXEMPLAR
TO
THE USER INTERFACE PLATFORM
OF THE
GLOBAL FRAMEWORK FOR CLIMATE SERVICES
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EXECUTIVE SUMMARY

The Exemplar for Disaster Risk Reduction – Using Climate Services to Build Resilience to Disasters

Changes in weather and climate extremes, and their related impacts, pose challenges for global, regional, national and local disaster risk reduction systems. Better climate services can help meet these challenges, in both the short- and the long-term, by giving decision-makers enhanced tools and systems to analyse and manage risk, under current hydrometeorological conditions, as well as in the face of climatic variability and change.

This Exemplar explains how this assistance might work. It illustrates a vision as to how the development and application of targeted climate products and services through the Global Framework for Climate Services (GFCS) can advance efforts to reduce disaster risk associated with hydrometeorological hazards.

VISION

GFCS will develop and incorporate climate information and prediction into planning, policy and practice to build society’s resilience in the face of disaster risk. This vision will be achieved by improving the quality and utility of climate information to analyse, reduce, manage and finance risks associated with hydrometeorological hazards.

Getting to Work Right Away

The area of disaster risk reduction offers immediate opportunities to benefit from enhanced climate services. There is already broad recognition of the value of climate services in reducing disaster risk, and substantial and often unfulfilled demand for actor-driven and tailored climate services.

Bridging the Gap between Providers and Other Stakeholders

Globally, regionally, nationally and locally, a coordinated and strategic effort to reduce disaster risk is already underway, involving a wide range of activities. However, particularly at national and local levels, actors still need more and better climate information: information that is tailored to their specific decision-making needs, and that is provided in appropriate language and in formats that facilitate action.

Working with Partners to Pursue Six Priority Categories of Activities

In response, this Exemplar describes six priority categories of activities, with outcomes, that can be implemented under the GFCS. Activities in these categories would catalyze provision of GFCS-related products and services, and promote widespread implementation of programmes and initiatives that incorporate climate information and services. These categories are aligned with existing disaster risk reduction structures, and compatible with other relevant international initiatives, including the international blueprint for disaster risk reduction known as The Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters. From these categories, individual projects will be developed in partnership with other stakeholders. Within the international priorities for action on disaster risk reduction, climate information is most useful when applied in six categories within the larger areas of risk analysis, risk reduction and financial protection, namely:

1. **Risk Assessment**

2. **Loss Data**
Globally, activities in these categories are already ongoing. Therefore the GFCS implementation will provide organized support to existing activities, on a pilot basis from 2013 to 2015, and more broadly afterwards, to demonstrate discrete climate-service results. An inclusive, comprehensive process that ensures that the projects are part of a system-wide international effort is recommended to identify GFCS activities for the six-year and ten-year timeframes. GFCS activities to reduce disaster risk will be supported by means of the GFCS’s five components, or pillars. This Exemplar outlines the specific actions for each priority category of activity that the pillars can support.

While pursuing activities in these priority categories, it will be essential for the GFCS to interact with stakeholders at all levels, strengthening existing institutions, developing formal partnerships, and establishing collaboration with agencies and organizations working on disaster risk reduction. Throughout the development of this Exemplar, consultation participants specifically underlined the importance of engaging communities and decision-makers at the local level, where losses and damage occur, as well as sectoral specialists and disaster managers, to ensure that climate information is relevant and is used.

Building on Existing Expertise and Structures

The GFCS seeks to promote support for its vision and activities at regional, national and global levels, building on existing partnerships while avoiding duplication. This principle can be implemented through active engagement in the working mechanisms, programmes and activities of disaster risk reduction networks and of key organizations. This document identifies some of these key mechanisms, as well as the means to seek out the many others that exist, and suggests ways for the GFCS to engage with the mechanisms. It also discusses communications and resource mobilization strategies.

Evaluating and Monitoring Progress to Manage Risk

The principal challenge faced by the GFCS in its initial stages will be to demonstrate its ability to add value. In this sense, the risks associated with implementing GFCS priority activities include organizational complexity, leadership and management, resourcing, and support for coordination between international agencies and actors on the ground. In a broader sense, the challenge is to enable effective communication between a sciences-led provider community and a needs-driven actor community. To manage these risks, the Exemplar proposes establishing monitoring and evaluation practices, both to assess the success of activities in its priority categories, and to measure overall improvement in climate knowledge and communication between technical experts, disaster risk reduction practitioners, and decision-makers at all levels.

Conclusion

Reducing disaster risk is a complex endeavour, involving systematic integration of risk reduction measures into policies, plans and programmes, over time, across multiple sectors and across broad organizational scales. Nonetheless, by leveraging the power of improved, more user-friendly climate services, the GFCS offers the possibility of significantly reducing the risk of disasters and related losses in the years to come.
1 INTRODUCTION

The goal of this Exemplar is to illustrate how the development and application of targeted climate products and services through the Global Framework for Climate Services (GFCS) can advance efforts to reduce disaster risk posed by "hydrometeorological" hazards. Nearly 80 per cent of disasters caused by natural hazards are hydrometeorological in nature, or weather- or climate-related. These hazards will change in frequency, intensity, geographic range and duration as a result of projected changes in climate, according to the Intergovernmental Panel on Climate Change (IPCC), the leading international body for the assessment of climate change science (IPCC SREX, 2012). Currently, even under existing climate conditions, there are ever greater concentrations of people and assets exposed to hydrometeorological hazards: the proportion of world population living in flood-prone river basins has increased by 114 per cent, while the proportion living on cyclone-exposed coastlines has grown by 192 per cent, over the past 30 years (UNISDR 2011a).

Better climate services can help address this problem in both the short- and the long-term. The severity of the impact of weather and climate events depends strongly on the level of vulnerability to these events. Measures which help manage current disaster risk by addressing vulnerability as well as exposure, such as improving climate services, therefore can both offer immediate benefits and lay the foundation for addressing projected climate changes (IPCC SREX, 2012).

Enhancing climate services can help reduce disaster risk by better meeting stakeholder needs in a variety of ways. While the demand for climate services is not readily monitored, there is evidence in disaster risk reduction practice of both substantial unmet demand for climate services, and a broader range of areas in which better climate services, over time, can improve risk reduction efforts. The value of climate services in reducing disaster risk is broadly recognized, given the preponderance of hydrometeorological hazards in shaping disaster risk, and the fundamental role that climate information plays in disaster risk reduction efforts. However, climate services and stakeholder needs are often not aligned. Disaster risk reduction decisions are taken by a broad group that includes disaster risk managers, as well as government sectors, humanitarian and development agencies and banks, the private sector, nongovernmental organizations, communities and individuals. Multiple consultations, meetings and publications have found that these actors need climate information that is tailored to their specific decision-making needs, and provided in appropriate language and formats that facilitate action.

1.1 OBJECTIVE, SCOPE AND FUNCTIONS

This Exemplar provides a vision as to how enhanced climate services can advance efforts to reduce disaster risk. The Exemplar lays out general principles, backed by examples, on how best to improve climate services for disaster risk reduction, and identifies categories of relevant activities.

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1 More specifically, UNISDR defines a hydrometeorological hazard as being of atmospheric, hydrological or oceanographic nature, including tropical cyclones, thunderstorms, hailstorms, tornados, blizzards, heavy snowfall, avalanches, coastal storm surges, floods including flash floods, drought, heat waves and cold spells (UNISDR, 2009).

2 "Vulnerability" is defined as characteristics, such fragility or lack of capacity, that give a person or group the propensity to be adversely affected by hazards. "Exposure", on the other hand, refers to physical presence of people, livelihoods, infrastructure or other assets in places that could be adversely affected by hazards. Both are required for a disaster to occur. IPCC SREX, 2012, p. 32 and Chapter 2.

3 See for instance: WMO and others, 2009; Goddard and others, 2010; WMO 2011a; Hellmuth and others, 2011.
The GFCS will develop and incorporate climate information and prediction into planning, policy and practice to build society’s resilience in the face of disaster risk. This vision will be achieved by improving the quality and utility of climate information to analyse, reduce, manage and finance risks associated with hydrometeorological hazards.

This vision will be realized through the implementation of activities in six priority categories – within the larger areas of risk analysis, risk reduction, and financial protection – which will advance the use of climate services for disaster risk reduction. Activities will be implemented first in two-year, six-year and ten-year timeframes, and then beyond. For the six-year and ten-year timeframes, the Exemplar recommends development of a comprehensive process to identify GFCS activities, to ensure that the projects are integrated into the existing system-wide international effort to reduce disaster risk. This document focuses specifically on the categories of activities to be undertaken. From these categories, individual projects can be developed at global, regional, national and local levels.

To be effective, GFCS’s vision and the activities it describes for disaster risk reduction must align with existing disaster risk reduction structures, and be compatible with other relevant international initiatives. This vision is therefore designed to support the international blueprint for disaster risk reduction known as The Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters (the Hyogo Framework). The vision supports both the Hyogo Framework’s overarching goal of “building resilience and achieving the substantial reduction of disaster losses”, and its five priorities for action, as follows:

1. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation;
2. Identify, assess and monitor disaster risks and enhance early warning;
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels;
4. Reduce the underlying risk factors;
5. Strengthen disaster preparedness for effective response at all levels.

Additionally, the vision is framed so as to support global international coordination efforts to reduce disaster risk after 2015 – a process usually referred to as HFA2. It is also expected to contribute to the future sustainable development goals currently being developed and the successor to the Millennium Development Goals after 2015. Furthermore, GFCS’s contribution to reduce hydrometeorological risk aligns with the priorities of the United Nations Framework Convention on Climate Change and the Rio+20 United Nations Conference on Sustainable Development. (For more details see Annex 1.)

To help illustrate the planned implementation of this vision, this document includes boxes with case studies and terminology, to help clarify the meaning and relevance of certain disaster risk reduction concepts and practices.

**How Climate and Weather Services Interact**

In GFCS, climate services complement the role of weather services in disaster risk reduction. Effective climate services will facilitate climate-informed decisions that will, with implementation of this Exemplar, reduce loss and damage in climate-related disasters. Such climate services can provide advance warning of future potential risks (as well as potential opportunities) several weeks, months, years and decades ahead, depending on the nature of the risk. This advance warning can be particularly effective when integrated with weather services. Climate services enable decision-

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makers and communities to assess, and prevent or prepare for, potential harmful weather events; weather services enable action in response to specific events as they become imminent.

The next subsection identifies the areas in which climate services currently can add the greatest value for disaster risk reduction.

1.2 THE NEED FOR GFCS IN THE AREA OF DISASTER RISK REDUCTION

While the demand for climate services is not readily monitored, there is evidence in disaster risk reduction practice of both substantial unmet demand for climate services, and a broader range of areas in which better climate services, over time, can improve risk reduction efforts. The GFCS selection of disaster risk reduction as a priority area for improving the delivery and uptake of climate services therefore can promptly and significantly advance efforts to reduce hydrometeorological disaster risk. To outline these opportunities for progress, this subsection first introduces the concepts and practice of disaster risk reduction, and then identifies the categories of activities to which climate services can add the greatest value.

What is Disaster Risk Reduction?

Disaster risk reduction is the concept and practice of analysing and reducing the causal factors of disasters by decreasing exposure to hazards, lessening vulnerability of people and property, improving management of land and the environment, and enhancing preparedness for adverse events. Disaster risk reduction also includes establishing adequate financial protection, including financial planning and investment as well as the sharing of risk through financial mechanisms. (See Box 1.1, “Relevant terminology,” below.) Disaster risk reduction activities at local, national, regional and global levels are guided by an international blueprint known as the Hyogo Framework, which was adopted by the United Nations General Assembly in 2005. Its adoption reflects a paradigm shift from disaster management – that is, from coping with impacts – to prevention. The Hyogo Framework’s five priorities for action (see section 1.1, above) emphasize that reducing disaster risk requires strengthened governmental commitment and investment, risk information and early warning capacity, education and public awareness, understanding the underlying risk factors, and preparedness to respond to impacts that could not be avoided.

Disaster risk reduction is primarily concerned with hazards of natural origin – such as earthquakes, floods, droughts and cyclones – and related technological threats. These hazards arise from a variety of geological, meteorological, hydrological, oceanic, biological, and technological sources, sometimes acting in combination (UNISDR 2009b). Although the magnitude, frequency and duration of these hazards can differ considerably, some preventative measures are common to many of them. This has led disaster risk reduction to embrace a multi-hazard approach. Exercises such as undertaking risk assessments, avoiding settlement in exposed areas, raising the public’s awareness of risk, diversifying livelihoods, transferring disaster risk through insurance and ensuring a population acts on early warning all help to manage risk across a range of hazards.

Reducing disaster risk requires a highly diverse set of actions, and thus a key challenge is to ensure that resources to support disaster risk reduction programmes reach all relevant levels, particularly the local level, where losses and damage occur. Disaster risk reduction involves systematically integrating risk reduction measures into policies, plans and programmes across multiple sectors, geographic and organizational scales, and institutional settings. Because disasters not only endanger lives, but also affect all areas of the economy, reducing disaster risk requires coordinated action among many sectors and ministries responsible for sustainable development and poverty reduction, including planning and finance, health, environment, agriculture, education, transport and infrastructure. This "multi-sectoral" action is undertaken at global, regional, national and local levels, by government and nongovernmental stakeholders including the private sector, academia and civil society organizations.

5 As stated in footnote 3 of the Hyogo Framework (UNISDR, 2007a).
Box 1.1. Some Relevant Terminology

Disaster risk management
The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.

Disaster risk reduction
The concept and practice of analysing and reducing the causal factors of disasters by decreasing exposure to hazards, lessening vulnerability of people and property, improving management of land and the environment, and improving preparedness for adverse events.

Preparedness
The knowledge and capacities developed by governments, professional response and recovery organizations, communities, and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions. Comment: Preparedness action is carried out within the context of disaster risk management and aims to build the capacities needed to efficiently manage all types of emergencies and to achieve orderly transitions from response through to sustained recovery. Preparedness is based on a sound analysis of disaster risks and good linkages with early warning systems, and includes activities such as contingency planning, stockpiling of equipment and supplies, the development of arrangements for coordination, evacuation and public information, and associated training and field exercises. These must be supported by formal institutional, legal and budgetary capacities.

Recovery
The restoration and, where appropriate, improvement of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.

Risk financing
The process of managing risk and the consequences of residual risk through products such as insurance contracts, CAT bonds reinsurance, or options (Cummins and Mahul, 2009).

Risk transfer
The process of formally or informally shifting the financial consequences of particular risks from one party to another, whereby a household, community, enterprise, or state authority will obtain resources from the other party after a disaster occurs, in exchange for ongoing or compensatory social or financial benefits provided to that other party.


Priority Categories of Activities for GFCS

Within the international priorities for action on disaster risk reduction, as established by the Hyogo Framework, climate information is most useful when applied to six categories of activities within the larger areas of risk analysis, risk reduction and financial protection. These six "priority categories" are:

1. Risk Assessment
2. Loss Data
3. Early Warning Systems
4. **Risk Reduction in Sectors**

5. **Planning Investment in Reducing Risk**

6. **Risk Financing and Transfer**

The six priority categories are shown in the green boxes in Figure 1.1, below. These are the categories in which needs for climate information are established, and existing programmes and services would be enhanced by GFCS inputs. It is in these categories, therefore, that GFCS can best start to significantly advance efforts to reduce hydrometeorological disaster risk.

As shown in Figure 1.1., the six categories of activities are drawn from more general areas of disaster risk reduction practice, which may over time benefit in other ways from enhanced climate services. Risk assessment and loss data are both forms of risk analysis. Early warning systems and sectoral risk reduction fall within the broader heading of risk reduction actions. And finally, both planning investment in reducing risk, and risk financing and transfer, comprise a part of a larger category of financial protection activity aimed at lessening the economic impact of disasters. Clearly there is a great deal of interaction between the areas, as, for instance, risk analysis is the basis for effective risk reduction and financial planning, and planning investment is required to finance both risk analysis and risk reduction.

**Figure 1.1.** Priority categories of activity for GFCS implementation (in green).

![Figure 1.1](image-url)
It should be noted that, as activities in these priority categories all help to manage risk and to increase resilience to the potential adverse impacts of hydrometeorological hazards, work in all these areas contributes to climate change adaptation (IPCC SREX, 2012). The categories reflect the needs identified by the World Climate Conference-3 (which gave rise to GFCS), among others (see Annex 2 for the full list of WCC-3 expert panel recommendations).

The six priority categories are described in general terms below. More detail on the types of actions, inputs and outputs, and projected benefits from GFCS activities in these categories can be found in section 2.3.

1. **Risk assessment.** Risk assessment determines the nature and extent of risk by analyzing potential hazards, exposed assets, and conditions of vulnerability (such as casualties, construction damages, crop yield reduction or water shortages) that could result in loss and damage to people, property, livelihoods and to the environment on which they depend (UNISDR, 2007b). Information on weather and climate hazards needs to be complemented with exposure and vulnerability information to develop a complete picture of risk. Armed with evidence concerning risk, individuals, communities, organizations, businesses and governments can make decisions to protect themselves from loss and adapt to the changing climate. Climate information is critical for the analysis of hazard patterns and trends. Analysis of hazard patterns from historical data is necessary but not sufficient; the emergence of climate prediction and forecasting tools provides unprecedented opportunities for forward-looking analysis of changing patterns and characteristics of hydrometeorological hazards (for instance, a 100-year flood may become a 30-year flood). In addition, satellite-based observations offer a unique means to provide objective and comprehensive information on hazards and exposure, and more efforts need to be devoted to fostering dialogue between risk reduction specialists and the earth science and satellite communities.

2. **Loss data.** Loss and damage data sets, of which at least 60 currently exist at regional and country levels, require a number of inputs and have a wide variety of applications. Historical and real-time data on loss and damage provides a crucial input for assessing risks of future disasters. Although past loss and damage data do not provide a complete picture of future losses – in light of climate change, growing societal hazard exposure and changes in patterns of vulnerability – they are nonetheless essential for quantifying vulnerability to help assess future risk. Data on loss and damage are also an input for evaluating the cost-effectiveness of investments intended to reduce losses, and evaluating the success of risk reduction measures. Climate services, over time, provide information on historical and ongoing extreme climate events, and help to identify and build processes for integrating this information into loss and damage accounting systems.

3. **Early warning systems.** In the past five decades, mortality rates from disasters have decreased in some regions as a consequence of the development of multi-hazard early warning systems. Effective early warning systems include risk knowledge; monitoring and warning service; dissemination and communication; and response capacity (see Figure 1.2, below).

Lessons learned from a number of good national practices in multi-hazard early warning systems indicate that these systems enable decisions to protect lives and livelihoods in short- and longer-term timeframes by extending the lead time for contingency planning and preparation (Golnaraghi, 2012). Short-term warnings can enable evacuations and transportation to predetermined shelters, the protection of some assets (for instance, by calling boats to shore and boarding-up buildings, and the pre-positioning of emergency capacities). Longer-term early warnings provide lead times of a few weeks to several months for slow-onset hazards like drought. They enable individuals and communities to make adjustments for improved agricultural planning (such as, selection of drought-resistant crops and adjustment of planting and harvesting timing) and for governments to adjust delivery of health services (for example, pre-positioning of pharmaceuticals and weather-informed vector-control activities). They also enable longer-term preparedness actions, as described below.
Figure 1.2. The four components of early warning systems

Both short-term weather forecasts and seasonal forecasts can be used to build reliable deterministic or probabilistic risk scenarios and, in turn, to strengthen disaster preparedness. Warning of a fast-onset hazard enables preparedness capacity to be activated for early response, including by: distributing stockpiles of medicine, food, water, emergency shelter and body bags; dispatching skilled personnel for rescue, and specialists to provide medical, communication, engineering and nutrition services; and accessing contingency funding. Seasonal forecasts are used in preparedness efforts such as training volunteers, mobilizing the community disaster response teams, pre-positioning of stocks, and logistics planning, including securing visas for international emergency personnel and setting up camps for the displaced. Seasonal forecasts can also be used to secure emergency funding (see example in Box 1.2). At community level, longer-term preparedness includes development of community preparedness plans and related infrastructure, e.g. shelters and raised mounds for flood evacuation, as well as measures such as carrying out other community disaster preparedness activities and micro-mitigation projects. Seasonal forecasts have been proven invaluable for contingency planning, which are plans to address and respond to specific events or scenarios for different hazards and settings and at various scales, such as citywide flooding or agricultural drought. Similarly, seasonal forecasts enable trans-boundary coordination to manage water resources in countries sharing riverways in order to reduce downstream impacts.

Box 1.2. Improving disaster response and cost savings – the first Red Cross appeal based on seasonal climate forecasts

In 2008, the International Federation of Red Cross and Red Crescent Societies (IFRC) issued its first-ever flood emergency appeal based on seasonal climate forecasts (Tall, 2008; 2010). The forecasts, issued in May, indicated a heightened chance of above-normal rainfall during West Africa’s July to September rainy season. Concerned about climate change, and having been caught off guard by devastating floods in West Africa the year before, the IFRC and the national Red Cross societies in the region were eager to respond early. To this end, the IFRC West Africa office consulted the International Research Institute for Climate and Society (IRI) for help with interpreting forecasts and developing contingency plans for the potentially serious flooding that above-normal rainfall could bring.

To prepare for impending impacts, the Red Cross also held training events throughout the region, beginning in June. Then, as the rains began, the IFRC requested funding for preparedness activities in four West African countries (IFRC, 2008). Though donor funds did not materialize until August, the IFRC was able to make use of its Disaster Relief Emergency Fund to initiate emergency response preparedness activities for imminent crisis.

As a result, communities were better prepared when the flooding began. The pre-positioning of stocks allowed the national Red Cross societies to meet beneficiaries’ needs for shelter, cooking supplies, water, and sanitation within 24–48 hours – as opposed to the 40-day wait between disaster and response when flooding occurred in West Africa in 2007. Pre-positioning also allowed the Red Cross to reduce the cost per beneficiary of their response to one-third that associated with 2007 flood relief (Braman et al., 2010).

Source: Hellmuth, 2011.

4. **Risk reduction in climate-sensitive sectors.** Governments and the private sector must make decisions to reduce disaster risk in climate-sensitive sectors to protect existing investments and lives. Climate-sensitive sectors include agriculture, health, water, energy, housing, infrastructure, tourism, industry and trade (Figure 1.3, below). Multi-sectoral plans to reduce disaster risk and to adapt to climate change consider historical, current and long-term risk in order to avoid investment that locks in future risk or results in mal-adaptation, such as infrastructure that cannot withstand shorter return times for heavy rain. Relevant multi-sectoral planning and investment decisions include financial planning, land zoning, agricultural practices and food security measures, water management, health service provision, education planning and social protection programmes, among others.
5. Planning Investment in Reducing Risk. Sound financial planning and investment plays a crucial role in reducing the risk of disaster. Countries need to assess their social and financial exposure to disasters and the potential impacts on public finances in order to inform decision-making on optimal investment, both under budgetary and legal constraints linked to sectoral planning (for instance, infrastructure or zoning), and within the disaster risk management cycle. Guidance frameworks for optimizing public investment in reducing risk are needed to support planning. Additionally, governments should enable and manage private investment to complement public financing of disaster risk management. With consideration for the social and financial risks associated with disasters, both government and private sector actors should first ensure that financial resources for risk reduction are available to invest in developing more overall resilience, and then prioritize applications of these resources among potential initiatives, deciding when and in what sequence to invest.

Financial assessments of disaster risk put a price tag on risk that allows for more systematic cost-benefit analysis for planning and investment strategies. Strategies can include: programmes to increase the financial capacity of a state or organization to respond to an emergency, while protecting its overall fiscal balance; assessments of contingent liabilities; and integration of disaster risk reduction into private and public debt management; among others. Climate information is an important component of the evidence base required to guide decisions regarding appropriate levels of investment to minimize potential impacts on the economy (such as retrofitting or relocating industry), ensuring uninterrupted delivery of critical services and infrastructure (for example, climate-proofing the transportation network), investing in the development of early warning systems and contingency planning, reserving contingency funds for emergency use, and potentially subsidizing vulnerable or impacted sectors (such as agriculture) to help protect socio-economic welfare.
6. **Risk financing and transfer.** Disaster risk financing and transfer can be broadly defined as structured sharing of the potential financial impacts of disasters caused by natural hazards; often, but not strictly, through insurance mechanisms. Vulnerable governments, communities and individuals tend to rely on high interest-rate borrowing, emergency selling of productive assets, and/or charitable assistance after a disaster, which in the worst cases can further deteriorate their economic welfare, and at best slows recovery and forces budget reallocation to the detriment of socio-economic development. However, a suite of risk financing approaches can be used at different levels to guarantee the availability of immediate post-disaster funds, while also avoiding such longer-term negative impacts. Examples include: regional or national insurance pools (such as the Caribbean Catastrophe Risk Insurance Facility) and catastrophe bonds; property catastrophe risk insurance for homeowners and enterprises; traditional and parametric agricultural insurance programs for farmers, herders, and agricultural financing institutions (for instance, rural banks and microfinance institutions); and micro-insurance products to protect the livelihoods of the poor and promote disaster risk reduction in conjunction with social programs such as conditional cash transfer programs. It must be noted, however, that risk financing and transfer mechanisms are not a panacea; they come at a cost, and must be developed as components of broader risk-management strategies.

Risk financing and transfer requires climate services to inform risk assessments and catastrophe risk analysis, ideally based on at least 30 years of hydrometeorological and other asset and vulnerability information. This information is used to determine relevant index (in case of parametric insurance) as well as the optimal level(s) (“layers”) of risk transfer, to design the financial mechanisms, and to quantify affordability, pricing and capital reserving requirements. In the case of innovative risk transfer tools (often termed “alternative risk transfer” or ART), such as weather derivatives or index-insurance, climate information is also needed to determine payout structures, as payouts are not based on actual losses, but triggered by meteorological parameters such as wind, rainfall and temperature. Forecasts of these types of parameters have been used for both portfolio risk management and diversification purposes.

The next section provides information on how each of the five GFCS pillars can support activities in these six priority categories.

### 1.3 INTERLINKAGES AMONG THE GFCS PILLARS TO ADDRESS DISASTER RISK

GFCS will improve the delivery and uptake of climate services in the six priority categories identified above by means of activities that will be supported through GFCS’s five components, or pillars (see table 1.3, below). These activities are described in GFCS’s implementation plan as follows:

- **User Interface Platform:** a structured means for users, climate researchers and climate information providers to interact at all levels.

- **Climate Services Information System:** the mechanism through which information about climate (past, present and future) will be routinely collected, stored and processed to generate products and services that inform often complex decision-making across a wide range of climate-sensitive activities and enterprises.

- **Observations and Monitoring:** to ensure that climate observations and other data necessary to meet the needs of end users are collected, managed and disseminated and are supported by relevant metadata.

- **Research, Modelling and Prediction:** to foster research towards continually improving the scientific quality of climate information, providing an evidence base for the impacts of climate change and variability and for the cost-effectiveness of using climate information.
- *Capacity Development:* to address the particular capacity development requirements identified in the other pillars and, more broadly, the basic requirements for enabling any GFCS-related activities to occur.

Table 1.3, below, outlines the specific actions for each priority category that the first four pillars can support to help realize the overall vision of this Exemplar, that of developing and incorporating climate information and prediction into planning, policy and practice to build society’s resilience in the face of disaster risk. The fifth pillar, capacity development, provides cross-cutting support for all activities.
**Table 1.3. Priority Categories of Activity for Disaster Risk Reduction, by Pillar**

<table>
<thead>
<tr>
<th>Risk Assessment</th>
<th>UIP</th>
<th>CSIS</th>
<th>Obs/Mon</th>
<th>RMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Provide understanding of risk assessment demand and requirements.</td>
<td>• Historical databases of hazards (from in situ and space-based environmental variables) and related metadata - archive of past climate events.</td>
<td>• In situ and space-based Earth system observing networks for monitoring and detection of hazards, designed with consideration for decision-making spatial and temporal requirements.</td>
<td>• Loss and economic damage causality, extreme event behaviour and change (e.g. due to climate change), characterization of uncertainty.</td>
<td></td>
</tr>
<tr>
<td>• Incorporate relevant climate observations, statistical analysis, forecasts and projections of the weather, hydrological and climate related extremes in risk assessment processes.</td>
<td>• Statistical analysis of hazard characteristics. Inform the calculation of return periods, probabilities of occurrence, exceedance thresholds etc.</td>
<td>• In situ and space-based observations of exposed assets, including human settlements, infrastructure and socio-economic activities.</td>
<td>• Translation of environmental variables into hazards.</td>
<td></td>
</tr>
<tr>
<td>• Coordinate relevant inputs.</td>
<td>• Forward-looking forecasts and trend analysis of hazard characteristics at different temporal and spatial resolutions.</td>
<td>• Remotely sensed and ancillary data collected over study sites, including topography land use and change detection.</td>
<td>• Understanding and quantifying correlations of meteorological, hydrological and climate extremes.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Loss Data</th>
<th>UIP</th>
<th>CSIS</th>
<th>Obs/Mon</th>
<th>RMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Identify stakeholders and existing processes for loss accounting system implementation.</td>
<td>• Historical extreme climate events.</td>
<td>• Real-time monitoring of extreme events for attribution of associated losses.</td>
<td>• Extreme event characterization and loss attribution.</td>
<td></td>
</tr>
<tr>
<td>• Identify information channels.</td>
<td>• Archive of past losses.</td>
<td></td>
<td>• Data analysis for specific applications (e.g. cost-benefit, loss trends).</td>
<td></td>
</tr>
<tr>
<td>• Coordinate relevant inputs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Early Warning Systems</th>
<th>UIP</th>
<th>CSIS</th>
<th>Obs/Mon</th>
<th>RMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Identify responsible bodies for developing and implementing appropriate measures, warning communication, and awareness and education activities.</td>
<td></td>
<td></td>
<td>• Research into correlation of hazards and sectoral factors (tele-connections).</td>
<td></td>
</tr>
<tr>
<td>• Identify information requirements and channels.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Coordinate relevant inputs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CAPACITY DEVELOPMENT

**CAPACITY DEVELOPMENT**

UIP – User Interface Platform; CSIS – Climate Services Information System; Obs/Mon – Observations and Monitoring; RMP – Research Modelling and Prediction
Table 1.3. (continued) Priority Categories of Activity for Disaster Risk Reduction, by Pillar

<table>
<thead>
<tr>
<th>Risk Reduction in Sectors, e.g.:</th>
<th>UIP</th>
<th>CSIS</th>
<th>Obs/Mon</th>
<th>RMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>Define requirements. Other sectoral data – non-climate inputs.</td>
<td>Tracking of relevant climate/environmental variables affecting climate-related sectoral outcomes.</td>
<td>Source of relevant data – promote interoperability of health, socio-economic and biological data with weather, hydrological and climate extremes and changes in their characteristics.</td>
<td>Sectoral/extreme event (weather, hydrological and climate related hazards) impacts research – (see water, health and agriculture exemplars).</td>
</tr>
<tr>
<td>Water</td>
<td>Coordinate development of relevant climate products and services in relation to specific application to decision-making.</td>
<td>Historical analysis of the correlation of sectoral parameters to weather, hydrological and climate extremes.</td>
<td>Forward-looking analysis, forecasts and projection of relevant extremes, and related characteristics, at various time scales.</td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>(See water, health and agriculture Exemplars)</td>
<td>Forward-looking analysis, forecasts and projection of relevant extremes, and related characteristics, at various time scales.</td>
<td>Interoperability of observing networks.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Planning Investment in Reducing Risk</th>
<th>UIP</th>
<th>CSIS</th>
<th>Obs/Mon</th>
<th>RMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning Investment in Reducing Risk</td>
<td>Define requirements for climate services and other non-climate inputs.</td>
<td>Operational climate services including analysis, forecasts and projection of climatic regimes and probabilities and scenarios related to extreme patterns.</td>
<td>Real-time monitoring of hazards and meteorological and hydrological conditions, and development of historical databases and metadata per standards.</td>
<td>Applied research to understand correlation of climatic regimes, with extreme event patterns and financial and social risks at seasonal, annual and decadal time frames (associated with investment planning).</td>
</tr>
<tr>
<td>Planning Investment in Reducing Risk</td>
<td>Engage stakeholders for implementation – finance and planning ministries, disaster risk management authorities, local authorities and government, private sector etc.</td>
<td>Establish coordination and information channels for relevant inputs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning Investment in Reducing Risk</td>
<td>Establish coordination and information channels for relevant inputs.</td>
<td>Operational climate services including analysis, forecasts and projection of climatic regimes and probabilities and scenarios related to extreme patterns.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk Financing and Transfer</th>
<th>UIP</th>
<th>CSIS</th>
<th>Obs/Mon</th>
<th>RMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Financing and Transfer</td>
<td>Quantify risk and inter-correlations.</td>
<td>Historical data on weather and other relevant environmental variables to develop the index time series and values at risk (i.e. crop yield) for risk transfer product development.</td>
<td>Triggering of weather index/payouts, which depend highly on the near-real-time observation that have been quality assured, and on filled and homogenized datasets (e.g., enhanced databases for analysis and payouts).</td>
<td>Development of indices.</td>
</tr>
<tr>
<td>Risk Financing and Transfer</td>
<td>Define requirements including other non-climate inputs.</td>
<td>Inputs for calculation of maximum probable loss.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk Financing and Transfer</td>
<td>Identify stakeholders for implementation – finance ministries, private sector, etc., and information channels.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk Financing and Transfer</td>
<td>Coordinate relevant inputs.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CAPACITY DEVELOPMENT

UIP – User Interface Platform; CSIS – Climate Services Information System; Obs/Mon – Observations and Monitoring; RMP – Research Modelling and Prediction
To illustrate how GFCS’s various pillars might interact to reduce disaster risk of hydrometeorological origin, typically the following action would need to occur in countries, while recognizing that each country will have its specific needs and context.

1. Countries will have the option to invite the relevant ministry or ministries to establish a User Interface Platform (UIP).

2. Ideally, relevant stakeholders from sectors such as agriculture, housing, health, water resource management and disaster risk management will be engaged and provide their inputs.

3. The UIP could assist in identifying needs for climate services to improve understanding of the risks associated with hydrometeorological hazards in the main sectors driving the economy, and the capabilities from the mandated institutions to respond to these needs.

4. Climate and other environmental records will need to be digitized and securely archived (rescued).

5. Historical hazard data and metadata (if available), and additional monitoring stations, all will need to be developed based on internationally agreed standards.

6. Station locations ought to be determined based on consultations with organizations involved in, for example, national-to-local early warning and preparedness, as well as agriculture extension services. User-friendly and tailored information should be shared with key vulnerable groups and stakeholders to support preparedness and prevention measures. This effort will be supported by GFCS’s Observation and Monitoring pillar.

7. Socio-economic data, disaster loss data, asset exposure, and other information will be required to determine risk levels and help target forecasts and warnings to exposed and vulnerable people and sectors.

The Climate Services Information System (CSIS) will be able to assist the National Meteorological Services or the designated institution to turn weather and climate data into daily-to-seasonal forecasts and warnings of extreme events (such as droughts). They will do so by accessing climate data analysis and forecast products generated by Global Producing Centres and Regional Climate Centres through the existing telecommunication network (the WMO Information System) and post-processing it to generate tailored information and services for stakeholders. The country’s meteorological personnel ideally will have the option to participate in and contribute to trainings organized by Regional Training Centres and in Regional Climate Outlook Forums, which will allow them to benefit from regional and global knowledge to improve forecasts at national to local scales. The CSIS will facilitate the secure exchange of data, forecasts and warnings to relevant stakeholders, observing relevant national and international data policies, and using agreed common data format and standards. Standardization, data exchange, filling data gaps and defining how best to present forecasts and disseminate warnings are key functions of GFCS.

Through the Research, Modelling and Prediction pillar, countries will be able to call on regional and global research efforts, as required, to enhance knowledge about the climate system and the effect of changing parameters on socio-economic development and on the biophysical state of the earth. Beyond that, research efforts will be geared towards areas such as enhancing understanding of the correlation of climatic regimes with patterns and characteristics of hydrometeorological hazards (for example, how the El Niño Southern Oscillation impacts severe weather or drought patterns locally), enhancing operational applications, and facilitating the use of new technologies and/or traditional ones such as radios.

Countries should be able to call on the Capacity Development pillar to support these actions as required, for example to strengthen institutional capacities, such as a framework for climate services at a national level. Countries should be able to determine the infrastructural and human
capacities needed to expand their climate and weather network, for an interoperable database, and to train personnel in the meteorological, communications and disaster risk reduction communities. Strengthened procedural capacities would enable the smooth operation of activities, from the observation of data, to the communication of early warnings to the public, and risk analysis for sectoral decision-making.

1.4 RELEVANT EXISTING ACTIVITIES AND IDENTIFICATION OF GAPS

1.4.1 Sources of information on ongoing activities

GFCS activities to reduce hydrometeorological disaster risk aim to complement and enhance existing initiatives. Globally, regionally, nationally and locally, a coordinated and strategic effort to reduce disaster risk is already underway, involving a wide range of activities, in which climate services are used for disaster risk reduction. These activities are being performed at a local level by communities, non-governmental organizations and local government; at a national level by disaster risk management agencies and sectoral ministries and agencies, academic organizations and non-governmental organizations; and at a global level through partnerships between national governments and international humanitarian and development organizations and funding institutions. The private sector is also heavily engaged in both generating and using climate information and services.

A thorough mapping of activities at sub-national and national levels is impractical due to the vast number and constantly-evolving nature of such activities. Information regarding current activities is currently captured and presented in many forums. For those seeking additional specifics, PreventionWeb provides perhaps the most comprehensive portal into sources of information on the world of disaster risk reduction at local, national, regional and global levels, although it does not document programmes (www.preventionweb.net).

At a global level, a number of programmes and studies have underlined the importance of an integrated observing strategy for a hazards monitoring system. The Group on Earth Observations is coordinating international efforts to build a Global Earth Observation System of Systems (GEOSS). GEOSS is linking together existing and planned Earth observation systems and supporting the development of new ones where the need exists. The aim is to construct a global public infrastructure for Earth observations (EO) that will consist of a flexible and distributed network of content providers.

GEO is a voluntary partnership of governments and international organizations, which provides a framework within which these partners can develop new projects and coordinate their strategies and investments. This partnership collaborates to interlink their observing systems, coordinate their observation strategies and investments, and share their environmental data, information and know-how. Because the sheer costs and logistics of expanding EO infrastructure would be daunting for any single nation, GEOSS makes the production of comprehensive Earth observations more sustainable by leveraging investments from a wide range of partners, ensuring that EO remains a global public good accessible to all. Technological advances have made GEOSS possible, while the expanding requirements of users have made it necessary.

1.4.2 Gaps

Development of the vision and priorities for GFCS in the area of disaster risk reduction has been informed both by the work of several earlier international reviews on outstanding needs in disaster risk reduction and climate information, and by ongoing expert gap analysis.

Several earlier international reviews have identified outstanding needs, or 'gaps,' in the area of disaster risk reduction. On a broad level, the UNISDR system's Hyogo Framework for Action monitor and its analysis presented in the biennial Global Assessment Report (GAR) (UNISDR 2009, 2011, 2013) and the Hyogo Framework Midterm Review (UNISDR 2011c) have noted that
significant efforts are still required to strengthen disaster risk reduction worldwide and meet the goals of the Hyogo Framework by 2015. The main areas for improvement include:

- Taking responsibility for risk by investing in risk reduction, accounting for losses, as well as anticipating and transferring risk that cannot be reduced;

- Integrating disaster risk management into existing development instruments and mechanisms;

- Building risk governance capacities by demonstrating political will, sharing power, fostering partnerships and improving accountability (UNISDR 2011c).

Other, more specific gaps in climate services for disaster risk reduction can be found in the 2012 report by the IPCC on managing the risk of climate extremes and disasters. While the 2012 report pointed out the need for additional scientific research to fill technical-level climate-information gaps, it also identified the kinds of non-technical needs for climate information that GFCS seeks to address, as follows:

“Users require relevant climate risk information that is accessible, can be explained in understandable language, provides straight-forward estimates of uncertainties and is relevant or tailored to their management functions. This is best accomplished through sustained interactions between scientists and stakeholders and policy makers, usually maintained through years of relationship- and trust-building.

The timing and form of climatic information (including forecasts and projections) and access to trusted guidance to help interpret and implement the information and projections in decision-making processes may be more important to individual users than improved reliability and forecast skill…. Decision support activities should be driven by users’ needs, not by scientific research priorities, and these user needs are not always known in advance but should be identified collaboratively and iteratively in ongoing two-way communication between knowledge producers and decision-makers.”

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6 Chapter 3, IPCC SREX, 2012.
2 IMPLEMENTING GFCS TO REDUCE HYDRO-METEOROLOGICAL DISASTER RISK

2.1 CONDITIONS FOR SUCCESSFUL IMPLEMENTATION

Successful implementation of the GFCS for disaster risk reduction depends on:

1. **Engaging international disaster risk reduction leaders.** The endorsement of GFCS at the highest levels by chief executives of international organizations is critical. This includes the support of the Special Representative of the United Nations Secretary-General for Disaster Risk Reduction (SRSG); the UNDP Administrator, who also chairs the United Nations Development Group; the United Nations Emergency Relief Coordinator, who also chairs the International Standing Committee; the International Federation of Red Cross and Red Crescent Societies (IFRC); and counterparts among international finance institutions, among others. It is similarly important to garner the support of the leaders of additional international organizations (within and outside the United Nations system) that financially enable and/or implement disaster risk reduction programmes in countries.

2. **Establishing partnerships with potential implementation partners.** GFCS implementers must gather and work with partners to jointly define and undertake GFCS activities. In particular, they should engage with stakeholders at the local level through community-based organizations, civil society organizations, Red Cross and Red Crescent Societies, and regional and international organizations. Such partnerships need to engage national disaster risk reduction platforms or similar mechanisms established or to be established under the guidance of the Hyogo Framework for Action.

3. **Developing and delivering projects that address identified gaps in climate information to reduce disaster risk and improve collaboration.** The projects must attract the interest of potential collaboration partners. This interest will be sparked if and when the projects fill a gap, and scale up the partners’ successful initiatives.

4. **Strengthening regional and national climate service providers’ capacities.** Projects must allow these actors to provide the services required for implementation. Furthermore, they should build the capacity to communicate about climate services among stakeholder groups.

5. **Ensuring coordination of GFCS with other global, regional, national and local actors.** GFCS implementation should continue to be coordinated with not only the larger disaster risk reduction agenda, but also the global agenda on climate change and sustainable development, and should make linkages with key sectors, the private sector, and other relevant actors.

6. **Developing the institutional and policy setting.** Implementing government authorities, supported by their partners, should ensure that regional and national frameworks for disaster risk reduction include a climate information component. Efforts should be made to set standards and monitor progress for climate service provision, including through the Hyogo Framework Monitor.

2.2 THE IDENTIFICATION OF PROJECTS

In the discussion which follows, it is important to understand that this Exemplar encompasses four classes of initiatives:

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7 IFRC already has committed its support to GFCS through a few high-level statements, such as the one in the WMO's First Extraordinary Congress, and recently through the IFRC Secretary General's statement to the High-level Meeting on National Drought Policy. Available at www.ifrc.org.
1. **Priority Categories of Activities:** The six priority categories are presented as generic descriptions of objectives, outputs, specific activities, inputs and partnerships. These descriptions illustrate how the GFCS can best add value to existing areas of work in disaster risk reduction. These are not implementable projects, but rather are intended to define for the wider GFCS community some of the key products and services for disaster risk reduction, and to explain how they are generated.

2. **Individual Projects:** Partners can use the 'priority categories' from (1), directly above, as templates or framing criteria when preparing actual projects for implementation in specific contexts to identify, reduce or protect financially against risks. Funding mobilized for GFCS implementation could potentially be directed towards these projects, through a process yet to be determined. Alternatively, partners may find the generic descriptions in the Exemplar below to be useful guidance for preparing projects which embody the GFCS pillars, for funding by third parties.

3. **GFCS DRR Capacity Development Activities:** In the GFCS two-year initiation phase, in furtherance of the general areas of work described in the Exemplar, it is recommended that a set of start-up capacity development activities be designed and proposed. These could be included in a compendium of proposed projects, prepared by the GFCS Project Oversight Board, compiled by the GFCS Secretariat and submitted to GFCS governing bodies. These proposals are intended to catalyze the contributions of the GFCS pillars to the categories of activities related to disaster risk reduction that are identified in Table 1.3 (p.18) and below. These initial projects will emphasize supporting the establishment of User Interface Platforms during the first two years of GFCS implementation, through which the other GFCS pillars can feed into and begin to support the areas of work described below. They also would support other initiatives intended to directly achieve reduced losses and damages in specific contexts (i.e. "2. Projects for Implementation", directly above, and "4. Ongoing Activities," directly below.)

4. **Ongoing Activities:** Although not itemized here, there is an exceedingly large body of ongoing activities at country level, along the lines of those described below, to be found worldwide. These activities provide entry points for GFCS products and services, as well as, potentially, resources for advancing the GFCS agenda of climate-resilient societies.

All individual GFCS projects (both "2. Individual Projects" and "3. GFCS DRR Capacity Development Activities," above) should support national sustainable development goals, such as those expressed in countries’ United Nations Development Assistance Framework (UNDAF) documents and Poverty Reduction Strategy Papers (PRSP), where applicable. They should also build on other government efforts to reduce disaster risk, including implementation of the Hyogo Framework for Action and development of HFA2.

The High-Level Taskforce report (WMO 2011b) identified the following timeframes for project implementation: two-year (2013-2015), six-year (2015-2019) and ten-year (2019-2023) timeframes. Projects to be implemented in the two-year timeframe will necessarily differ in scale and ambition from those that can benefit from a deeper needs assessment and broader engagement with partners. Projects in the six-year and ten-year timeframes will take advantage of the implementation lessons learned in the first two years but may or may not be continuations or scale-up of the first-term projects. Longer-term projects will respond to stated national strategic priorities and be part of system-wide, coordinated programming of development and humanitarian agencies from the United Nations system and other international organizations, and major nongovernmental organizations in target countries.

Out of the four classes of initiatives discussed in this section, the next section describes the first: suggested "priority categories of activities" for GFCS, in the area of disaster risk reduction.
2.3 SUGGESTED PRIORITY CATEGORIES OF ACTIVITIES

This section outlines the six categories of projects that are suggested priorities for GFCS in the area of disaster risk reduction. Activities in these categories would catalyze provision of GFCS-related products and services, and promote widespread implementation of programmes and initiatives that incorporate climate information and services.

Section 1.1 and Table 1.3, above, have already identified the six general categories of activities (products and services) that GFCS can enhance and contribute to through its operations and five constituent pillars as:

1. **Risk Assessment**
2. **Loss Data**
3. **Early Warning Systems**
4. **Risk Reduction in Sectors**
5. **DRR Financial Planning and Investment**
6. **Risk Financing and Transfer**

The next few pages provide more detail, explaining these categories via generic descriptions of objectives, outputs, activities, inputs and partnerships. The descriptions illustrate how GFCS can add value to existing areas of work in disaster risk reduction. These are not implementable projects, but rather are intended to define for the wider GFCS community some of the key products and services for disaster risk reduction, and to explain how they are generated.

Specific projects in the categories described below could be undertaken with partners in GFCS’s first implementation period (2013-2015) to demonstrate discrete climate-service results. An inclusive, comprehensive process that ensures that the projects are part of a system-wide international effort is recommended to identify GFCS activities for the six-year and ten-year timeframes.

**Category 1: Risk Assessment**

**Description:**
Activities in this category aim to determine the nature and extent of risk by analyzing potential hazards, exposed elements (people, infrastructure and socio-economic activities such as agricultural yield), and evaluating existing conditions of vulnerability.

**Objective:**
The desired result would be an evidence base for risk management decision-making (for risk reduction and transfer, resource allocation and preparedness).

**Benefits:**
- More effective preparedness and response plans and policies.
- More efficient allocation of resources.
- Better informed preparedness and response activities.
- Decreased disaster losses.

**Outputs:**
- Risk analysis reports available to decision-makers and the public.
- Better-informed climate services to meet local needs.
• Evidence-based disaster risk reduction strategies and action plans.
• Implementation of activities to address the causal factors of disasters.

**Specific activities:**
• Develop an understanding of the decision-making/risk management and requirements.
• Identify the nature, location, intensity and likelihood of major hazards.
• Exposure assessments – identify populations at risk and delineate disaster prone areas.
• Vulnerability analysis – determine the capacity of elements at risk to withstand hazard scenarios.
• Loss/impact analysis – estimate potential losses.
• Risk profiling and evaluation – identify cost effective risk reduction options.
• Inform formulation or revision of disaster risk reduction strategies and action plans.
• Build a National Disaster Observatory, to learn from disaster history and incorporate this knowledge into the disaster risk reduction strategies.
• Vulnerability and capacity assessment – assess involved communities, local authorities and key stakeholders (bottom-up approach).

**Inputs:**
• Data on:
  o Hazard return periods with various magnitudes, duration, location and timing.
  o Exposed elements.
  o Vulnerability factors.
• Methodology.
• Communication, outreach, application strategy.
• Human resources.

**Partners:**
• Local and national government departments.
• Data providers including meteorological organization of the country.
• NGOs and international relief organizations.
• Sectoral/risk management stakeholders.
• Red Cross and Red Crescent National Societies.
• At-risk communities.

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**Box 2.1. Risk assessments in Barbados**

Although Barbados has not used risk assessments for development planning, the country notes that comprehensive risk assessments for critical infrastructure and particularly vulnerable areas can be undertaken by coordinating different institutions that are not directly responsible for disaster risk management. Barbados’ Town and Country Planning Department and Coastal Zone Management Unit have jointly developed coastal regulations based on a 100-year storm surge inundation line. Coastal setbacks (buffer zones above a high-water mark) are measured based on distance from this benchmark. The government has committed significant resources (US$ 30 million) to conduct a comprehensive coastal risk assessment for the major coastal hazards identified.

Despite this progress, resources are limited for similar exercises in non-coastal areas of the country. To overcome this barrier, different government departments are acting as lead institutions on other hazards. Specific assessments and hazard maps were developed for an area of Barbados that is particularly vulnerable to landslides and soil erosion, and the existing Soil Conservation Act is used as the driving force for implementing structural and non-structural disaster-mitigation efforts in the area through the country’s Soil Conservation Unit. These measures include the relocation of communities’ inland slide- and flood-prone areas.

**Source:** UNISDR 2011a.
**Category 2: Loss Databases**

**Description:**
This product consists of near-real time, ongoing capture of extreme event-related loss and damage.

**Objective:**
The desired result would be data on extreme event-related loss and damage levels, patterns, and trends, as an input for risk-management decision-making and outcome measurement.

**Benefits:**
- Allows governments to understand their level of overall and regional vulnerability and react to mitigate and prepare for hazards, while also guiding relief, recovery and reconstruction programmes following a disaster.
- Empowers governments to identify future disaster risk and therefore implement efficient and effective disaster risk reduction programmes and policies.
- Identifies disaster-prone areas and hazards by a number of variables such as loss of life, financial cost etc., to illustrate different levels of vulnerability.
- Once a loss database has been established, it can be used to monitor progress on disaster risk reduction initiatives, and allow governments to prioritize future activities.

**Outputs:**
- A loss database providing a systematic collection of relevant data for historical analysis of disasters and for future potential disasters based on past evidence.
- An analysis of a country’s vulnerability and its past losses from disasters in economic, social and environmental terms.
- A homogenous database of different countries’ and/or different regions within a country’s losses from disasters to assess regional vulnerability.

**Specific activities:**
- Hazard event monitoring.
- Loss and damage monitoring.
- Loss and damage attribution.
- Data registration.
- Publication.
- Quality assurance.
- Analysis.
- Application.

**Inputs:**
- Definition of institutional roles and partnerships.
- Data definition.
- System implementation.
- Staff.
- Data collection.
- Reporting.

**Partners:**
- National Meteorological and Hydrological Services.
- Municipal authorities.
- National disaster observatory (such as the National Disaster Management Authority, non-governmental organization or research institution).
- Insurance companies.
- Research.
Category 3: Extreme Event (Multi-Hazard) Early Warning Systems

Description:
This category is designed to provide two products. First, using multi-hazard risk analysis, it provides the decision-making foundation for design and development of Multi-Hazard Early Warning Systems. Second, it provides probabilistic forecasts and related early warning of extreme events (droughts) at practicable lead-times through monitoring and seasonal forecasting. As such, it will provide information to public and affected sectors to improve outcomes. It includes advance preparation of elements such as response options based on warnings. While there may already be good forecasting and preparedness plans in place, the aim of an early warning system is to make the separate elements operate as a single system. Depending on the limits of predictability and forecasting technology, it could cover time scales from seasonal/annual to days/hours.

Objective:
The desired result would be to ensure an integrated network that generates and communicates information vital for knowing when and where an extreme event will occur, in order to be prepared for and execute an emergency plan that will help to avoid loss and damage.

Benefits:
- Early warning systems have proven to be successful in reducing losses of life, livelihoods and property from the impacts of natural hazard events, including in high-risk and lower-income countries such as Mozambique, Cuba and Bangladesh.
- Economic/sectoral benefits, thanks to the optimization of activities using weather information, such as better agricultural practice and epidemic control (see water, health and agriculture Exemplars).
- Communities, local/national authorities and organizations are ready to use the information and take decisions and measures to reduce their risks.

Outputs:
- Hazards are detected, monitored, forecasted.
- Risks are analysed and information is incorporated into the warning messages.
- Warnings are issued by an official/pre-determined source and disseminated in a simple and timely fashion to authorities and public via pre-established channels.
- Activation of preparedness plans/decision in response to warnings to reduce potential impacts (such as community response/evacuation plans and sectoral risk management plans).

Specific activities:
- Data collection and analysis of forecasts and historical tipping points.
- Field meteorological stations to record and relay real-time meteorological data.
- Satellite imagery and products of region.
- Real-time data management – data entry and processing to and from the forecasting model.
- Hazard, exposure and vulnerability information are used to carry out risk assessments.
- Establishment of critical thresholds for multi-hazard events and development of understandable, recognizable and timely warnings.
- Stakeholders are identified and their roles, responsibilities and coordination mechanisms are clearly defined and documented within national-to-local plans, legislation, directives, MOUs, and other means.
- Establishment of a dissemination plan – including media, politicians, NGOs, News agencies, foreign embassies, etc.

Note: Current climate forecasting technologies do not provide reliable probabilistic forecasts of extreme events such as tropical cyclones.
• Communities, local authorities and other organizations carry out risk analysis and establish close contact and coordination with key national meteorological services and Disaster Risk Management offices, to complement governmental mandates, and also to catalyze dialogue about what national systems are required and, as necessary, to play a role in supporting them.
• Enhancement of community and local authorities’ awareness on how to use the information, and preparation to use it.

Inputs:
• Institutional arrangements, policies, laws, etc. to guide inputs and outputs of early warning systems.
• Effective meteorological surveillance system, with appropriate human and material resources.
• Effective communication pathways between the meteorological surveillance system and civil defence institutions.
• Human resources – technical and organizational expertise.
• Communication technology – secure telecommunication installations and networks.
• Plans designed for different situations, on the basis of likely disaster scenarios, and supported by all available resources.
• On-going public awareness campaigns of multi-hazard early warning systems.
• Community-based disaster preparedness activities at local levels.

Partners:
• Meteorological organization of the country.
• Satellite Data and Service providers.
• National Disaster Risk Management office or systems.
• Relevant ministries, such as environment, transport, health, agriculture and tourism.
• National and sub-national/ local authorities and key organization such as Red Cross and Red Crescent National Societies and national non-governmental organizations.
• Non-governmental organizations and international relief organizations.
• Foreign embassies and consulates.
• Socio-economic sectoral stakeholders.
• Communities.
The absence of dialogue between providers of climate services and vulnerable communities can be a barrier to the use of forecasts. Forecasts may not match the information needs and decision-making timelines of local actors and may be perceived as too technical at the community level. Conversely, ensuring that communities receive, understand and are able to act on warnings of impending hazards may be vital to their survival. To address this communication gap and promote effective early warning, the International Federation of Red Cross and Red Crescent Societies and the United Nations International Strategy for Disaster Reduction supported workshops at community-level in Africa between 2009 and 2011.

The “Early Warning, Early Action” workshops took place in Senegal, Kenya, Uganda and Ethiopia. They included forecasters from national hydrometeorological services, climate modellers from university climate research centres, hydrologists, remote sensing experts and agrometeorologists, as well as representatives from communities affected by hydrometeorological risk, national and sub-national government disaster managers, representatives from community-based organizations and international non-governmental organizations working at community-level and other national actors involved in disaster prevention and climate change adaptation. In most cases, representatives from the provider and actor communities had never met.

During the three-day workshop, participants were tasked with: (1) jointly developing a plan to communicate timely and actionable early warnings to populations facing climate risk; and (2) developing a strategy to enable access to climate information to the pilot disaster-prone community participating in the workshop. A visit to the nearby community where the communication strategy will be piloted was included. The results of the workshops include opening communication channels between national meteorological services and national disaster risk management offices, the establishment of a national online forum to relay warnings, and the development of partnerships with emergency preparedness organizations.
• Measures to reduce sector-specific risks and contribute to climate change adaptation.

Specific activities:
• Identification and tracking/forecasting of relevant climate/environmental variables affecting climate-related sectoral outcomes.
• Coordination and development of relevant products and services and definition of relevant measures to reduce risk.
• Mainstream disaster risk issues into sectoral work plans and budgets.
• Outcome monitoring.

Inputs:
• Identification of stakeholders.
• Identification of decision-making contexts and decision-support requirements.
• Research to establish how climate affects sectors, forecasting potential, and to test decision options.
• Reliable data on climatic and non-climatic factors needed for decision-support.
• Communication between sectoral and scientific stakeholders.
• Institutional, financial, technical and human resources.
• System implementation.
• Monitoring of results.

Partners:
• Sectoral stakeholders, including relevant ministries (may include private sector).
• Insurance companies.
• Research partners.
• Data providers.

Category 5: Planning Investment in Reducing Risk

Description:
Public and private entities face budgetary constraints that limit how much can be invested in risk reduction. While, in an ideal world, risk could be reduced to negligible levels, this is for the most part not possible physically or financially. A structured planning framework is therefore needed to optimize investments across the disaster management cycle, including: prevention and mitigation if possible and affordable, preparedness to respond to immediate impacts, transfer to offset potential financial losses (see Category 6) and societal recognition of unavoidable residual risk, including through the reserving of contingency funds. Such a financial planning framework must be informed by reliable information and projections of short- and long-term disaster risks. This kind of approach is needed in both the public and private spheres.

Objective:
The desired result would be to optimize short- and long-term disaster management investments under constrained budgets, targeting a balance between reducing risk to acceptable levels, and potential opportunity costs of investing less in development activities.

Benefits:
• Reduction of disaster risk to socially acceptable levels.
• Most cost-effective use of limited budget for risk reduction.
• Incorporation of climate change and dynamics in longer-term planning, recognizing issues of uncertainty.
• Recognition of the importance of risk management in longer-term planning.
• Provision of emergency funds in case of disaster.

Outputs:
• Financial risk assessment incorporating projections and uncertainty.
• Structured planning framework.
Robust budget plans with pre-agreed provisions for modifications during and after crises.

Specific activities:
- Probabilistic financial risk assessment utilizing climate and weather projections.
- Multi-sector and stakeholder dialogue to agree priorities for activities across the risk management spectrum.
- Pricing and planning of agreed risk management activities.
- Publication of budget plans and risk management framework, followed by stakeholder feedback and potential adjustment.
- Implementation, including potential triggering of crisis modifiers/contingency activities in case a disaster occurs.

Inputs:
- Climate records and projections.
- Economic and financial expertise for modelling of impacts of disasters.
- Disaster management expertise to help design a structured and coherent risk management strategy.
- Multiple-sector expertise representing the key contributors to the economy (or to the business, in the case of the private sector).

Partners:
- Government.
- Multilateral development banks.
- Private sector, particularly the financial services industry.

Category 6: Risk Financing and Transfer

Description:
A suite of different risk financing and transfer mechanisms at different scales exist. This description uses weather index-based crop insurance for smallholder farmers as an example. While the details may differ, the general approach for implementing different risk financing and transfer mechanisms at different scales is relatively consistent.

This product provides financial coverage to protect smallholder farmers against the potential impacts of deficit/erratic rainfall, extreme temperatures and other environmental variables. An index insurance contract pays out on the value of an index; in this case the index is based on measured hydrometeorological variables such as rainfall, temperature or river levels. While these variables are not influenced by the insured farmer’s behavior, in order for the insurance scheme to be effective, farmers’ potential disaster losses must be highly correlated with the selected variables (the index can be based on a single variable or combinations of variables). For example if there is less rainfall than what would be expected based on historical observations or what is needed for a specific crop, the insurance contract will pay out to policy holders whether their crops have failed or not. Detailed climate and agricultural data is therefore needed to minimize “basis risk”, meaning the risk that a farmer’s crops fail but s/he does not receive an insurance payout. To avoid moral hazard (insurance fraud and cheating) the index and triggers must by definition be monitored by a neutral third party.

Objective:
The desired result is to provide protection against the financial impacts of extreme weather events (such as drought). While index insurance will not stop a farmer’s crop from failing, it will provide finances to offset the farmer’s income losses in relation to an index rather than the actual asset loss.
Benefits:
- Secures financial coverage in case of a disaster, knowing that funds would be available if/when needed. This allows farmers to make higher-risk/higher-reward investments, leading in the long term to economic growth.
- Payouts tend to occur quickly, enabling prompt disaster response, and thus allowing people to hold onto their assets (avoid emergency sell offs) and recover more quickly from a crisis.

Outputs:
- Disaster relief can be more effective and cost less, due to the speed of response.
- Farmers affected will have a greater chance of avoiding the poverty trap that comes with natural hazards.
- Decreased loss of livelihoods and other assets.

Specific activities:
- Feasibility analysis: Is there or can there be demand for such a product? Would it ultimately be affordable and beneficial to potential clients? Would there be sufficient data and monitoring infrastructure to develop and run the product? Are there existing local organizations to help distribute the product and monitor hydrometeorological variables, and do potential clients trust these institutions?
- Local-scale monitoring of the hydrometeorological variable with high quality resolution; for example a rule of the thumb is that for rainfall, an insured farmer must be within at least 25 km of a qualified rain gauge to reduce basis risk.
- Potential remote sensing of rainfall to ensure accuracy and viability of rainfall records.
- Actuarial analysis of natural hazards based on historical records: the likelihood of an event must be quantifiable.
- Modeling and analysis of the interaction between crops to be insured and hydrometeorological variables in the specific region.
- Development of indices, triggers and quantification/minimization of basis risk.
- Outreach, education and awareness-raising of farmers and rural communities through existing trusted local organizations and service providers.
- Contracting and engagement of the domestic financial services industry.

Inputs:
- Committed government, relief agency, farmers’ cooperative, NGO or community-based organization willing to hold the contract and engage its members.
- Reliable, timely and high quality weather observation networks operated by a neutral third party to avoid tampering.
- Committed meteorological service with appropriate human resources for reliable provision of data, analysis and advisory services.
- Long and consistent historical records of weather variables and crop productivity.
- Access to real-time high quality observations of weather variables during the period of the contract.

Partners:
- Government, at the least in terms of providing an enabling environment for insurance development.
- Relief and development agencies.
- The National Meteorological and Hydrological Services of the country.
- Farmers, and rural communities and organizations.
- Domestic insurance companies and/or banks.
- Potentially, international reinsurance companies to back the scheme.

For further information on the categories, please see "References on Categories of Activities," in the References section at the end of this document.
2.4 INITIAL IMPLEMENTATION ACTIVITIES AND IMPLEMENTATION APPROACH
(INCLUDING OPERATIONAL AND ORGANIZATIONAL ASPECTS)

To implement the GFCS Exemplar on disaster risk reduction, the first steps will be to identify both relevant sectors and ways to integrate the described activities, organizationally and operationally, into existing programmes and initiatives. Activities will be demand-driven, but given especially the short timeframe of the first two-year phase, demand will be assessed not directly by GFCS, but by proxy through the existing processes of partners. Therefore, implementation of the activities described in this Exemplar will require discussion with potential partners to further define the scope of activities, identify roles and responsibilities, garner government and community support, mobilize and allocate resources, agree on monitoring and evaluation methods, and undertake initial administrative procedures. Partner organizations will implement activities with the support of GFCS’s pillars; the pillars’ supporting activities are detailed in the table 1.3, p.20, and in annexes of GFCS’s implementation plan. In 2015, activities will be evaluated and partners will determine the value of continuing, modifying or concluding the first-phase initiatives. For GFCS’s six-year and ten-year timeframes, further activities to advance the reduction of hydrometeorological risk will be undertaken with additional partners.

Throughout the development of this Exemplar, consultation participants underlined the need to engage the final stakeholders of climate information – communities at local level – to ensure that climate information is relevant and is used. Also critical to GFCS success is the development of formal partnerships and collaboration with agencies and organizations working on disaster risk reduction. Box 2.3 provides an example of a successful partnership for climate information.

**Box 2.3. Making climate information accessible to communities in Paraguay**

The departments of Boquerón and Presidente Hayes lie in the Chaco region of Paraguay. These rural areas are populated by indigenous people and others vulnerable to yearly droughts and floods. Climate forecasts existed, but they were not widely accessible and not of good quality. The National Emergency Secretariat, the Ministry of Agriculture and Livestock, the Board of Hydrology and Meteorology, the National Board of Aeronautics and nongovernmental organizations signed an agreement to collaborate in the production and dissemination of climate bulletins. They set up a climate surveillance and early warning system that could be communicated by press and radio. Technical experts and radio services adapted their language to ensure it could be understood by all, including a large non-Spanish speaking population. The bulletins include recommendations for working the soil, watering and planting and drought preparedness. Thus the information is useful in making daily decisions regarding crops and managing the water supply to face shortages. The next steps are to maintain current efforts and to invest in meteorological stations to improve forecast accuracy for specific geographic areas. More radio channels need to be trained in transmitting the bulletins in indigenous languages as well.

*Source:* Global Infancia, with others.

2.5 MONITORING AND EVALUATION OF IMPLEMENTATION ACTIVITIES

Monitoring and evaluation of GFCS activities will be required on least at two levels: to assess activities’ progress, and to measure achievement in meeting the GFCS’ larger goals for improved climate knowledge and communication. For both levels, standard project management tools and reporting procedures can be used, as defined by agreement among relevant partners. The mechanism for the final evaluation of activities would also be identified by agreement among the activities’ partners to ensure that the reporting requirements of each agency are met.

The definition of criteria for monitoring and evaluation would be specific to each project. The disaster risk reduction literature contains numerous relevant checklists, guidelines and principles from which the criteria can be drawn; for early warning, for instance, the ISDR’s “Developing Early
Warning Systems: A Checklist,”9 Mercy Corps and Practical Action’s “Establishing Community Based Early Warning System - Practitioner’s Handbook,”10 IFRC’s Community Early Warning Systems: Guiding Principles,11 and WMO’s ten principles of multi-hazard early warning systems,12 among others, could be useful to guide criteria development. To facilitate Hyogo Framework Monitor reporting, it would be useful to consider the criteria specified therein when designing the evaluation format to be used by partner agencies.13

In addition, a method for quantifying the financial costs and benefits of implementing GFCS activities for disaster risk reduction should be developed and included in the monitoring and evaluation processes. This information would be an important contribution to global efforts to attach value to disaster risk reduction action, so as to make the case for further investment to reduce disaster losses.

Furthermore, given the importance of information, knowledge sharing and training to the success of GFCS, a monitoring and evaluation process also is required to assess whether GFCS activities to reduce disaster risk served the purpose of improving climate knowledge and communication. Did the activities enable stakeholder needs to be understood to better deliver climate services? Did they promote dialogue among climate service providers and disaster risk managers? Did they contribute to monitoring and evaluating the effectiveness of GFCS? And did they increase climate literacy among disaster risk managers and other stakeholders? GFCS’s secretariat would be best placed to set up and manage the process to monitor progress at this level, as oversight and assessment will also be required for the other three areas for priority implementation (agriculture, health and water).

2.6 RISK MANAGEMENT OF ACTIVITY IMPLEMENTATION

The principal challenge faced by GFCS in its initial stages will be to demonstrate its ability to add value. In this sense, the risks associated with implementing GFCS priority activities for disaster risk reduction include organizational complexity, leadership and management, resourcing, and support for coordination between international agencies and actors on the ground, as discussed in GFCS’s Climate Services Information Systems annex.

In a broader sense, the challenge for GFCS is enabling effective communication between a sciences-led provider community and a needs-driven actor community. Decision-making will take place whether or not adequate climate information is available. Nevertheless, it is hoped that by making improved climate services available via implementation of GFCS as soon as possible, particularly at national levels and with links to local actions, decision-making will be aided, and the desired outcome – that of reducing risks or reducing costs of the decision – will be promoted.

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9 Available at www.unisdr.org.
10 Available at www.preventionweb.net.
11 Available at www.ifrc.org.
12 Available at www.wmo.int.
13 Available at www.preventionweb.net.
3 ENABLING MECHANISMS

3.1 SYNERGIES WITH EXISTING ACTIVITIES

3.2 ENGAGEMENT IN THE WORKING MECHANISMS OF POTENTIAL PARTNERS AT ALL LEVELS

One of the central principles of GFCS is that its structure and activities should build on existing partnerships and avoid duplication. For disaster risk reduction activities, this principle can be implemented through active engagement in the working mechanisms, programmes and activities of existing disaster risk reduction networks and key organizations at national, regional and international levels. Linking with partners in ongoing regional and national work will be perhaps the most important component of such engagement. This section identifies a few of the most significant mechanisms at national, regional and international levels; and discusses how GFCS could engage with them.

National Level: As national governments have the primary responsibility for disaster risk reduction, engagement with ongoing activities at the country level will be critical for GFCS success. Countries have national mechanisms for coordination on disaster risk reduction that GFCS should link to and build on. These nationally owned and led multi-stakeholder forums or committees working on disaster risk reduction vary in format from one country to another. They are referred to by Governments as "national platforms for disaster risk reduction" in internationally agreed documents such as the Hyogo Framework for Action. These platforms help determine how disaster risk reduction efforts are developed and implemented nationally: they coordinate the implementation of the Hyogo Framework for Action, and serve as a mechanism for mainstreaming disaster risk reduction into development policies, planning and programmes.

Regarding the support by international partners to national and local efforts to reduce disaster risk, the GFCS should seek to harmonize with existing mechanisms that the international system has put in place, which are increasingly being employed to put in place comprehensive, multi-stakeholder, multi-year disaster risk reduction programmes of a scale and scope sufficient to help countries achieve substantial reductions in disaster losses. The principal mechanism for development assistance is the United Nations Development Assistance Framework or Partnerships (UNDAF), led by the United Nations Resident Coordinator and supported by the United Nations country team (UNCT), which is composed of agencies with a country presence. Non-resident agencies also contribute to the UNDAFs. Through the UNDAFs, the United Nations assists national disaster reduction actors in supporting government-led strategies and plans. Humanitarian Country Teams consist of organizations that undertake humanitarian action in countries with a humanitarian presence.

Regional Level: Regionally, GFCS should seek to systematically and effectively represent climate services when governments come together in regional platforms and in ministerial meetings led by regional inter-governmental organizations. Regional platforms are multi-stakeholder forums that reflect the commitment of governments to improve coordination and implementation of disaster risk reduction activities, while linking to international and national efforts. The frequency of regional platform meetings varies, but is at least once every two years, to host ministerial discussions. The outcomes feed into the Global Platform for Disaster Risk Reduction (see Table 2.2).
<table>
<thead>
<tr>
<th>Region</th>
<th>Regional DRR Platform/Event</th>
<th>Outcome Strategy</th>
<th>Socio-economic Organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americas</td>
<td>The Regional Platform for Disaster Risk Reduction in the Americas, held in Mexico in 2011 endorsed:</td>
<td>&quot;The Communiqué of Nayarit on Lines of Action to Strengthen Disaster Risk Reduction in the Americas.&quot; (available at: <a href="http://www.unisdr.org">www.unisdr.org</a>)</td>
<td>CEPREDENAC, MERCOSUR, Organization of American States (OAS), Organization of Caribbean States (OCS), CDEMA</td>
</tr>
<tr>
<td>Arab States</td>
<td>Meeting of the Council of Arab Ministers Responsible for the Environment held in 2010 endorsed:</td>
<td>&quot;The Arab Strategy for Disaster Risk Reduction 2020&quot;. (available at: <a href="http://www.preventionweb.net">www.preventionweb.net</a>)</td>
<td>League of Arab States (LAS)</td>
</tr>
<tr>
<td>Asia</td>
<td>The “Fourth Asian Ministerial Conference on Disaster Risk Reduction” adopted:</td>
<td>The “Incheon Declaration”, the “Incheon Regional Roadmap and Action Plan on Disaster Risk Reduction through Climate Change Adaptation in Asia and the Pacific (Incheon REMAP),” and the “Action plan for Incheon REMAP”. (available at: <a href="http://www.unisdr.org">www.unisdr.org</a>)</td>
<td>ASEAN, SAARC,</td>
</tr>
</tbody>
</table>
**International level:** GFCS should continue to engage with the key coordinating bodies for disaster risk reduction at the international level – the International Strategy for Disaster Reduction system (ISDR system) and the Inter-Agency Standing Committee (IASC) – seeking endorsement and partners for its initiatives. In addition, continuing opportunities exist for GFCS to synchronize its activities and leverage resources within the international partnerships that have been developed through the GFCS Project Oversight Board. These three bodies are described below.

1. **International Strategy for Disaster Reduction system**
   The International Strategy for Disaster Reduction system (ISDR system) provides an opportunity for GFCS to promote collaboration and support for GFCS at national, regional and global levels. ISDR is a system of partnerships including governments, the United Nations system, regional bodies and platforms, international financial institutions, civil society organizations, academia and research institutions, the private sector, and media. Agencies and networks promoting and undertaking disaster risk reduction are part of the system. The overall objective of the partnerships is to generate and support a global movement to reduce risk to disasters. The ISDR system’s active mechanisms are:

   - The Global Platform for Disaster Risk Reduction (Global Platform);
   - Regional platforms (discussed above);
   - National platforms (discussed above);
   - Thematic platforms;
   - The ISDR Support Group;
   - The ISDR Inter-Agency Group;
   - The United Nations Office for Disaster Risk Reduction (or UNISDR).

   Of these the most relevant mechanisms for the GFCS implementation are the Global Platform sessions (discussed below), the regional and national platforms, and UNISDR.

   **The Global Platform for Disaster Risk Reduction:** The Global Platform for Disaster Risk Reduction is a mechanism, highlighted in biennial sessions, for information exchange and defining priorities on a biennial basis based on regular monitoring of progress in the implementation of the Hyogo Framework for Action. It is a unique set-up, as government representatives, non-governmental organizations, scientists, practitioners, and United Nations organizations share experiences and formulate strategic guidance and advice for the implementation of the Hyogo Framework for Action.

   **International Strategy for Disaster Reduction secretariat:** The secretariat (or UNISDR) is an entity of the United Nations Secretariat, led by the Special Representative of the Secretary-General for Disaster Risk Reduction.

   GFCS should work with UNISDR to promote GFCS in upcoming regional platform meetings and other disaster risk reduction events. Additionally, GFCS should seek to ensure that climate services are appropriately engaged and reflected in the mechanisms of Global Platform for Disaster Risk Reduction (Global Platform) and the HFA2 process. Finally, GFCS should seek to collaborate with UNISDR to integrate the monitoring and evaluation of GFCS activities in the Hyogo Framework Monitor (under Hyogo Framework Monitor “Priority for action 2: Identify, assess and monitor disaster risks and enhance early warning”).

2. **Inter-Agency Standing Committee (IASC)**
   The IASC will give GFCS a means to engage with the humanitarian community, and in particular with UNICEF, the World Food Programme and IFRC, which have expressed interest in collaboration. GFCS should pursue collaboration through the Inter-Agency Standing Committee Sub-Working Group on Preparedness, as it undertakes the most relevant work to the described GFCS activity in this area. GFCS should invite the Sub-Working Group on Preparedness to further define GFCS's preparedness activity to serve its climate information needs.
IASC brings together international organizations working to provide humanitarian assistance to people in need as a result of natural disasters, conflict-related emergencies, global food crises and pandemics. By coordinating activities, members improve overall service delivery, share resources, pool analysis and disseminate best practices. Participants use the forum to agree on system-wide policies to achieve a better overall response, while respecting organizations’ individual mandates. Coordination in the IASC takes place at different levels. The IASC Principals are the heads of the organizations that form the IASC, while the IASC Working Group brings together the emergency directors or other directors of the IASC organizations. In addition, representatives from the humanitarian community in Geneva and New York meet informally to share information on current emergencies and to discuss new developments, such as the use of new technologies in humanitarian response.

The IASC members are:
- Food and Agriculture Organization (FAO);
- United Nations Office for Coordination of Humanitarian Affairs (OCHA);
- United Nations Development Programme (UNDP);
- United Nations Population Fund (UNFPA);
- United Nations Settlements Programme (UNHABITAT);
- United Nations High Commissioner for Refugees (UNHCR);
- United Nations Children’s Fund (UNICEF);
- World Food Programme (WFP); and
- World Health Organization (WHO).

Nine other organizations, including the International Federation of Red Cross and Red Crescent Societies (IFRC) as well as the World Bank, comprise the standing invitees list.

**Inter-Agency Standing Committee Sub-Working Group on Preparedness:** The Inter-Agency Standing Committee Sub-Working Group on Preparedness promotes collaboration in emergency preparedness among humanitarian actors to support effective and timely humanitarian response. It explores and develops a variety of preparedness, contingency planning, early warning and early action approaches, methods and trainings to enhance the United Nations and IASC partners’ overall preparedness capacity. Among key contributions, the Sub-Working Group publishes the quarterly IASC Early Warning-Early Action Report and has been instrumental in setting up the Humanitarian Early Warning Service Website. It continues to enhance the Inter-Agency Contingency Planning Guidelines for Humanitarian Assistance and increase its usage at field level. In addition, it works to strengthen inter-agency capacity to support emergency simulations and trainings.

3. **GFCS Project Oversight Board:**
   In February 2013, GFCS established the Project Oversight Board as an inter-agency coordination group to help guide its development and its integration with relevant international agencies. In implementing disaster risk reduction activities, the GFCS should continue to coordinate with the agencies that both participated in the Project Oversight Board and have a mandate that involves disaster risk reduction, namely: the International Federation of Red Cross and Red Crescent Societies, the United Nations Development Programme, UNISDR (described above), the World Bank and the World Meteorological Organization. Descriptions of these agencies are provided in Annex 3.

3.3 REVIEW MECHANISMS

The mechanisms for review and evaluation of implementation activities will be identified by agreement among GFCS partners, to ensure that the reporting requirements of each agency are met. For more information, see section 2.6., "Monitoring and evaluation of implementation activities."

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14 Available at www.hewsweb.org.
In addition, to assist Governments in reporting about GFCS activities to reduce disaster risk at the global level, activity implementers (such as National Meteorological and Hydrological Services) should provide timely written information and supporting documentation to the national disaster risk management office for inclusion in the countries’ biannual Hyogo Framework implementation reports. The activity implementation reports should follow the required Hyogo Framework Monitor format so as to facilitate the Disaster Risk Management office’s inclusion (see Annex 4).

3.4 COMMUNICATIONS STRATEGY

To develop the partnerships required to implement GFCS’s activities, it will be necessary to effectively communicate the following:

- **The opportunity offered by GFCS**: potential partners need to know that a mechanism is now available to develop climate information relevant to them for risk reduction.

- **The benefits of collaboration**: potential partners need to understand the final products that could result from collaboration, such as a risk map for a particularly exposed area, or information bulletins that are translated into planning advice for communities.

- **What is available and what is possible**: climate service providers need to be able to describe in non-technical terms the existing technologies and climate products (such as their specifications and formats), as well as their limitations.

- **Willingness to understand and improve**: climate service producers must show willingness to take time to understand potential partners’ climate information requirements and the information used for disaster risk reduction.

- **Willingness to jointly develop, test and upgrade climate products**: climate service producers must convey willingness to work with other stakeholders, rather than alone in meteorological services.

Communicating all of the above is a first step, but an essential one, in the process of delivering more useful climate services to reduce disaster risk.

At the international level, the first two points can be communicated at disaster risk reduction meetings of the ISDR system. These include, at an international level, the 2015 (Japan): World Conference on Disaster Reduction; as well as regional meetings such as the Ministerial Conferences and Regional Platforms for Disaster Risk Reduction in the second half of 2013 and in 2014.
4 RESOURCE MOBILIZATION

As expressed in GFCS’s Implementation Plan, most implementation resources for GFCS will come from expert participation and the routine contribution of services from partner governments and stakeholder organizations, as part of their ongoing mandates and programmes. In the developing world, the work of implementing GFCS will require support from development agencies and multilateral development banks, and from the country programmes of the United Nations system. In order to implement all activities described in this Exemplar for the 2013-2015 period, existing funding for climate information and for disaster risk reduction would need to be reallocated, and additional resources would need to be secured. For this purpose, a reminder of how disaster risk reduction is currently governed might be useful. The Hyogo Framework is clear that disaster risk reduction is a government responsibility, but that it also requires international capacity support; each State has the primary responsibility for taking effective measures to reduce disaster risk, including protecting people, infrastructure and other national assets. Simultaneously, however, concerted international cooperation and an enabling international environment are required to help develop the knowledge, capacities and motivation for disaster risk reduction at all levels.15

Governments need to mobilize funding from all sectors. In countries where external aid is required, governments may mobilize multilateral development banks and development assistance agencies for disaster risk reduction activities by incorporating such activities in their United Nations Development Assistance Framework documents and Poverty Reduction Strategy Papers, as well as including the required funding into governments’ general budgeting system. Mobilizing funding for GFCS’s priority activities may require that governments reallocate funds; thus these must readily fit within and complement existing plans and programmes. Governments should be encouraged also to target capacity developed through GFCS’s other funded activities to reduce disaster risk. For instance, governments might determine that strengthened climate observations will be used to produce climate products for risk assessment, as described in this Exemplar. In the slightly longer term, governments should be encouraged to include the activities described here in their strategic planning for consideration by international development agencies and banks.

At regional and global levels, humanitarian and development agencies and banks should be encouraged to facilitate resources to implement activities that can be embedded in existing country and regional programming, adding value to existing portfolios. Partner agencies should be encouraged to combine their resources and to engage in joint fundraising. Organizations can be particularly helpful by assisting governments in navigating international funding procedures for development, environment, climate change adaptation, humanitarian assistance and disaster risk reduction.

The private sector could be engaged through the UNISDR Disaster Risk Reduction Private Sector Partnership, which calls on businesses to make available expertise in fields such as construction, communications, financing, transport and contingency planning.

Resource mobilization for GFCS’s six-year and ten-year timeframes should begin as soon as possible and in tandem with the implementation of priority activities. It is expected that activities in the longer term will be integrated components of system-wide, coordinated programming of development and humanitarian agencies from the United Nations system and major nongovernmental organizations in target countries.

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15 UNISDR 2007, IIIA(b).
5 ANNEXES

- Annex 2: WCC-3 recommendations for disaster risk management.
- Annex 3: Members of the Project Oversight Board for the GFCS.
Annex 1

Alignment of GFCS disaster risk reduction activities with the priorities of the United Nations Framework Convention on Climate Change and the Rio+20 United Nations Conference on Sustainable Development

GFCS’s contribution to reducing hydrometeorological disaster risk aligns with the priorities of the United Nations Framework Convention on Climate Change (UNFCCC) and the Rio+20 United Nations Conference on Sustainable Development. Specifically, it dovetails with the following recommendations.

The UNFCCC Cancun Adaptation Framework calls for enhancing (UNFCCC, 2010):

(i) Climate change related disaster risk reduction strategies, taking into consideration the Hyogo Framework for Action where appropriate;
(ii) Early warning systems;
(iii) Risk assessment and management; and
(iv) Sharing and transfer mechanisms such as insurance, at local, national, sub-regional and regional levels, as appropriate; among other decisions.

The Rio+20 United Nations Conference on Sustainable Development outcome document includes the following (United Nations, 2012):

186. We reaffirm our commitment to the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters and call for States, the United Nations system, the international financial institutions, subregional, regional and international organizations and civil society to accelerate implementation of the Framework and the achievement of its goals. We call for disaster risk reduction and the building of resilience to disasters to be addressed with a renewed sense of urgency in the context of sustainable development and poverty eradication, and, as appropriate, to be integrated into policies, plans, programmes and budgets at all levels and considered within relevant future frameworks. We invite governments at all levels as well as relevant subregional, regional and international organizations to commit to adequate, timely and predictable resources for disaster risk reduction in order to enhance the resilience of cities and communities to disasters, according to their own circumstances and capacities.

187. We recognize the importance of early warning systems as part of effective disaster risk reduction at all levels in order to reduce economic and social damages, including the loss of human life, and in this regard encourage States to integrate such systems into their national disaster risk reduction strategies and plans. We encourage donors and the international community to enhance international cooperation in support of disaster risk reduction in developing countries, as appropriate, through technical assistance, technology transfer as mutually agreed, capacity-building and training programmes. We further recognize the importance of comprehensive hazard and risk assessments, and knowledge- and information-sharing, including reliable geospatial information. We commit to undertake and strengthen in a timely manner risk assessment and disaster risk reduction instruments.

188. We stress the importance of stronger interlinkages among disaster risk reduction, recovery and long-term development planning, and call for more coordinated and comprehensive strategies that integrate disaster risk reduction and climate change adaptation considerations into public and private investment, decision-making and the planning of humanitarian and development actions, in order to reduce risk, increase resilience and provide a smoother transition between relief, recovery and development. In this regard, we recognize the need to integrate a gender perspective into the design and implementation of all phases of disaster risk management.
Annex 2

World Climate Conference-3 Expert Panel Recommendations

The expert panel of the World Climate Conference-3 recommended (WMO, 2009):

- Identification of requirements of the various user-communities within different sectors of disaster risk management;
- Scaling up pilot studies that have utilized relevant climate information for managing risks.
- Increased investments in data for historical and real-time climate data through increased investments in NMHSs to strengthen observing networks and data maintenance systems;
- Improved climate forecasting technologies (for seasonal, inter-annual, decadal) for use in sectoral planning for disaster risk reduction (e.g., predictions of trends and patterns of droughts, tropical cyclones, floods and heat waves at longer time scales);
- Increased decision-maker awareness. Utilization of climate information must be augmented with systematic public and decision-maker awareness programmes.
Annex 3

Members of the Project Oversight Board for GFCS

The following international agencies are members of the Project Oversight Board for GFCS, and have mandates that include disaster risk reduction, thereby becoming important potential implementation partners for GFCS. UNISDR, while not described below (see instead section 3.2 of the text) is also such a partner.

International Federation of Red Cross and Red Crescent Societies

The International Federation of Red Cross and Red Crescent Societies (IFRC) is the world's largest humanitarian organization. The IFRC coordinates activities between the 187 National Red Cross and Red Crescent Societies within the Movement. To reduce disaster risk, the IFRC has three main strategies: to strengthen the preparedness and capacities of communities so that they are in a better position to respond when a disaster occurs; to promote activities and actions that mitigate the adverse effects of hazards; and to protect development projects such as health facilities from the impact of disasters. In doing so, the IFRC focuses also on addressing the impacts of climate change on the most vulnerable people, by ensuring that both current and future risk are adequately taken into account in programming at different levels. Through their partnership, the IFRC and the International Research Institute for Climate and Society (IRI) developed the IRI-IFRC Map Room, an online tool that demonstrates how an individual forecast compares to normal conditions in a specific location to support Red Cross and Red Crescent managers to take action.

In addition, the Red Cross/Red Crescent Climate Centre, hosted by The Netherlands Red Cross, supports the IFRC to better understand and address the humanitarian consequences of climate change and extreme weather events.

United Nations Development Programme

The United Nations Development Programme (UNDP) has country presence in 160 countries and territories, and provides assistance through disaster risk reduction and climate change adaptation programmes to more than 80 countries. It participates in or leads the Capacity Development for Disaster Reduction Initiative (CADRI), the Global Risk Identification Programme, the International Recovery Platform and a Climate Risk Management Technical Assistance Support project.

UNDP spearheads many initiatives relevant to GFCS. UNDP Country Offices assist countries to design and implement programmes to manage climate-related risks to development. Through United Nations Resident Coordinators and Development Assistance Frameworks, UNDP seeks to align its programmes with those of other United Nations and international organizations at country level to attain a scale and scope sufficient to achieve significant improvements in climate-related development outcomes. UNDP country programmes are supported by regional centres and programmes that address specific technical issues related to managing climate risks. The UNDP Bureau for Crisis Prevention and Recovery (BCPR) supports disaster-prone countries in the development of comprehensive disaster risk reduction programmes, strengthening of institutional and legislative systems, implementation of community-level disaster preparedness activities, including contingency planning and early warning, and establishment of coordination mechanisms to ensure the integration of risk reduction into human development as well as the development of national capacities for recovery planning. UNDP’s Bureau for Development Policy Energy and Environment Group (BDP/EEG) promotes low carbon climate resilient development through its network of regional and country-level advisors. BDP/EEG's climate change adaptation section provides support in three key areas: integrated policy and planning; formulating, financing and implementing climate-resilient projects and programmes; and knowledge management and methodology support. Increasingly UNDP is integrating its disaster reduction and climate change adaptation work to assist countries to manage risks to development associated with climate variability and change in a holistic manner.
World Bank

The World Bank has been involved in risk reduction, post-disaster recovery and reconstruction for 25 years and has increased lending for risk reduction and mitigation mainly by integrating risk reduction into investment programmes. It has established Global Expert Teams (GET) for Disaster Risk Management and Climate Change Adaptation, among others, to provide high quality rapid advisory support to governments in disaster risk assessments, risk reduction, risk transfer and insurance products, post-disaster needs assessment and recovery and reconstruction operations. GET consists of World Bank staff and experts from its partner organizations with global expertise in disaster risk management. Between 2006 and 2011, the World Bank financed 113 disaster prevention and preparedness operations (US$ 7.9 billion) and 68 disaster reconstruction operations (US$ 3.8 billion).

The Global Facility for Disaster Reduction and Recovery (GFDRR) is managed by the World Bank on behalf of its partners (see description in section 1.4.1) and serves as the World Bank focal point for disaster risk management. GFDRR approved 31 projects worth over US$ 22 million in the fiscal year 2012. The highest share of funding – over 60 per cent – was allocated for risk reduction activities. This was followed by 13 per cent each for risk identification and financial protection, 9 per cent for resilient reconstruction and 4 per cent for preparedness. Among GFDRR’s programmes, GFDRR Hydromet (previously called the Programme for Strengthening Weather and Climate Information and Decision-Support Systems (WCIDSSs)) was launched jointly by the urban, agriculture and water departments of the World Bank in 2011. It helps to mainstream the development of modern, sustainable, service-oriented weather and climate information systems into the World Bank and GFDRR portfolio, functioning as a service centre providing analytical, advisory and implementation support to World Bank/GFDRR teams and ultimately their clients (governments). It focuses on three pillars of activities: analytical support and knowledge management, capacity building and technical assistance, and support to portfolio development and operations.

Both GFDRR and the WMO have identified a common interest in the enhancement of the capabilities of WMO Members to conduct socio-economic benefits analyses and studies of the weather, water and climate services provided by National Meteorological and Hydrological Services. There is a growing need for the demonstration of the benefits brought to society and the economy by service providers financed through public funds; however the expertise needed for conducting such studies is normally not available in most National Meteorological and Hydrological Services. At the same time socio-economic benefits analysis and monitoring should contribute to the development, implementation and updating of sustainable business plans for National Meteorological and Hydrological Services. GFDRR Hydromet and the WMO have therefore agreed to join efforts in providing assistance by developing relevant guidance and promotion of good practice in the field.

World Meteorological Organization (WMO)

WMO has important in-house capacity, through its Programmes and Commissions, to contribute toward the implementation of GFCS. WMO’s Disaster Risk Reduction Programme undertakes relevant work in the areas of: (1) knowledge development, involving the documentation of good practices, standards and guidelines for the provision of meteorological, hydrological and climate services to support disaster risk reduction policy development, sectoral hazard/risk assessment, multi-hazard early warning systems, and disaster risk financing and risk transfer; (2) operationalization of services and capacity development through the implementation of user-driven national/regional disaster risk reduction projects, which involve national agencies as well as the network of Global Producing Centres, Regional Specialized Meteorological and Regional Climate Centres; and, (3) support humanitarian planning and preparedness. These activities are underpinned by strong partnership with the disaster risk reduction stakeholder community.

WMO combines observing systems, information systems and telecommunication facilities, and data-processing and forecasting centres, operated by Members. It includes the Tropical Cyclone Programme and the Instruments and Methods of Observation Programme, to ensure the quality of the
observations for weather forecasting and climate monitoring. WMO promotes the improvement of the understanding of climate processes through internationally coordinated research and the monitoring of climate variations or changes. It also promotes the application of climate information and services to assist in economic and social planning and development. The research component of the Disaster Risk Reduction Programme is the joint responsibility of WMO, the International Council for Science and the Intergovernmental Oceanographic Commission (IOC) of the United Nations Economic and Social Council. The Climate Impact Assessment and Response Strategies component is coordinated by the United Nations Environment Programme. WMO also assists Member countries in obtaining adequately qualified staff for their National Meteorological and Hydrological Services through collaboration with international partners, universities, relevant training institutions, schools and the media. It works closely with all WMO scientific and technical programmes in organizing specialized training in weather-, climate- and water-related fields.
Annex 4

Hyogo Framework Monitor reporting guidance

Available at: http://www.preventionweb.net/english/hyogo/hfa-monitoring/national/?pid:73&pil:1

SECTION 4: PRIORITY for ACTION 2

**PRIORITY FOR ACTION 2: DEFINITION AND SIGNIFICANCE**

**Identify, assess and monitor disaster risks and enhance early warning**

The starting point for reducing disaster risk and for promoting a culture of disaster resilience lies in the knowledge of the hazards and the physical, social, economic and environmental vulnerabilities to disasters that most societies face, and of the ways in which hazards and vulnerabilities are changing in the short and long term, followed by action taken on the basis of that knowledge.

In view of the areas outlined in the Hyogo Framework for Action, Priority for Action 2 has four ‘core indicators’ with which progress and challenges on implementation are to be monitored and reviewed:

1. National and local risk assessments based on hazard data and vulnerability information are available and include risk assessments for key sectors;

2. Systems are in place to monitor, archive and disseminate data on key hazards and vulnerabilities;

3. Early warning systems are in place for all major hazards, with outreach to communities;

4. National and local risk assessments take account of regional /transboundary risks, with a view to regional cooperation on risk reduction.
6 REFERENCES

References for Section 2.3, Suggested Priority Categories of Activities

Category 1: Risk Assessment

Category 2: Loss Data


Category 3: Early Warning Systems


Category 6: Risk Financing and Transfer – Weather Indexing

General References


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Tall A., 2008. Climate Forecasting to Serve Communities in West and Central Africa: Bridging the Gap between the IFRC-WCAZ and the Climate Science Community. The Netherlands, Red Cross/Red Crescent Climate Centre.


Tall, A., Hassan Virji, Jon Padgham, Pablo Suarez, Mamina Kamara, Emma Visman, Dominic Kniveton and Youcef Ait-Chellouche. Bridging the Gap between Climate Scientists & Communities at Risk in Africa: Learning from Practice through Community Early Warning - Early Action Workshops. Unpublished.


### ACRONYMS

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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>DRR</td>
<td>Disaster risk reduction</td>
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<tr>
<td>GFCS</td>
<td>Global Framework for Climate Services</td>
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<tr>
<td>GFDRR</td>
<td>Global Facility for Disaster Reduction and Recovery</td>
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<tr>
<td>IASC</td>
<td>Inter-agency Standing Committee</td>
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<tr>
<td>IFRC</td>
<td>International Federation of Red Cross and Red Crescent Societies</td>
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<tr>
<td>IRI</td>
<td>International Research Institute for Climate and Society</td>
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<tr>
<td>UNDAF</td>
<td>United Nations Development Assistance Framework/Partnership</td>
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<td>UNDP</td>
<td>United Nations Development Programme</td>
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<td>UNICEF</td>
<td>United Nations Children's Fund</td>
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<td>UNISDR</td>
<td>United Nations Office for Disaster Risk Reduction</td>
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<td>WMO</td>
<td>World Meteorological Organization</td>
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