

HELP's Position Paper on Climate Change and Water-related Disaster Risk Reduction

Water-Related Disaster Risk Reduction: Time for Preventive Action!

Position Paper of the High-level Experts and Leaders Panel on Water and Disasters (HELP)

Climate change is exacerbating the extremes in hydro-meteorological events. Together with other global drivers under change – population growth, rapid urbanisation, increased asset values – this may result in increased frequencies and even higher impacts of water-related disasters.



“Investments in risk reduction and prevention pay off.”

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HELP's Messages for Water-related Disaster and Risk Reduction

1. Water related disasters, such as floods, droughts, storm surges and tsunamis account for 90% of all disasters in terms of number of people affected. This number is still increasing. The poor, vulnerable groups, women and girls are suffering the most. Economic and environmental losses associated with water related hazards are rising in all regions.
2. Disaster Risk Reduction, Water Resources Management and Climate Adaptation should no longer be treated as separate topics.
3. More data and better tools for risk assessment are ready for use now and need to be more widely deployed to identify and prioritize actions. Better preparedness of citizens in terms of risk awareness and emergency planning are also essential.
4. Risk reduction, preparation and prevention are sensible investments that pay off in terms of reduced loss of life, avoided damage, and long-term economic growth and stability. Further emphasis on the role of financial protection measures in Disaster Risk Management is needed.
5. Risk prevention should be integrated with long-term planning. This allows communities and decision makers to identify and exploit opportunities for synergies with planned investments, including plans for adaptation to climate change.
6. Uncertainties are no excuse for inaction: uncertainties are inherent in long-term planning and should be accounted for in a comprehensive, flexible and adaptive approach.
7. Align the efforts under the major 2015 international policy frameworks to create synergy and to increase effectiveness.

1.1. Climate shifts and other global changes are already impacting water-related disasters

The projected impacts of climate change clearly indicate the consequences for the occurrence of disasters: enhanced sea level rise and more pronounced hydro-meteorological extremes, with a higher frequency of intense storms, locally more intense rainfall, higher river discharge extremes, but also longer dry periods and droughts that can lead to deterioration of already scarce water resources.

In some regions, new kinds of disasters are occurring, such as droughts, in areas that have not experienced such kinds of impacts before.

Meanwhile, other global drivers contribute to the increase of the vulnerability of the population, resulting in potential additional risks and to the casualties and hazards that may occur in the case of extreme events. Population growth, asset deterioration, rapid urbanisation and subsidence from groundwater extraction may pose an additional risk to already vulnerable urbanised flood prone areas, as does the increased value of assets which are often concentrated in and around these same urban areas.

1.2. Water-related disasters have large impacts and these impacts are growing in scope and severity

Globally, water-related disasters already account for 90% of all natural disasters¹. Their frequency and intensity is generally rising due to climate change, causing enormous damage to life and property. Climate change is a factor in these trends. Damages attributed to water-related disasters can mount up to 15% of annual GDP for certain countries.

Population growth, poverty, land shortages, urbanization, the poor condition of flood protection and drainage infrastructure, and water storage facilities, especially in developing countries, have increased the vulnerability of people to flood hazards and droughts, and, inter alia, have multiplied impacts on public health associated with water-borne epidemics. The poor, women and girls are suffering the most.

Moreover, droughts, as slowly developing disasters, but large in extent, lead to the collapse of social structures and to refugees that may cause disruptions in social structures of adjacent regions.

Recent history has taught us that even the most developed countries are vulnerable to water-related hazards. Climate change is very likely to exacerbate this trend, both for floods and droughts, although in different parts of the world different trends in precipitation and temperatures are expected.

¹ WWDR4, 2012. <http://unesdoc.unesco.org/images/0021/002156/215644e.pdf>

2.1. Disaster Risk Reduction, Water Resources Management and Climate Adaptation should no longer be treated as separate topics.

To date, most disaster response agencies at global, national, and local levels have treated disaster threats as (a) relatively fixed and unchanging, and as (b) threats that should be responded to after their occurrence rather than in advance, through planning and preparation.

Indeed, in terms of development aid, emergency aid, global adaptation funding, and national water and emergency planning processes, the divisions between climate adaptation, water resources management, and disaster response seem potentially dangerous, exacerbating risks to communities, economies, and the environment.

Given the shifting nature of water related threats, climate adaptation, water resources management, and disaster risk reduction should be merged and better integrated to address new and emerging impacts.

3.1. Information to manage and predict water-related disasters needs improvement

Data on the impacts of water-related disasters (floods and droughts) is increasingly available but varies considerably in quality and quantity. Assessing vulnerability analysis is an essential tool in water-related disaster management. Yet, documentation of disease outbreaks and public health after-effects of water-related hazards is still lacking.

Another limitation is our understanding of how to account for secondary (or indirect) economic consequences, such as long-term disruptions to economic chains, economic damage through infrastructure impact, and environmental damage from increasing competition between increasing water resources demands from human communities and activities and ecosystems.

Greater consistency in the reporting and documenting of water-related disasters, as well as a better understanding of impacts based on common criteria, are crucial to establish baselines, set priorities, track trends and assess the effectiveness (costs and benefits) of any proposed response.

Box 1: Resilience, vulnerability and risk assessment

Resilience can be described as “The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions” (UNISDR, 2009).

Climate adaptation assumes that, under novel conditions, rather than recovery also transitions into new states are inherent elements of resilience.

Resilience concepts need to be further developed for critical infrastructures (supply of basic services like water, food, energy, transport, housing/ shelter, communications, finance, health), but also for the wider public to integrate and address human and social dynamics in crises and disaster situations.

Resilience concepts take into account the necessity to anticipate, to plan and to implement in the crises time a substitution process aiming to deal with a lack of material, technical or human resources or capacities necessary to assume the continuity of basic functions and services until recovery from negative effects and until return to the nominal position. Immediate civil organisational arrangements post-disaster are essential.

Moreover, as resilience management and vulnerability reduction are closely related, it is necessary to link the on-going efforts and share risk assessment and mapping approaches, e.g. physical exposure mapping with relevant resilience management approaches, to ensure that risk assessment is followed by the development of resilience concepts in the various security sectors, based on the results of the risk assessments.

4.1. Disaster management as currently practiced is typically reactive, rather than proactive

Historically, water-related disasters have been thought of and treated as isolated, one-off events that triggered responses in their aftermath as reactive crisis management (relief and response). Hence, disaster risk reduction has often focussed on improving primary, reactive responses, such as capacity building for civil defence on how to cope with major disasters such as tsunamis, or developing drought or flood contingency plans on how to coordinate emergency responses amongst a variety of actors. Compared to relief and response much less attention has been paid to prevention and mitigation.

4.2. Shifting Disaster Management from Reaction to Prevention

Preventive action aims at developing measures to prevent disasters from happening or measures to increase the resilience (see Box 1) to cope with potentially disastrous events.

Several examples exist to alleviate droughts by, for instance, the use of Aquifer Storage and Recovery (ASR) or building sand dams, or by better forecasting and early warning (see Box 2), or to address flood issues through integrating “green infrastructure” in management plans (Box 3) and by addressing climate uncertainties through more flexible management systems (Box 4).

This approach pays: risk prevention is usually a sensible investment. For example, some studies show that in certain situations every euro/dollar spent on preventive measures can pay back up to ten-fold in avoided damage and loss of life. As the incidence and severity of extreme events are expected to continue to increase, investment in prevention is becoming increasingly advantageous. These observations are not new. In 2005, the Hyogo Framework for Action articulated the need for a more risk based and preventive approach, though little progress has been observed in this area in response to this agreement. This has to be considered against an underlying problem of deterioration of existing assets and asset systems due to long-term under-investment around the world.

Box 2: Strengthen preparedness to droughts

By advancing drought forecasting, early warning and mitigation practices the DEWFORA projects aims to reduce vulnerability and strengthen preparedness to droughts in Africa. To this aim, a framework for monitoring, predicting, timely warning and responding to droughts at the seasonal time scale is developed, applicable within the institutional context of African countries. The project also contributes to improve the identification of vulnerable regions taking into account the increased hazard due to climate change, and has developed feasible adaptation measures.

The project showed that improved drought forecasting and early warning based in vulnerability assessments can improve the preparedness to droughts in Africa. However, lack of financial resources and institutional arrangements that are not suited for the operation of an early warning system and dissemination of its results lead to a situation in which the available information is not suitable and not timely for the end-users and generally unreliable and inadequate.

In collaboration with UNESCO IHP, Princeton University has developed an experimental drought monitoring and forecast system for sub-Saharan Africa since current approaches to drought monitoring in developing regions have generally been limited, in part because of unreliable monitoring networks and limited national capacity. Hydrological and drought forecasts are provided out to 6 months (<http://hydrology.princeton.edu/monitor>). The Africa Drought Monitor (ADM) has been implemented at AGRHYMET (Centre Regional de Formation et d'Application en Agrométéorologie et Hydrologie Opérationnelle) regional center in Niamey, Niger, and at the Greater Horn of Africa Region at ICPAC in Nairobi.

Source: Dewfora 2011. <http://www.dewfora.net/index.php>

4.3. Incorporating Financial Protection as a measure and an incentive for preparedness.

Financial protection can serve as an effective preparedness measure, which can drastically reduce the impact of disasters.

For instance, the World Bank has undertaken a pilot index-based livestock insurance program in four counties in Northern Kenya, which builds on Kenya's Hunger Social Safety Net Program (HSNP), with the aim of scaling up to a large scale livestock insurance program. The primary objective of the program is to reduce the vulnerability of pastoralist households against drought, an effective risk retention and preparedness measure. Furthermore, the Bank also provides contingent instruments (such as CAT-DDOs) which are pre-approved credit lines that offer immediate sources of liquidity to countries when disasters strike. For countries to be eligible for these risk transfer mechanisms, they must implement a comprehensive DRM program, which the Bank monitors on a periodic basis. Therefore, these credit lines serve as incentives for incorporating effective preparedness measures in national level strategies. Additionally, the DRM program helps countries identify and understand risk which can then prompt other effective prevention measures.

5.1. How do we include preventive action in disaster risk reduction?

In recent years an integrated, adaptive approach has been developed based on the recognition that risks, if not properly addressed in advance, may lead to the occurrence of disasters. Its widespread and effective implementation requires a reframing of the paradigm of disaster risk management from its traditional focus on mitigating the (direct) impacts of disasters using stand-alone and ad hoc interventions to (i) a broader focus on prevention, mitigation, preparedness, and vulnerability reduction, (ii) the recognition that disaster risk management is surrounded by many uncertainties and should therefore be an iterative or continuous, on-going effort requiring experimentation and learning, and (iii) an integration and mainstreaming into sustainable development policies, planning and programming at all levels: globally, nationally as well as locally and at community level.

As an example, spatial planning should include considering restrictions for building in areas exposed to disaster impacts, thus reducing exposure of people and assets. UNISDR currently facilitates the development of a post-2015 framework for disaster risk reduction. This offers an excellent opportunity to include these latest experiences and insights in disaster risk reduction. The post 2015 framework should therefore have a stronger foundation through a risk based, preventive approach. Such an approach should be accompanied by agreements on concrete actions as well as monitoring of such actions.

Box 3: Green infrastructure for Disaster Risk Reduction in the Mekong Delta,

Vietnam: merging traditional and innovative solutions

Floods play an important role in the life of people living in the Mekong Delta. Each year floodwaters inundate 1.9 million ha and affect the lives of more than 2 million people. Normally, these floods are essential to food security and biodiversity and people have a tradition in living with the floods. However, extreme flood events can be destructive and cause enormous damages.

Sea level rise is expected to result in large areas of more frequently and even permanently inundated coastal plains. Furthermore, sea level rise will increase salinity levels in the delta rivers and its water network. Agricultural production will be affected through more frequent and longer periods of flooding as well as because of salinity intrusion. The population size is projected to almost double by the year 2050 from 17 million up to around 30 million.

This will fuel the urbanization trend, taking more land out of agricultural production. At the same time more people need to be provided with food and fresh water. Ongoing industrialization will also take up more space and increase the demand for water as well as the production of wastewater. Both trends will increase the need for proper spatial planning, efficient water supply, investments in water treatment and stringent enforcement of environmental legislation.

The current water management system is based on the 1994 Mekong Delta Master Plan. An update is presently under discussion in order to include environmental and socio-economic developments as well as recent innovations and modern approaches, such as green water defences. This concept can be very useful in combination with the traditional measures for flood control. In fact, several good practices of the concept can be found in Government decisions and design guidelines for infrastructure and land use.

Source: Worldbank, 2012. Growth in Concert with Nature – Green water defense for flood risk management in East Asia.

5.2. Preventive action is an opportunity for (economic) development

There are many opportunities for reducing water-related disaster vulnerabilities in the face of global change. Whilst aging infrastructure and building stock in the developed world pose a risk due to increasing vulnerability, this also provides an opportunity to introduce new technologies in the redevelopment process and to adapt infrastructure and buildings to enhance disaster resilience.

Urban restoration, regeneration and modernization can be a key driver of economic development, both as a result of the initial investments required and the benefits that will accrue over time (e.g. formerly flood-prone areas may become available for productive use).

In addition, in many new economies and developing countries, their growing economy also provides an opportunity to use the lessons from the developed world to avoid some of the past mistakes (leap frogging).

Better preparedness of the civil population through awareness-raising and clear actions to be taken in advance of or during a disaster can also significantly reduce the human impact.

6.1. Increased resilience is needed to deal with uncertainties

Uncertainties are no excuse for inaction; uncertainties are inherent in long-term planning and should be accounted for in an adaptive approach, which may be adjusted over time in response to evolving economic and environmental conditions.

There is an urgent need to enhance the disaster resilience (both conditions and performance, also see box 1) of our critical infrastructure using preventive measures, as to secure the basic supply of services such as water, food, energy, transport, housing, communications, finance, health. This should take into account the various interactions between sectors at the local scale, and also how these interact with regional, national or even transboundary levels.

6.2. Preventive action is not to be executed in isolation

It may be clear that preventive action against disasters requires a long-term development perspective. It can therefore not be linked to disaster risk management alone. Preventive action needs to be embedded in an integrated process that incorporates water resources management and climate adaptation processes (see also Par. 2.1), and mainstreamed into national planning processes.

Such an approach also enables optimisation of resources, where, for instance, flood prevention infrastructure can also serve the purpose of drought prevention, and at the same time hydropower and/or irrigation.

6.3. Towards a flexible approach

There is growing international recognition that water related disaster risk management should be a programmed and flexible process of continuously improving management practices, in which short term actions are linked to long term goals, flexibility is valued and incorporated, and multiple strategies are considered in a rational manner and different investment agendas are inter-linked.

The development of a post-2015 framework for disaster risk reduction offers an excellent opportunity to put this recognition into practice, developing a framework that builds on preventive action and that promotes flexible implementation of measures.

Box 4: Adaptive Delta Management: optimizing investments in risk reduction

In the Netherlands, the central government, water boards, provinces and municipalities are working together on a new Delta Plan on Water Risk Management. This program is referred to as the Delta Programme. Its primary goal is to protect the Netherlands against floods and ensure the availability of fresh water, now and for future generations.

The Delta Programme comprises a cohesive set of projects (measures) for the short term, but also looks ahead to the medium and long term (up to 2050). The Delta Programme has developed a new, adaptive management strategy: the Adaptive Delta Management (ADM) approach. ADM is defined as “a smart and intelligent way of taking account of uncertainties and dependencies in decision-making on Delta Management with a view to reducing the risk of overspending or underinvestment”. ADM entails a phased approach towards investments while decision making is driven by major uncertainties around future developments and the desirability of responsible financial investment. It starts off from short-term decisions in the broad fields of water, land use and spatial planning and link to long-term issues in the specific fields of protection against flooding and freshwater supply, allowing to switch between strategies through adaptation pathways. Short-term measures must be logical in the long term: they are useful, do not obstruct long-term measures, or are even necessary to keep long-term options open.

Important features of the Delta Programme are:

1. involving multiple stakeholders in joint a decision making process to enhance legitimacy and feasibility;
2. taking a risk-based perspective;
3. adopting a flexible approach in the possible strategies by valuing flexibility with regard to the timing of implementation;
4. inter-linking various investment agendas and looking for opportunities for mainstreaming with planned investments; and
5. other key success factors, including the Delta Programme being led by an independent coordinator; considering the financing of both planning and implementation; and having a firm legal basis.

Source: <http://www.deltacommissaris.nl/english/>

7.1. Align the efforts under the major 2015 international policy frameworks to create synergy and to increase effectiveness.

In 2015 a number of important events of international policy frameworks will take place, such as the decision making on the post 2015 Sustainable Development Goals, the Sendai World Conference on Disaster Risk Management (Hyogo Framework for Action) and the Paris Climate Conference. By aligning these frameworks in terms of Disaster Risk Management synergy and efficiency can be reached, for instance in tracking and measuring goals and outcomes.