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QUICK TIPS

INTEGRATING DISASTER RISK REDUCTION, ENVIRONMENTAL AND CLIMATE CHANGE ACTION AT SECTOR LEVEL

The number and severity of disasters is increasing. Disaster events in 2000–2019 almost doubled compared to the 1980–1999 period¹. Related economic losses have been rocketing over the past 15 years and now reach a staggering EUR 480 bn per annum. Between 2005 and 2017, almost 70% of worldwide economic losses² were caused by disasters.

About 91% of all disasters reported between 1998 and 2017 were triggered by climate-related natural hazard, such as floods, storms, droughts, heatwaves and other extreme weather events³. Climate change not only accentuates these hazards⁴, it also affects natural regulating systems such as forests, oceans and coasts and reduces their capacity to buffer impacts when a hazard occurs. Climate change and environmental degradation amplify the three drivers of disaster risk: hazard, exposure and vulnerability. Natural hazard-related disasters tend to hit low-income households hardest, pushing 26 million people into poverty every year⁵, and threatening development gains.

Disasters are not natural. They are a serious disruption of the functioning of a community or a society at any scale and only happen when a hazardous event, such as a flood, storm or earthquake, interacts with conditions of exposure and vulnerability, leading to human, material, economic and/or environmental losses and impacts. As such, a disaster can only happen where a society exists. That society can make socio-economic decisions that alter its vulnerability and the way a hazard impacts it.

Disasters may be small- or large-scale, frequent or infrequent, with a slow- or sudden onset. Their effect can be immediate and localised, but is often widespread and lingering, testing or exceeding the capacity of a community or society to cope using its own resources and therefore requiring external assistance. While intense and rare natural hazard events are the main cause for mortality, small and recurrent events are responsible for

almost half of economic losses and for greater proportions of morbidity and displacement⁶. This means disasters are potentially predictable and can be prepared for, leading to reduced risks and impacts and an opportunity to prevent hazards from turning into disasters. Even if some natural hazard events may be inevitable, the resulting disasters are mostly due to human (in)action.

It is worth investing in disaster risk reduction (DRR). In low- and middle-income countries, investing in more resilient infrastructure yields four euros in benefit for each euro invested⁷. Prevention, mitigation⁸ and preparedness are less costly than response, recovery and reconstruction. For instance, securing water for all could cost 1% of global GDP, yet failure to improve water management would result in regional GDP losses from 2–10% by 2050⁹. Soft or “non-structural” approaches, such as land use planning, early warning systems, and household-level adaptive/preventive measures, can be as or even more effective than structural measures¹⁰.

DRR is an integral part of EU development strategy and closely associated to climate commitments. In the 5th Intergovernmental Panel on Climate Change (IPCC) Assessment Report¹¹, global actors agreed on the need to integrate climate change adaptation (CCA) and DRR. DRR and CCA are not only an imperative for protecting investments in development, but also an opportunity for a transformative shift towards a more resilient, sustainable development. The EU Green Deal envisages a transformation towards economies that are more resilient to climate and environment-related risks. The new EU Adaptation Strategy (2021)¹² underlines the “**common ground**”^{13,14} **that ties DRR and CCA frameworks together**, by putting the onus on a coherent response to increasing climate hazards and the shared approaches to resilience and on leaving no one behind.

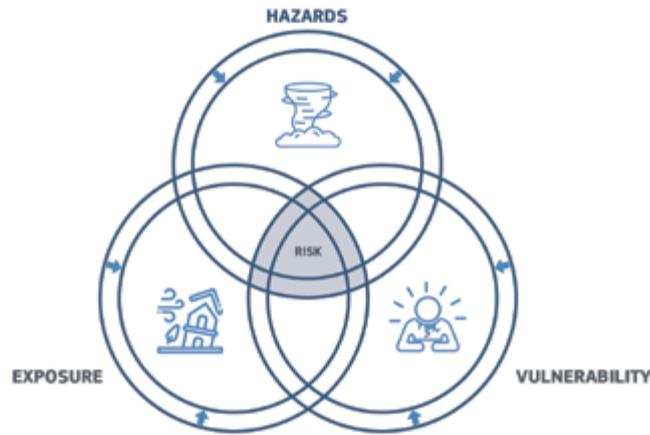
WHAT IS DISASTER RISK?

Disaster risk is the potential loss of life, injury, or the destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure and vulnerability.

Hazard: A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation

Exposure: The situation of people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas.

Vulnerability is determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards.



WHAT IS DISASTER RISK REDUCTION AND MANAGEMENT?

Disaster risk reduction (DRR) is the policy objective of disaster risk management (DRM) aimed at preventing new, reducing existing and managing residual disaster risk. DRM is the application of DRR policies and strategies, while **disaster (or emergency) management** is used to refer to the cluster of measures that deal with disasters once they are imminent or have occurred.



Incorporating climate information into the disaster risk management cycle illustrates the kinds of information that can inform specific decisions (adapted from Kelly and Khinmaun, 2007).¹⁵

DRM measures involve activities related to **risk assessments** (analyse and evaluate potential hazards, existing or possible future conditions of exposure and vulnerability, and prevailing and alternative coping capacities with respect to likely risk scenarios), **prevention** (avoiding existing and new disaster risks by e.g. relocating exposed people and assets away from a hazard area), **mitigation** (lessening or limiting the adverse impacts of hazards by e.g. constructing flood defences, planting trees to stabilize slopes, or implementing strict land use and building codes), **risk transfer** (shifting the financial consequences of particular risks from one party to another, e.g. insurance and other disaster risk financing tools), **preparedness** (building capacities to effectively anticipate, respond to, and recover from the impacts of likely or imminent hazards/disasters, e.g. installing early warning systems, identifying evacuation routes, stocking emergency supplies, providing forecast-based funds), **response** (providing disaster relief directly before, during or immediately after a disaster), and **recovery, rehabilitation and reconstruction** (restoring or improving livelihoods and economic, physical, social, cultural and environmental assets, systems and activities, aligning with the principles of sustainable development and “building back better”). All of these measures need to be anchored in sound **disaster risk governance**, i.e. the institutions, mechanisms, policies, strategies, plans and legal frameworks at various levels that guide, coordinate and oversee DRR and its alignment with climate action and its mainstreaming in sectoral and overall development policies, planning and budgeting systems.

THE SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION 2015–2030

The Sendai Framework for Disaster Risk Reduction 2015–2030 is the main reference on DRR and should be considered in the design of EU programmes and investments. It was adopted by 187 United Nations member states and aims to achieve the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries. The Sendai Framework includes four priorities to guide action and seven global targets against which to assess progress.

1 OUTCOME

The substantial reduction of disaster risk and losses in lives and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries

1 GOAL

Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience.

4 PRIORITIES

Understanding disaster risk

Strengthening disaster risk governance to manage disaster risk

Investing in disaster risk reduction for resilience

Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction

7 TARGETS

- ↓ Disaster mortality by 2030
- ↓ Number of affected people by 2030
- ↓ Economic loss by 2030
- ↓ Infrastructure damage by 2030
- ↑ DRR National/local strategies by 2020
- ↑ International cooperation by 2030
- ↑ Multi-hazard early warning systems and disaster risk information by 2030

EXAMPLES OF DISASTER RISK REDUCTION INTEGRATION IN SECTORAL ACTIVITIES



Urban Development and Construction

Neglecting risks in urban planning, construction and industrialisation will create new risks and lead to losses, damages and costs.

- ▶ Ensure adequate **planning capacity** of local institutions (including municipalities) to address disaster, climate and environmental risks and the consequences of hazardous events.
- ▶ **Map communities and zones at risk**, considering data on past and modelled weather and flood events, physical and environmental characteristics, infrastructure, current and possible future vulnerabilities and exposure to the elements. Constructions/critical infrastructures, notably public health and education facilities, should be subject to risk zoning, design standards and building codes.
- ▶ Use **blue and green urban areas** for nature-based solutions to absorb or mitigate the impacts of floods, heat island effects or droughts (e.g., through wetlands, forested areas, or natural water retention measures)
- ▶ **Retrofit** existing buildings by e.g. adding structural stability and improving energy efficiency standards.
- ▶ Ensure good **solid waste management**, an effective non-structural measure used e.g. in flood risk management.



Education

Mainstreaming DRR in education is the first building block to improve awareness on hazards, vulnerability, climate change, risk reduction and adaptation.

- ▶ **Build awareness** through education, outreach/advocacy and drills to improve attitudes and practices of exposed groups that result in a culture of disaster prevention and resilience.
- ▶ **Promote a child-friendly Sendai Framework¹⁶**, putting attention and building evidence on how children's rights are affected by disasters, their exposure and vulnerability to environmental and climate shocks, stresses and hazards and how to deliver improvement in their access to key services. Children's rights include the right to health, education, family life and an adequate standard of living¹⁷.
- ▶ Use public information and education programmes to **enable local communities** to take the necessary measures to reduce disaster risk and improve the natural environment at the community level.
- ▶ **Integrate sustainability and resilience considerations** into education curricula, both in primary and higher education.
- ▶ **Train (high level) professionals in national meteorological, hydrological, geophysical, statistical and DRM agencies** and address limited capacity to provide their mandated services.
- ▶ **Exchange** with national, regional and international technical agencies and research and educational institutions to boost understanding on the needs for and the design, implementation, maintenance and delivery of DRR measures and climate services, leading to improved knowledge on risks and DRR/DRM and CCA.



Health

Impacts on human life and environmental quality imply that all disasters are a health issue.

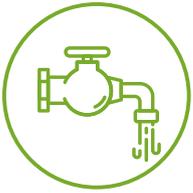
- ▶ **Ensure environmental and climate risks** and DRR/CCA considerations **are included** in health policies and systems, and epidemics and pandemics are included as additional natural hazards in national and local risk assessments.
- ▶ **Design or strengthen health infrastructures** taking into account their vulnerability to different hazards, notably health centres in hazard-prone areas and destined to accommodate large numbers of victims in cases of emergencies; Support their capacity to design and implement **contingency and management plans**.
- ▶ Provide **risk awareness and health education** to communities on local environmental and climate-related hazards and their impact on health and vectors, including water-/foodborne diseases, surge of disease-carrying pests, impacts of (air) pollution, heat strokes, extreme wildfires, etc.
- ▶ Strengthen **surveillance and control** of infectious diseases in light of the interplay between climate change and infectious disease risks.
- ▶ Analyse causes of **health services disruption** related to hazardous events; Connect with actors from multiple sectors to modify existent/future health (response) systems against these impacts/damages.



Transport/Mobility

A critical service where disruption has significant social and economic impacts.

- ▶ Promote **Green mobility** (e.g., cycling, interconnected public transport) in urban areas that can ensure connections and improved transport resilience, particularly in case of disaster.
- ▶ **Continuously maintain transport infrastructure** to guarantee transport performance. Rail transport lines can be buried by sedimentation or affected by erosion. In case of disasters, quality of secondary roads affects performance of the network in turn affecting provision of (e.g., logistics, rescue operations) and access to (e.g., education, health) services.
- ▶ **Prepare contingency and management plans** that address typical environmental risks in transport such as hazardous materials transport, major road incidents (e.g., due to flooding), or multiple risks (e.g., maritime oil spills leading to risks to human life and environmental impacts, coastal erosion affecting road safety and functionality).
- ▶ Strengthen **early warning systems** which are essential for land, air and sea transport (e.g., haze or dust for aviation, freezing rain on roads, sea travellers/maritime transport) or for communities whose livelihoods depend on river, sea or coastal resources.



Water/Sanitation/Wastewater

Water-related adversities form the bulk of disasters.

- ▶ **Analyse water-related risks**, including those of floods and droughts, tropical cyclones, sea level rise, or pollution, and potential barriers for access to water, to incite governments and international partners to pay more attention to risk preparedness, prevention and address root causes of vulnerability.
- ▶ Develop **preventive communication** on water usage, sanitation and hygiene in disaster situations.
- ▶ Ensure **Integrated Water Resources Management plans** include explicit measures addressing extreme hydrometeorological events and are coordinated with flood and drought risk management plans.
- ▶ **Support maintenance** of water supply and sanitation systems notably in urban areas as poor maintenance can lead to disruption in case of hazardous events.
- ▶ **Build back better and greener**, implying the redesign of wastewater and storm water infiltration facilities in light of extreme or potentially high-impact hazardous events (at municipal and household level).
- ▶ Promote **nature-based solutions** such as flood plain or mangrove restoration that increase the capacity of river systems / coasts to cope with extreme events.



Energy

Energy infrastructures are often interdependent, implying cascading service disruptions in case of disasters.

- ▶ **Update risk management practices** and build capacity of the power sector to ensure business continuity and improve resilience of supply systems.
- ▶ Assess **climate vulnerabilities of energy infrastructure**, notably hydropower facilities, and include how climate-related hazards affect not only the structural designs (failure risks e.g., overtopping in dams, destruction of distribution grids), but also their surrounding areas (landslides, floods, ecosystems) and the potentially reduced electricity generation performance and reliability. Climate change – i.e. changing averages (temperature, sun hours, precipitation, etc.) – impacts solar, wind and hydropower.
- ▶ Promote **nature-based solutions** such as forestry management that offer energy risk management benefits as a reliant, long-term supplier of biomass energy.



Agriculture, Food and Nutrition Security

A resilience approach means to take a systems view, addressing also root causes and drivers of vulnerability.

- ▶ Favour **no-regret options**, which are usually well-suited for smallholder farmers, including livelihood diversification, the introduction of drought- and flood-tolerant varieties (crops) and breeds (livestock), or the use of organic pesticides. Analyses of costs and benefits (with/without DRR options) and of the performance of options under different scenarios are useful tools for option selection.
- ▶ Promote **resilient and sustainable agricultural practices** such as agroforestry and soil and water conservation, through medium- to long-term commitments, compatible with communities' engagement, avoiding one-off investments.
- ▶ Support **information and early warning systems that are easily accessible by farmers**, notably related to weather, water and climate, locusts, famine, animal disease outbreaks, and market prices.
- ▶ Ensure **food availability** in climate or environmentally sensitive areas, through food stock schemes or animal feed banks.
- ▶ Develop **insurance and microfinance** tools that can help improve farmers' financial stability and capacity to invest (e.g. for agricultural inputs such as fertilisers, pest control consumables, or feedstuff).
- ▶ Fund **infrastructures and equipment** (e.g. storage facilities, animal shelters) that can increase their adaptive capacity to defy food crises and natural hazards.
- ▶ Step up **dissemination and sensitisation efforts** since most DRR measures can work at farm level without external support, yet they need to be known and understood.



Migration

Durable solutions come with the full-cycle engagement of all stakeholders.

- ▶ Support the conservation, sustainable use and enhancement of **local environmental services leading to improved and resilient livelihoods** (e.g., provision of sufficient space for economic and social activities, land suitable for agriculture, quality freshwater) to reduce drivers for forced migration and/or to support a sustainable return.
- ▶ **Safety nets, cash for work, temporary labour** mechanisms used to mitigate the negative impact of forced migration and displacement (for both migrants and destination localities) can systematically **integrate climate-smart land and water conservation activities**.
- ▶ Build capacity of district and local actors to better prevent, mitigate and respond to multiple hazards, applying an inclusive and gender-sensitive approach to tackle health and security issues and causes of eroding quality of livelihoods.



Tourism/Recreation

Tourism is a sector where especially private entities can support DRR by developing contingency plans to ensure business continuity and improve disaster preparedness.

- ▶ Deploy **simple signalisation and communication for tourists**, to inform them on disaster risks and how to prepare for and react in case of an emergency (e.g. tsunami escape routes).
- ▶ Use **nature-based solutions as natural buffers** for hazard impacts while also providing **cultural ecosystem services/recreation**. For instance, local mangroves can sustain biodiversity and eco-tourism, while also alleviating coastal storm energy. Artificial lakes can shape attractive landscapes and buffer low-flows and water scarcity.
- ▶ Foster **partnerships and engagement** of income-generating sectors that depend on weather conditions, such as tourism and aviation, with National Meteorological and Hydrological Services and related agencies and in national and regional DRR governance/coordination mechanisms.



References, further reading, and selected tools

References used in the text and further reading

- ▶ Sendai Framework: [Official document and related publications](#) | [Child-friendly Sendai Framework](#)
- ▶ Guides and tools: [Words into Action implementation guidelines for the Sendai Framework](#) | [CRISTAL Community based Risk Screening Tool](#) | [Making Cities Resilient Campaign](#) | [UNDRR terminology](#) | <https://media.ifrc.org/ifrc/drr-climate> | [OECD approaches to strengthen climate resilience](#)
- ▶ Risk indices: [INFORM indices](#) | [World Risk Index \(WRI\)](#) | [Notre Dame Global Adaptation Initiative Country Index \(ND GAIN\)](#) | [Climate Risk Index \(CRI\)](#) | [UN Stats](#)
- ▶ Loss and risk data: [Sendai framework monitor](#) | [The International Disaster Database \(EM-DAT\)](#) | [UNDRR/UNDP Disaster Inventory System \(DESINVENTAR\)](#) | [Global Assessment Reports on DRR \(GAR\)](#)
- ▶ Emergency/disaster management and humanitarian activities: United Nations (2021). [Scaling up Disaster Risk Reduction in Humanitarian Action 2.0](#) | [Anticipation Hub](#) | World Bank, European Commission, United Nations Development Group and Global Facility for Disaster Reduction and Recovery (2013). [Post-Disaster Needs Assessment Guidelines](#).

Endnotes

1. [Human cost of disaster. An overview of the last 20 years 2000-2019](#). UNDRR and Centre for Research on the Epidemiology of Disasters, 2020. The capacity to keep track of disasters also improved during this period.
2. [UN Global Assessment Report on Disaster Risk Reduction \(GAR\)](#) | [Comprehensive risk management. BMZ's contribution to dealing with disaster and climate risks](#)
3. [Economic Losses, Poverty & Disasters: 1998-2017](#)
4. Climate change increases intensity, periodicity and scale of weather events and became an essential contributor to losses. For instance, US\$67bn of Hurricane Harvey's overall damages (US\$90bn) are associated with climate change (Source: <https://www.preventionweb.net/news/cost-extreme-weather-due-climate-change-severely-underestimated>).
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10. Climate-ADAPT (2019). [Establishment of early warning systems](#). | [Terminology: Structural and non-structural measures](#).
11. [IPCC reports](#)
12. [EU Adaptation Strategy](#)
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14. VOICE and Bird, M. (2017). [EU Member States' Policies and Practice: Disaster Risk Reduction in Humanitarian Assistance and Development Cooperation](#).
15. Hellmuth M, Mason SJ, Vaughan C, van Aalst M, Choularton R (2011); [A Better Climate for Disaster Risk Management](#). IRI, New York.
16. Details in the Guides and tools section above
17. [The Convention on the Rights of the Child: The children's version](#)

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