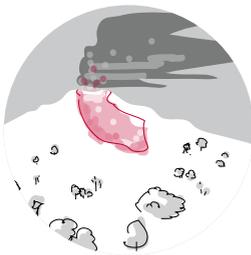


# GAR19 - A guided tour

The Sendai Framework for Disaster Risk Reduction 2015–2030 (Sendai Framework) emphasizes that risk is everyone’s business – explicitly identifying the need for all-of-society and all-of-State institutions’ engagement. Past Global Assessment Reports (GARs) presented the now-accepted wisdom that managing risk does not equate to firefighters, first responders and civil protection authorities managing the consequences of

realized risk. Risk must be understood in much broader terms – contextually and temporally. Previous GARs also emphasized that risk is a function of more than simply hazard, that disasters are not natural, but a product of the interaction of often naturally occurring events and human agency. We define these events as disasters when people suffer and things we care about are damaged or lost.

## Risk and the context of hazard, exposure and vulnerability



There is no such thing as a **natural disaster**, only **natural hazards**



We make **choices** as to where we inhabit, how we build and what research we do



Risk is the combination of **hazard, exposure** and **vulnerability**



**Death, loss** and **damage** is the function of the context of hazard, exposure and vulnerability

(Source: UNDRR 2019)

This puts the onus on all of us to understand the nature of risk – that death, loss or damage (impacts that define a disaster – that *are* the disaster) are a function of the context of hazard,

vulnerability and exposure. The Sendai Framework exhorts us to reduce risk by avoiding decisions that create risk, by reducing existing risk and by building resilience.

The Sendai Framework translates those messages into ones that can be used in the real world:

- Risk is everyone's business: "While the enabling, guiding and coordinating role of national and federal State Governments remain essential, it is necessary to empower local authorities and local communities to reduce disaster risk, including through resources, incentives and decision-making responsibilities, as appropriate." (Para. 19f)
- Disasters are not natural: "The present Framework will apply to the risk of small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters caused by natural or man-made hazards, as well as related environmental, technological and biological hazards and risks. It aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors." (Para. 15)
- Risk is a function of the decisions we take and how we consume, which then shape the world around us: "Business, professional associations and private sector financial institutions, including financial regulators and accounting bodies ... to integrate disaster risk management, including business continuity, into business models and practices through disaster-risk-informed investments." (Para. 36c)
- Understanding and managing risk is everyone's business and integral to the success of all 2015 agendas: "Disaster risk reduction requires an all-of-society engagement and partnership" and "Civil society, volunteers, organized voluntary work organizations and community-based organizations to participate, in collaboration with public institutions, to, inter alia,....advocate for resilient communities and an inclusive and all-of-society disaster risk management that strengthen synergies across groups." (Paras. 19d and 36a)

The Sendai Framework tells us that the risk landscape has changed, that it is complex, that we have perhaps been slow to realize this, and that we have a lot of catching up to do. In calling for engagement

of all stakeholders, and integration with policy on climate change, development and risk financing, the Sendai Framework identifies that risk and disasters are part of a complex set of human systems that operate at different scales and along different time frames. Failure to manage these systems will reverse development gains for most people in the world, and place the functioning of our global society in jeopardy.

This GAR is about understanding better the systemic nature of risk, how we are able to recognize, measure and model risk, and about strategies to enhance the scientific, social and political cooperation needed to move towards systemic risk governance. It reinforces the message that we need to reduce vulnerability and build resilience if we are to reduce risk. It looks at what countries and regional and international organizations have been doing according to formal reporting under the Sendai Framework Monitor (SFM). It also considers country practices in developing national and local plans to enhance risk reduction capacity, to integrate disaster risk reduction (DRR) with development planning and climate change adaptation (CCA), and to pay special attention to risk in rapidly growing cities and fragile/complex contexts.

This GAR demonstrates the urgency of the action and ambition required, reinforced by current climate science. We can expect non-linear changes in the intensity and frequency of hazards. We know that many of the ways in which human activity will be affected are, as yet, unforeseeable, and that we are fast approaching the point where we may not be able to mitigate or repair impacts from cascading and systemic risk in our global systems. In propelling systems-based thinking and approaches to the fore, this GAR adds to the call for urgent action to deal with simultaneous systemic change around land, ecosystems, energy, industrial and urban systems, and the social and economic transformations that these infer.

# Setting the scene

The introduction, **Chapter 1: How we got to now**, provides background on a decades-long shift that has brought us to the Sendai Framework. It traces how a shared global policy commitment has emerged from the idea of managing disasters and seeking to mainstream DRR, to an approach of managing the wider risks embedded in our social, economic and environmental activity. The Sendai Framework is about transitioning towards resilient and sustainable – even regenerative – societies in a way that is informed by a deeper understanding of risk and its drivers.

Chapter 1 also introduces the wider context of the Sendai Framework as one of a group of key international agreements adopted in 2015 and 2016 that look towards a better future for people and societies around the globe. These include:

- Transforming our World: 2030 Agenda for Sustainable Development (2030 Agenda), which provides a plan of action for people, planet and prosperity that envisages a world free of poverty, hunger, disease and want, where all life can thrive
- Paris Agreement on climate change, which provides the foundation for sustainable, low-carbon and resilient development in a changing climate
- Addis Ababa Action Agenda, which outlines fiscally sustainable and nationally appropriate measures to realign financial flows with public goals and reduce structural risks to inclusive growth
- New Urban Agenda, which introduces a new model of urban development that promotes equity, welfare and prosperity
- Agenda for Humanity, which addresses conflict-related risk drivers and seeks to reduce future vulnerability through investment in humanitarian response that builds local capacities

These are reference points for implementation of the Sendai Framework's concept of integrated risk governance, at all scales.

The substantive elements of this GAR begin with **Chapter 2: Systemic risks, the Sendai Framework and the 2030 Agenda**, which is an examination of the nature of systemic risk and the systems-based approaches that the Sendai Framework invokes. There are profound implications in making the shift from a hazard-by-hazard view of risk, to a holistic understanding of disaster risk as a dynamic three-dimensional topography that changes through time. This chapter introduces and elaborates the concept of systemic risk. It delves into this field to explore what we need to understand, and how it might be possible to change the ways we think, learn and act.

The chapter discusses how current approaches measure and model holistic representations of disaster risk in light of the concept of systemic risk. It describes different types of systemic risks that vary with respect to temporal patterns, the ways in which feedback works in systems and the ways in which the scales used to view the system are related. It then considers the issue of governance of systemic risks and how it might be possible to change the ways we think about risk and behaviour. It examines combinations of theory, human ingenuity and uses of technology that may help to tackle risk reduction in systems, and to interrogate the complicated and complex nature of the dynamic interactions of social, economic, political and ecological dimensions.

Chapter 2 also tackles the topic of collective intelligence, the issue that data can change as a function of context, and considers the collaboration necessary to advance our understanding of systemic risks. It introduces the Global Risk Assessment Framework, which is an open and collaborative initiative called for, designed and developed by experts and facilitated by the United Nations Office for Disaster Risk Reduction. This framework seeks to help the world deal with complexity, uncertainty and inefficiencies in risk assessment and to provide decision makers at different scales with enhanced risk information and actionable insights, tools and demonstrations that are open, inclusive, collaborative and recognisant of the systemic nature of risk.

# The Sendai Framework's broadened view of the world's risk

(Part I, Chapters 3–6)

**Part I** highlights how risk science is changing. Hazards interact with each other in increasingly complex ways, and our understanding of this is expanding. Vulnerability can have myriad dimensions. Calculating the exposure to a virus is different to calculating the exposure to a landslide. Representation of risk in this GAR is therefore not as elegant as it has been in the past. Risk is messy.

The production of calculations to represent the risk a country faces is a highly complicated task that relies on complex equations and the inputs of multiple data sets. This produces an elegant series of metrics and graphics: multi-hazard average annual loss, probable maximum loss and hybrid loss exceedance curves. All are impressive scientific ways to inform a community about how to reduce risk. However, in practice, they do not actually do that.

Such metrics may be multi-hazard, but they rely on hazards being probabilistically measurable. Some hazards can be measured this way, but with others, it is harder. Return periods for seismic risk are well understood, but flooding is more complicated because there are many more drivers of floods (coastal and riverine floods, human infrastructure and settlements, etc.). It is harder still for droughts and insect infestations. And when hazards are no longer natural hazards only, but include industrial accidents, epidemics or agricultural blights, those elegant calculations become untenable.

The metrics usually rely on measuring exposure and vulnerability of the built environment. This is an important part of the cost of disasters and the nature of risk, but it does not take into account the human cost in terms of lives lost, health and livelihoods affected, or the differential impacts of hazards on vulnerable people.

With this recognition of uncertainty at the fore, **Chapter 3: Risk**, investigates how we currently monitor and model a range of hazards, including tsunamis, landslides, floods and fires. Other hazards are less familiar as they were not part of the Hyogo Framework for Action. However, they are part of the Sendai Framework and include: biological, nuclear/radiological, chemical/industrial, NATECH (natural hazards triggering technological disasters) and environmental hazards. Chapter 3 looks at our understanding of how these hazards interact with exposure and vulnerability.

**Chapter 4: Opportunities and enablers of change** highlights that the technological, policy, regulatory and scientific context has changed to enable new kinds of analysis, new understanding and new ways of communicating risk. It also informs us that disaster risk science has new partners. Thousands of people have realized they have a role to play in reducing risk since the Sendai Framework was adopted. Epidemiologists, nuclear safety experts, climate researchers, utility companies, financial regulators, zoning officials and farmers can all see themselves reflected in the Sendai Framework. People interested in protecting life, assets and the environment have been interlinking their knowledge and energy.

However, new opportunities unveil new challenges. **Chapter 5: Challenges to change** outlines some issues such as changing our mindsets, political factors, and technological and resource challenges. To succeed, the technical enablers of improved data science, risk assessment and risk modelling rely on the willingness of people to work with other disciplines, across cultural, language and political boundaries, and to create the right regulatory environment for new and urgent work to proceed.

**Chapter 6: Special section on drought** links all these themes. Drought risk contains elements of meteorology, climate change, agriculture, power politics, food security, commodity markets, soil science, hydrology, hydraulics, etc. Drought is highly destructive and is projected to become more frequent and more severe in many parts of the world due to climate change. This chapter lays

the groundwork for the GAR 2020 special report on drought, but in this GAR, it provides a detailed example of complex, systemic risk that can be reduced and managed only through a systems response.

## Implementation of the Sendai Framework and disaster risk-informed sustainable development

(Part II, Chapters 7–9)

The United Nations General Assembly endorsed the 2017 recommendations of the Open-ended Intergovernmental Expert Working Group on indicators and terminology relating to DRR, which was established to develop indicators for monitoring implementation of the Sendai Framework. The reporting period for Member States has thus been short. Consequently, the data available for inferring trends in terms of the targets is limited and does not yet offer statistical confidence. However, we can observe with confidence certain patterns in terms of the magnitude and the geographic and socioeconomic distribution of disaster impacts and abstract several points of departure for where and how countries have managed to reduce disaster risk. Nevertheless, we note that the observed period is still too short to reach definitive conclusions on a global scale.

**Part II** introduces the global disaster risk landscape with emphasis on the globally agreed goals and targets of the Sendai Framework and the 2030 Agenda. It takes stock of experiences so far, with a comparative analysis of country-specific evidence on national reporting, including roll out of the new SFM.

**Chapter 7: Risk reduction across the 2030 Agenda** sets out the targets and agreed indicators of the

Sendai Framework and the disaster-related Sustainable Development Goals (SDGs) of the 2030 Agenda, now that integrated and common reporting by Member States has been established. Since 2015, significant efforts have been made to implement the Sendai Framework, by an increasingly diverse spectrum of stakeholders, reaching across different geographies, sectors and scales. This chapter concludes with a discussion of the type of data needed for effective monitoring and also recognizes that the current gaps in data and knowledge limit governments' ability to act and effectively communicate with the public on reducing risk.

**Chapter 8: Progress in achieving the global targets of the Sendai Framework** presents the latest data available – including those presented by the ninety-six countries using SFM since it went live on 1 March 2018 - and infers early lessons on the status of the global disaster risk landscape. There has been growing awareness since 2015 of the need for better data. SFM represents a unique opportunity to streamline interoperable data on disaster losses. This chapter recognizes that national disaster loss databases may use different methodologies, and that reporting data in a comparable manner to the SFM system remains a challenge for many countries, not just developing countries.

Chapter 8 also reviews the contribution of SFM to reporting on relevant SDGs, by underlining the cross benefits of integrated reporting across the global frameworks. Recognizing that extra efforts are required to optimize these interactions to the mutual benefit of different frameworks, Part II offers some insights on improved opportunities for cross reporting through different SDGs.

**Chapter 9: Review of efforts made by Member States to implement the Sendai Framework** looks at successes and challenges as they emerge from the first years of reporting, including in terms of data, statistics and monitoring capability, and provides recommendations for further improvements. It also highlights best practices in capacity-building, monitoring and reporting, and discusses engagement of a broad spectrum of State institutions and non-State actors.

# Creating the national and local conditions to manage risk

(Part III, Chapters 10–15)

The Sendai Framework calls on governments to adopt and implement national and local DRR strategies and plans that meet its essential elements and which are thereby aligned with its goal and principles (Target E).

Fulfilment of Target E is a foundational step for governments to: (a) achieve the ultimate targets of the Sendai Framework by 2030 and (b) move towards risk governance that incorporates the broadened risk scope of the Sendai Framework in the context of the 2030 Agenda, and which incorporates systems-based approaches. It requires integration across different sectors and levels of government, engagement with civil society and the private sector, and contemplation of different time frames to address current and emerging risks. This is why Member States agreed that Target E should be achieved by 2020. National and local DRR strategies and plans are a necessary foundation for broader implementation of the Sendai Framework and for risk-informed sustainable development.

**Part III** discusses the enabling environment for Member States to develop and effectively implement national and local plans and strategies, including the technical support systems and resources available around the Sendai Framework and the other post-2015 agendas mentioned above. **Chapter 10: Regional support and national enabling environments for integrated risk reduction** discusses important aspects of the enabling environment, including the mutual support and resources that Member States access through their regional organizations and agreements. These can be formal intergovernmental mechanisms or innovative multi-stakeholder partnerships, and the governance framework of laws, policies, institutions and financing in place within Member States at national and local levels.

Part III then moves onto the evidentiary chapters on national and local practices, extending the Sendai Framework Monitoring data reported in Part II with qualitative analysis. Chapters 11–13 provide research and analysis on current practices in developing national and local DRR strategies and plans that align with the Sendai Framework, integration of DRR into development planning, and integration of DRR with national climate adaptation strategies and plans. Taking Sendai Framework Target E as the starting point, these chapters aim to provide a picture of the challenges, good practices and lessons learned in using a systems-based approach to risk reduction at national and local levels when developing and implementing these types of government policy instruments.

**Chapter 11: National and local disaster risk reduction strategies and plans** shows that while there are many examples of good practices around the world – with case studies highlighting how some countries have overcome resource and capacity challenges – Member States cannot assume that existing arrangements are fit for purpose under the broadened hazard and risk scope of the Sendai Framework. Likewise, **Chapter 12: Disaster risk reduction integrated in development planning and budgeting** examines the challenges and gathers examples of good practices, notably the opportunities provided during renewal of national socioeconomic development plans. **Chapter 13: Integration between disaster risk reduction and national climate adaptation strategies and plans** examines the degree of integration between DRR and CCA plans, including in the context of formal reporting to the United Nations Framework Convention on Climate Change and the Paris Agreement, and internationally financed CCA projects. The chapter is couched in terms of the existential threat posed by global warming if it exceeds a temperature of 1.5°C above pre-industrial levels, as presented in the 2018 report of the Intergovernmental Panel on Climate Change.

Part III concludes with two chapters on risk environments that are of concern due to their complexity and potential for risk creation, including cascading and compounding risks. Rapidly growing urban

environments and fragile or complex situations can create new risks as well as compound risks arising from natural hazards, armed conflict, poverty, malnutrition and disease outbreaks, thereby increasing the vulnerability of affected populations and reducing their coping capacity. They exemplify the imperative for systems-based approaches in risk governance, including addressing socioeconomic vulnerability in government policy and the engagement of non-State actors in a wide concept of risk governance.

**Chapter 14: Local disaster risk reduction strategies and plans in urban areas** considers urban

environments, which are growing rapidly in developing countries around the globe and which present challenges for many local governments. These challenges are amplified where the development of urban environments is accompanied by the growth of informal settlements. **Chapter 15: Disaster risk reduction strategies in fragile and complex risk contexts** tackles the critical and complicated aspects of risk reduction in fragile or complex situations – such as those created by population movements due to armed conflict and famine, in which decision makers need to take account of known threats as well as new and emerging sources of risk that are difficult to foresee.

## Conclusions, recommendations and supporting material

Principal **Conclusions and recommendations** of this GAR19 are consolidated in the above **Executive summary**, as well as in the accompanying document, **GAR19 Distilled**. They are drawn from the conclusions and recommendations presented in each chapter and part.

As with previous GARs, this report is underpinned and informed by the extensive research, knowledge and expertise of experts and competent bodies. This GAR continues the tradition of sponsoring and presenting additional, innovative research and evidence to support our understanding of the creation and propagation of disaster risk, as well as the conducive conditions and impediments to its management.

GAR19 introduces a more formal process of generating commissioned research. The online section **GAR19 contributing papers** presents research selected following a call for papers and which successfully passed external, academic peer review. Additional material is also available in the online **Bibliography**.

This GAR, and the supporting material and data that informed its development, can be accessed online and downloaded from the **GAR19 website** ([www.gar.unisdr.org/2019](http://www.gar.unisdr.org/2019)), which offers readers the opportunity to explore the report interactively.

