Chapter 8: Progress in achieving the global targets of the Sendai Framework

The 2018 report of the United Nations Secretary-General on implementation of the Sendai Framework emphasized the vital importance of "a comprehensive overview of progress towards the seven global targets of the Sendai Framework and the disaster risk reduction targets of the Sustainable Development Goals" to guide discussions at the HLPF and Global Platform for DRR in 2019.[23]

The online SFM system is the official Member State reporting mechanism and is complemented by the preparation and release of technical guidance notes. The monitoring system provides an avenue for national reporting on:

- Seven Sendai Framework global targets based on the agreed 38 indicators
- Eleven indicators in three SDG goals, of which UNDRR is the custodian

Monitoring requires significant effort by Member States to collect, enter and validate all data required by the indicators that were agreed by the United Nations General Assembly and the United Nations Statistical Commission.

Using the data from the SFM system, including the disaster loss database complemented with data from other sources, this chapter focuses on a quantitative analysis of the progress made by countries towards the achievement of the global targets of the Sendai Framework (A–G). It does so through a detailed analysis of specific trends, patterns and distribution of selected indicators, based on available data from reporting to date in the online monitoring system. It also introduces the structure of the monitoring system, showcases results achieved and, where possible, data trends, while demonstrating the level of participation and engagement of Member States in the monitoring process.

Cyclone Pam made downfall on Vanuatu (2015), destroying and damaging 15,000 homes
(Source: Silke von Brockhausen/UNDP Vanuatu)

8.1

Sendai Framework Monitoring database

The new online Sendai Framework Monitoring system is a state-of-the-art system built to support all the new indicators, extended hazards types and metadata mechanisms that were recommended by OEIWG and adopted by the United Nations General Assembly. It can be accessed at https://sendaimonitor.unisdr.org.

The related online tool for disaster loss and damage data collection, DesInventar Sendai, accessible at https://www.desinventar.net, was launched on 15 January 2018. The existing databases in the UNDRR public repository of loss and damage data were migrated to also support the requirements of OEIWG. This improved system will enable the collection of detailed disaster loss and damage data at all scales (temporal and spatial) using common methodologies. It also allows the capture of disaster information that is location- and time-stamped, contributing to a strong analysis of disaster loss and damage. Member States were invited to participate in monitoring and to start data-collection processes as soon as possible; the first milestone for data reporting that contributed to the SDG monitoring and reporting was set for 31 March 2018.

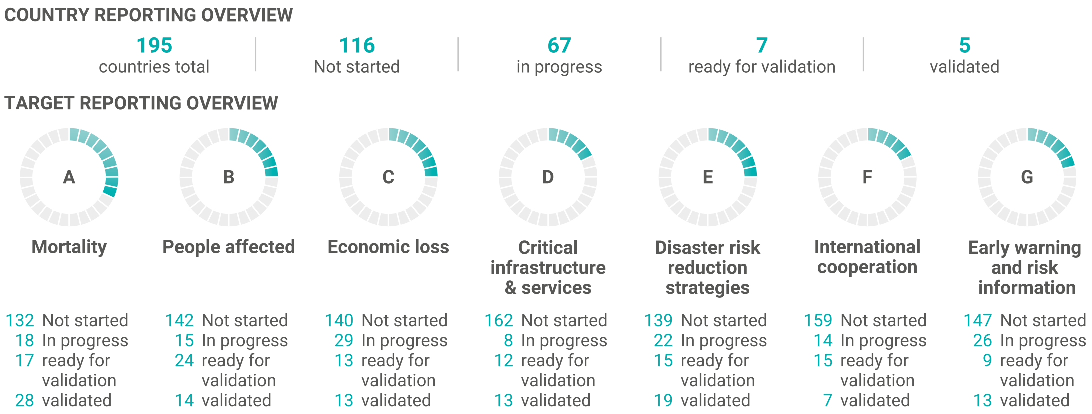
23 (United Nations General Assembly 2018)

8.1.1

How the loss data subsystem contributes to data on the global targets

As of the time of writing of this GAR, data is available for 104 countries in DesInventar format. These databases contain detailed locally collected data on disaster losses, enabling a representative view of the way the impact of disasters affects countries. This initiative is an open data and open source initiative, making the information available for governments, affected communities and other stakeholders, including the private sector. Analysis presented in the following sections has been generated based on data from the SFM consolidated loss database.

Figure 8.1. Progress on global targets, SFM (as of October 2018)



(Source: UNDRR, SFM)

8.1.2

Member State participation in the monitoring system in 2018

By 31 October 2018, ninety-six countries had started to use the Sendai Framework Monitoring system, out of which 79 were entering global targets data with different levels of progress on each target. Another 16 countries had started defining their institutional settings or entering the socioeconomic data required in the system such as population, GDP, exchange rate and other variables.

Among those 79 countries that entered indicator data, by far the most commonly reported target is Target A, on mortality, for which 63 countries supplied data for at least one year. Target B was reported by 53 countries, Targets C and E by 56, Target D by 33, Target G by 48 and Target F by 36.

Within each target, there are also differences in reporting of the different indicators, which reflects the availability of data and collection challenges. The most evident of those is Target F (international cooperation), for which around half the countries reporting were unable to provide data on any of the eight indicators (19 out of 36).

8.1.3

New types of data that may come to the monitoring system in the future

As of July 2018, the Sendai Framework Monitoring system allowed Member States to set up nationally defined and customized targets and indicators, in addition to those already defined and built into the system for the Sendai Framework global targets. There are several important reasons a Member State may wish to do so. Measuring the level of implementation of the Sendai Framework global targets can capture only some aspects of progress in a country. But the Sendai Framework is a complex document that contains a broad set of suggested measures to reduce risk and losses. Countries will need to verify to what extent these recommendations and measures are applicable to their circumstances, and accordingly may want to measure their own level of implementation in a way that informs policy implementation. Furthermore, according to Target E, national DRR strategies should have national "targets, indicators and time frames", and custom indicators that are part of the Sendai Framework Monitoring system.

Member State efforts to define systems of custom targets and indicators are incipient, such that a detailed analysis is not possible. It is expected that, as part of the efforts to reach Target E, Member States will design a variety of custom targets and indicators in national DRR strategies, as suggested by Priority 2 of the Sendai Framework.

8.2

Disaster losses: Sendai Framework Targets A–D

8.2.1

Achievement of Targets A–D: are losses being reduced?

As the development of the reporting system for Member States required extensive expert inputs and consultations, the data collection and reporting period has been brief so far, and the number of countries providing data is too small to provide in-depth trend analysis. The following findings are therefore qualified, but make the best use of available data, including comparison with other data sources.

Two of the targets, mortality (A) and direct economic loss (C), were compared with global data sources. Analysis confirmed that progress found appears to be correct, as data series from all sources present the same trends – despite limitations in the scope and composition of the indicators available in global data sets. Most of the conclusions on the achievement of the first four targets are rather positive, especially when relative values are taken into consideration. As economies grow and the world population increases, more assets and people are exposed, which affects the interpretation of indicators such as the number of deaths or economic losses. Relative values allow inference of more accurate conclusions on the real impacts and magnitude of disasters over time for different people. For example, in absolute terms, richer households may lose more as they have more to lose. Although absolute figures are useful – they offer information on the trends and costs of disasters – they often fail to detail how disasters affect people's lives in the long run. Most important in disaster loss data analysis is the proportion of income or assets lost, as the severity of losses depends on who and how they experienced it.

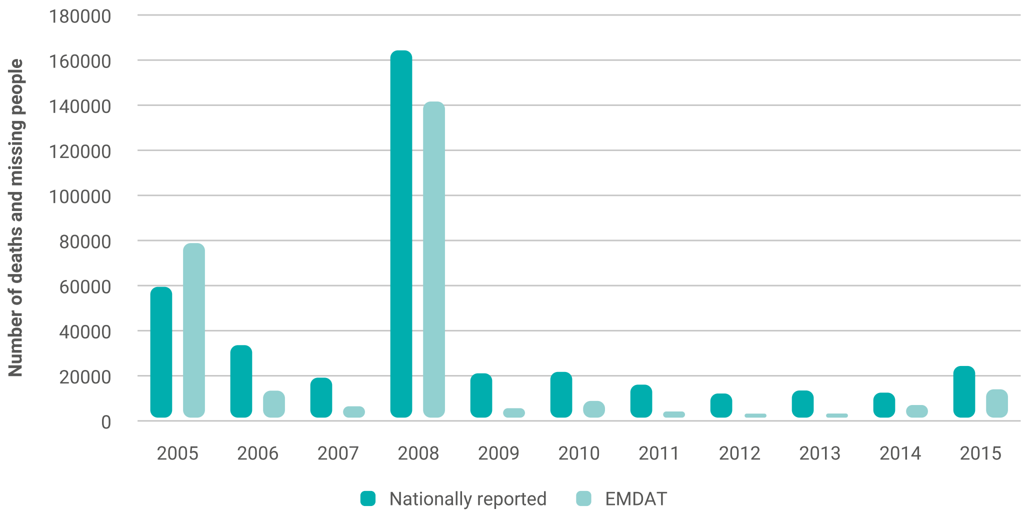
8.2.2

Target A – mortality: a confirmed long-term decline in fatalities relative to population size

The first of the global targets refers to the reduction of mortality attributed to disasters. Mortality is decreasing in absolute and relative terms in the data gathered for the countries participating in the Sendai Framework Monitoring process, as well as in other global data sets.

Ultimately, Targets A and B, mortality and number of people affected by disasters, will require a comparison between the HFA years of 2005–2015 and the final decade of the Sendai Framework of 2020–2030. Only 35 countries have a complete set of data from 2005 to 2017. In 2016 and in 2017, 69 and 81 countries reported mortality data, respectively, but these countries are not the same as the group that has completed the HFA baseline. Therefore, the following preliminary analysis mostly focuses on the 83 countries that completed the HFA baseline and examines the period 2005–2015.

Figure 8.2. Mortality reported nationally in the Sendai Framework Monitoring system and globally in EM-DAT for 83 countries and territories with baseline completed, 2005–2015



(Source: UNDRR with data from DesInventar and EM-DAT)
Note: 2010 appears low due to the absence of Haiti in the sample.

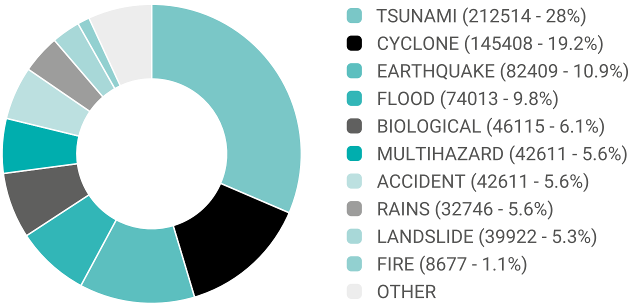
Figure 8.2 reports mortality data from SFM and EM-DAT over the period 2005–2015. Numbers reported by countries in the Sendai Framework Monitoring system are higher than in EM-DAT by an average of 39%, and as much as 300% higher in some years, due to different methodologies applied to the data sets. The thresholds applied by EM-DAT on what constitutes a disaster (at least 10 people killed, 100 affected, declaration of a state of emergency and call for international assistance) mean that many small- and medium-scale disasters are not considered. This difference can be significant, especially for countries not exposed to large-scale hazardous events, or in years where large-scale disasters do not dominate the data.

Global mortality appears to decline from 2005 to 2015 when looking at data reported in both databases (Figure 8.2). Several reasons may account for this. Numerous studies[24] and previous GARs have highlighted this trend and have associated continued economic development and better disaster management with reduced mortality, especially for those types of hazards for which early warning is possible. In addition to better and more available EWSs, which have demonstrated to be effective in hydrometeorological events, Part I discussed the added value of vulnerability analysis and the need to establish metrics for those dimensions of disaster impacts that accrue to the most vulnerable.[25]

While evidence across the globe demonstrates the direct links between resilience and vulnerability reduction, improved data and analysis when moving forward to monitoring the Sendai Framework will be able to better reveal these relationships and inform action and budgeting in the right directions. Other possible explanations of the reduction of mortality is the active work of Member States in reducing the stock of risks, for example the construction of flood defences in many areas of the world, better preparation for large-scale events (including the design of shelters and evacuation facilities) or retrofitting buildings to comply with seismic regulations.

Mortality numbers in the last two decades have continued to be driven by large geological events, accounting for 51% of worldwide mortality (EM-DAT), and 39% of all fatalities in the sample of the SFM baseline in the same period. Other data sources and studies confirm this pattern. There are several possible reasons for this concentration, including that warnings for earthquake events are not possible or not effective, and the enormous size of the current stock of existing risk in buildings and infrastructure that are not earthquake resistant (these are extremely costly and time-consuming to retrofit, despite the efforts of owners and governments and improved and better-enforced construction codes and land-use plans). In addition, tsunami warnings can, in some cases, give enough lead time to save lives, as demonstrated in Japan in 2011. However, a tsunami event killed more than 1,500 people following a 7.5 magnitude earthquake in Palu, Indonesia, in October 2018, with only a 4-minute lead time and a less-effective EWS.

Figure 8.3. Hazard distribution of mortality 1997–2017, for all countries in the Sendai Framework Monitoring system



(Source: UNDRR with data from DesInventar)

Other patterns previously discovered in the distribution of mortality remain valid. In particular, mortality due to disasters is concentrated in lower-income countries, still accounting for the majority of overall disaster deaths.

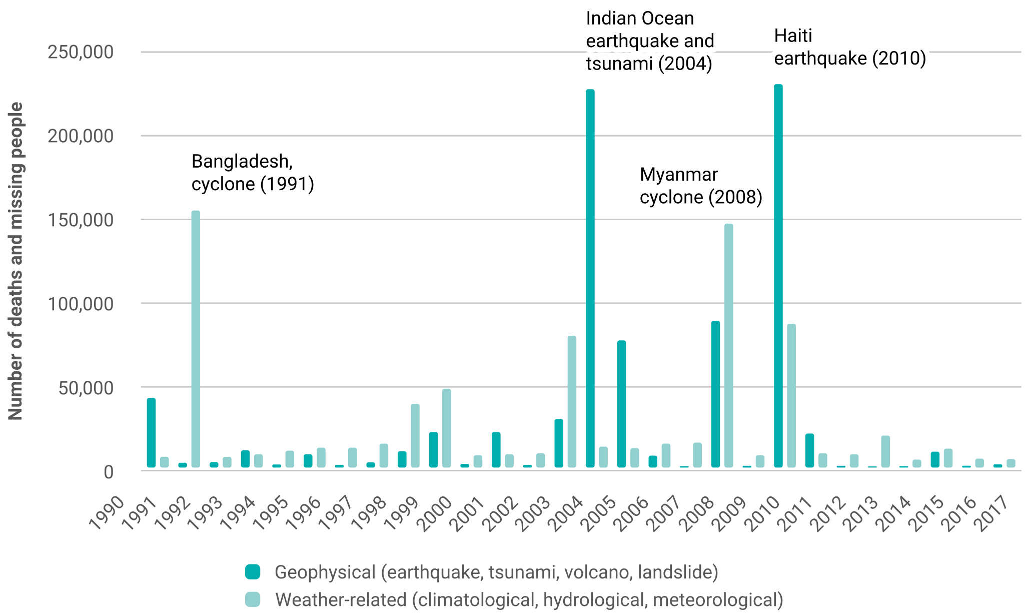
Countries with higher relative mortality are concentrated in low- and lower–middle-income groups (Figure 8.4). For example, of the top 20 countries by disaster mortality in proportion to their population for the years 1990–2017, the top five are low- or lower–middle-income countries, and only five are upper–middle income. Haiti, with by far the highest figure of 91.33 deaths per 100,000 population was largely affected by earthquakes, followed by a cholera epidemic in 2010, and storms and floods in 2004. The second-highest figure comes from Myanmar, with a high death toll from cyclones (e.g. Cyclone Nargis), tropical storms, floods and landslides.

24 (Guha-Sapir et al. 2017); (Below and Wallemacq 2018)

25 (UNISDR 2017e); (Walsh and Hallegatte 2019)

A high concentration in intensive disasters can be observed when analysing trends in disaster mortality (Figure 8.4). Nearly half of the total mortality since 1990 is dominated by four big events. The 2005 earthquake in Pakistan accounted for 64% and 93% of global mortality recorded in SFM and EM-DAT, respectively, in 2005. The 2008 cyclone in Myanmar accounted for 85% and 97% of global mortality recorded in SFM and EM-DAT, respectively, in 2008. Although these figures point to an upward trend, this trend is statistically insignificant as it changes arbitrarily subject to the time period chosen and specific intensive disasters in the respective period.

Figure 8.4. Mortality from disasters concentrated in a few intensive events, 1990–2017

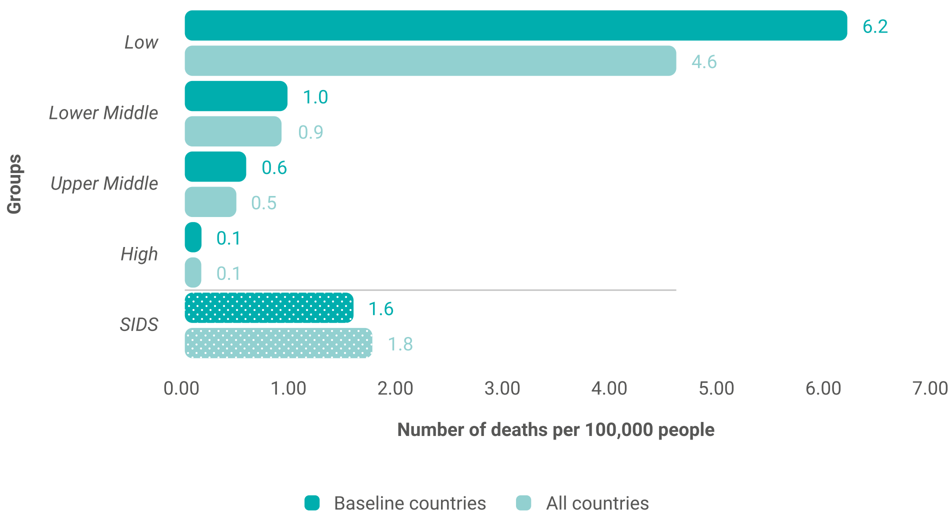


(Source: UNDRR with data from EM-DAT)

As shown in Figure 8.5, which reports data compiled from baseline countries and a sample of all SFM countries, low-income countries are characterized by a much higher number of deaths and missing persons relative to population size than any other income group. Generally, the average ratio of deaths and missing persons to 100,000 people tends to be lower for countries classified in higher-income groups. When compared to income groups, SIDS have, on average, higher ratios than lower–middle-income countries on average. Taking into account that data for SIDS remains largely incomplete, Figures 8.5 and 8.6 may be underestimated.

26 (Samoa 2018)
27 (UNISDR 2015a); (United Nations General Assembly 2017c); (United Nations General Assembly 2014b)

Figure 8.5. **Yearly average number of deaths and missing persons per 100,000 people, income groups and SIDS, 2005–2017**



(Source: UNDRR with data from DesInventar and World Bank)
Note: Baseline countries in the analysis refers to countries that consistently reported data over the period 2005–2015.

SIDS have been repeatedly recognized as a special case requiring intensified attention and funding for sustainable development, in view of their unique characteristics and intrinsic vulnerabilities to environmental and economic shocks. Future disaster losses represent an existential threat for many SIDS.

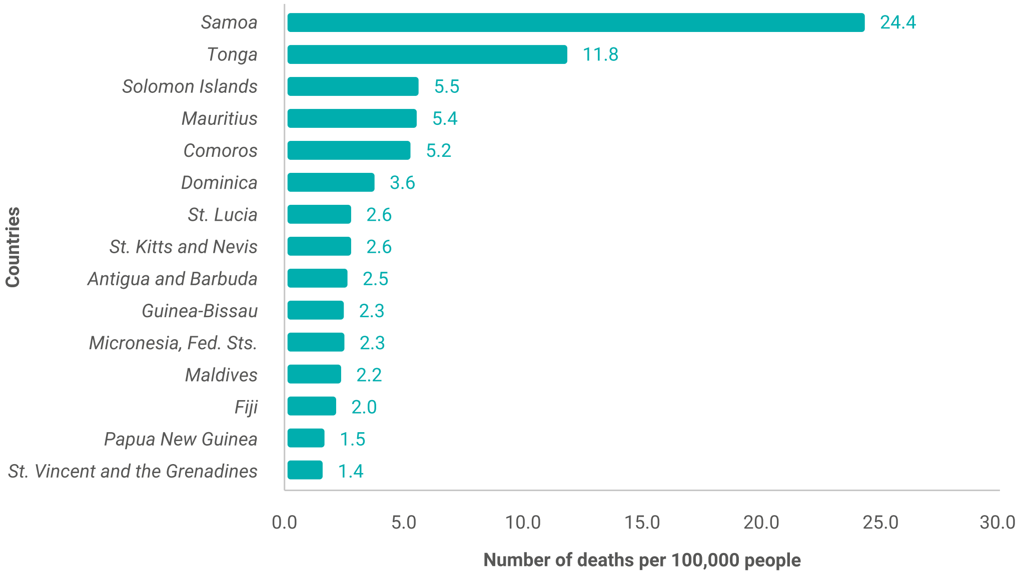
In the midterm review process of the Samoa Pathway, world leaders called for urgent action to address the systemic risks and vulnerabilities SIDS continue to face:

We remain deeply concerned about the escalating devastation already being inflicted on SIDS by the adverse impacts of climate change and…… we reaffirm our solidarity with our members impacted by increased intensity and frequency of natural disasters. We further call for the prevention of new and the reduction of existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political, financial and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery thereby strengthening resilience.[26]

Such vulnerabilities relate to small population size and land masses, spatial dispersion, remoteness, narrow resource and export base, subdued trade growth, high levels of national debt and exposure to global environmental challenges, including a large range of impacts from climate change.[27] In several cases, weak human, technological and institutional capacities, coupled with scarcity of domestic resources and inequality, induce a vicious cycle of low productivity and investment and limited technology transfer.

SIDS are faced with a particular web of challenges making them less able to mobilize and attract the significant amount of necessary finance to implement the 2030 Agenda, as compared to other developing countries. For instance, most SIDS are classified as middle-income countries and do not meet the eligibility criteria for concessional loans from multilateral and bilateral lending institutions, despite their disproportionate exposure to environmental and economic risks. The United Nations, the World Bank, the Commonwealth Secretariat, the Caribbean Development Bank and several other international organizations have established a joint technical working group to study how they can best support countries to gain access to finance on terms and conditions that are appropriate to their circumstances.[28]

Figure 8.6. SIDS yearly average number of deaths and missing persons per 100,000 people, by country, 2005–2017



(Sources: UNDRR and the World Bank)

Figure 8.6 shows the yearly average number of deaths and missing persons per 100,000 people in the period 2005–2017, for the top 15 countries with the highest ratios among SIDS. It is evident that disasters represent an existential threat for several SIDS and can derail an island's entire economy. Without tropical cyclones, for instance, the World Bank estimates that Jamaica's economy would be expected to grow by as much as 4% per year. However, over the past 40 years, it has grown 0.8% annually. Similarly, when Hurricane Maria struck Dominica in 2017, it caused damage and losses equivalent to 226% of the country's GDP.[29] Figure 8.7 captures the same ratio, but for groups of country in terms of geographic location. It is observed that Asia and Oceania, followed by Africa, are the regions with the highest number of ratio of deaths and missing persons per 100,000 people.

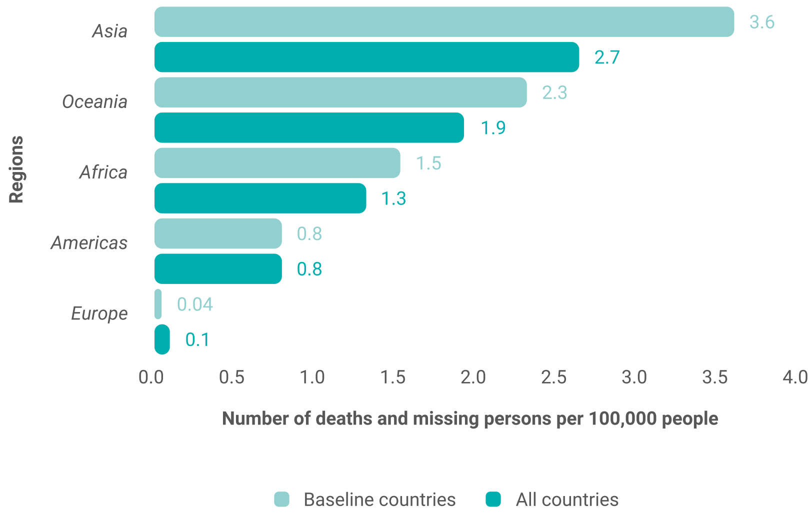
Long-term trends

As previously stated, trends reported in Figure 8.2 based on 11 years of data may have limitations, even though this is the latest available data to inform future measurement of progress towards the target. For example, the reduction in mortality appears to be entirely driven by the higher

28 (Hurley 2017)

29 (Kreisberg et al. 2018)

Figure 8.7. **Yearly average number of deaths and missing persons per 100,000 people, by region, 2005–2017**

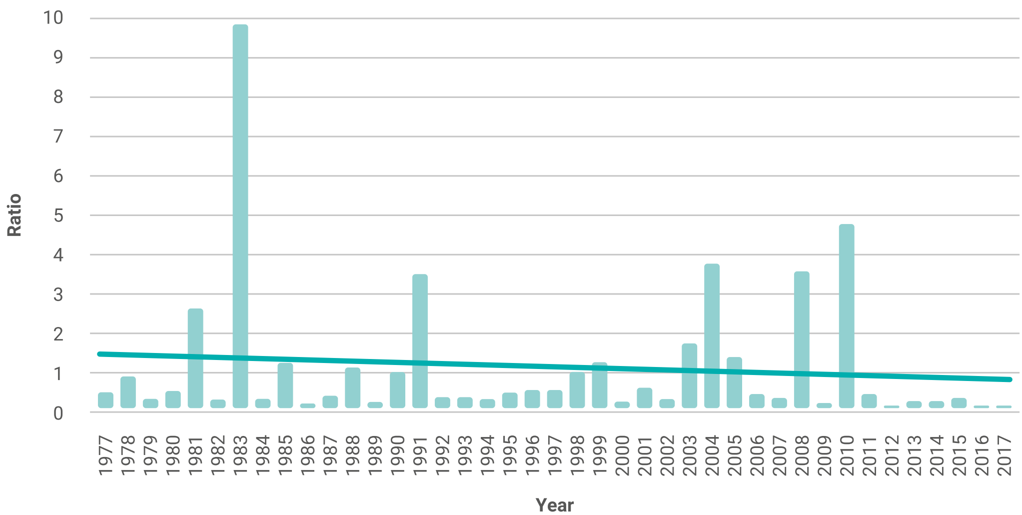


(Source: UNDRR with data from DesInventar)

frequency of large-scale events between 2005 and 2010 compared to the subsequent period, which may not be representative given the short period of time. It could be assumed that the frequency of large-scale events causing high numbers of fatalities is the real driver of trends in global mortality in the short term. Therefore, longer periods of time are required to draw clearer conclusions.

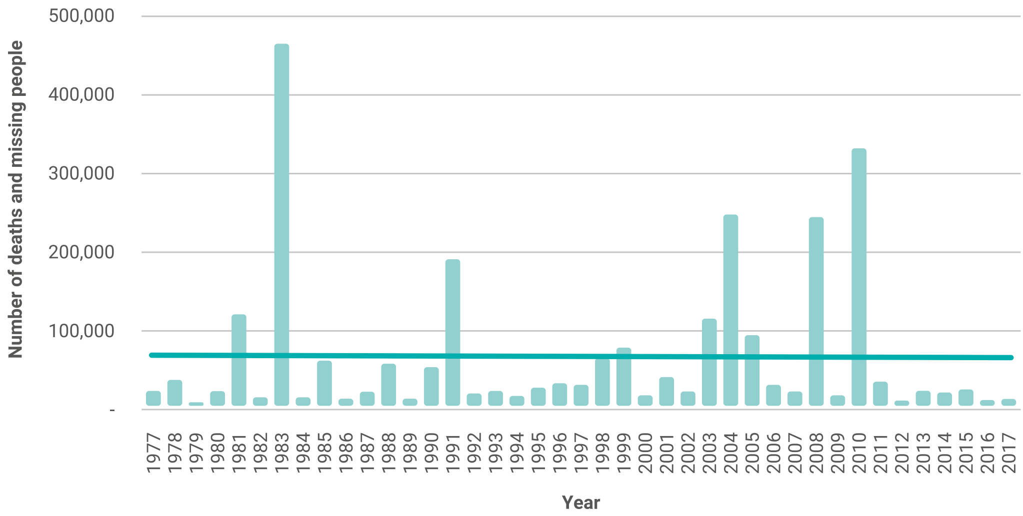
Figure 8.8 thus examines a 41-year period using EM-DAT data. The downward-sloping fitted line shows that the ratio of deaths to 100,000 people

Figure 8.8. **Relative global mortality per 100,000 population), 1977–2017**



(Sources: EM-DAT, United Nations statistics, processed by UNDRR)

Figure 8.9. Absolute global mortality (EM-DAT), 1977–2017

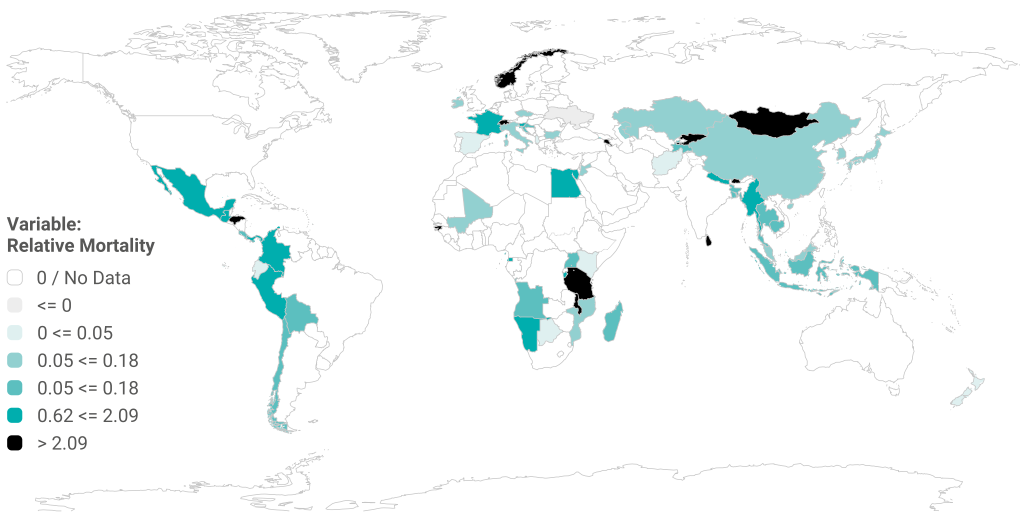


(Sources: EM-DAT, United Nations statistics, processed by UNDRR)

has declined from 1977 to 2017. The yearly average of the ratio of deaths to 100,000 people was 1.56 for the period 1977–1996 and dropped to 1.08 for 1997–2017.

In SFM, the average of number of deaths and missing persons attributed to disasters, per 100,000 people (Indicator A-1), or other relative indicators such as number of people affected by disaster per

Figure 8.10. Indicator A-1, mortality by 100,000 people with data for 2017 from 81 Sendai Framework Monitoring system countries



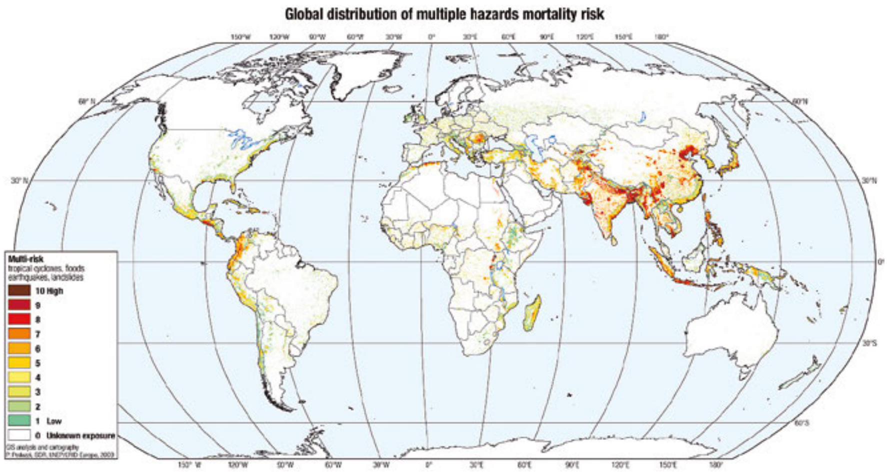
(Source: UNDRR)

Disclaimer: The boundaries and names shown, and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

100,000 (Indicator B-1), or direct economic loss in relation to GDP (Indicator C-1) for each country over the reporting period, could be seen as a risk map if a long enough history of losses and population could be gathered (Figure 8.10). So far, there is insufficient data for these maps to be produced with a high statistical confidence. If Member States continue monitoring the Sendai Framework, data for a map like this would become enriched and eventually could offer useful insights as to the advancement in the implementation, progress and impact of the Sendai Framework.

GAR09 featured a multi-hazard (major natural hazards) map of the world. Abstracting the empty areas of the world in the Sendai Framework Monitoring system data, there is a good resemblance between the map of relative mortality (A-1) and the GAR09 mortality risk map.

Figure 8.11. **Mortality risk index, global risk assessment – GAR09**



(Source: UNDRR)

Disclaimer: The boundaries and names shown, and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Countries that build and maintain detailed loss databases could use this technique to produce proxy risk maps, which can be useful representations of recurrent and localized hazards such as weather-related or biological hazards, even at a low level of resolution. Earthquakes, tsunamis and other less-frequent hazards cannot be represented with such tools, neither would they replace mathematical modelling of the type conducted by risk researchers. They would be limited by the degree of resolution possible from available data, but they provide a powerful means of validating models with direct data of experienced losses.

8.2.3

Target B – people affected

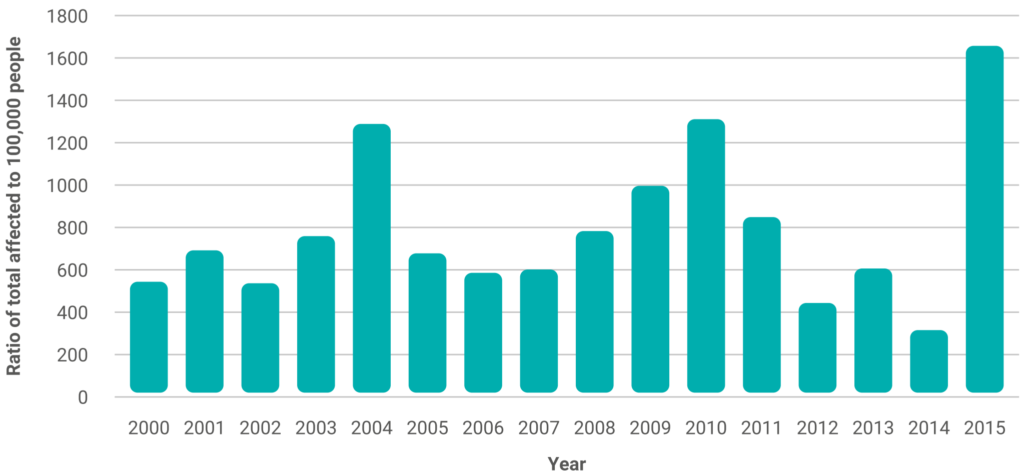
A proxy for the number of people directly affected by disaster can be made through: (a) the number of people who require medical attention (injured or ill), (b) those who are living in dwellings damaged or destroyed by disasters and (c) those whose livelihoods are affected. While some double counting will occur (e.g. those injured and living in affected dwellings), the main objective of this proxy is to verify trends. Consequently, it aims to measure the achievement of the target on the basis that if these numbers grow, then the total number of people affected must be growing, and vice versa. If this proxy measure trends downwards, it would be safe to assume the total number of affected people was decreasing.

Application of these methodologies requires important data. Each indicator for the relative number of people affected by disasters in a country faces challenges, especially the determination of the number of those whose livelihoods were affected. Targets A and B of the Sendai Framework require dividing loss data by population, so that the numbers are relative to population and therefore more comparable with each other within a country, and among countries.

For this GAR, good data was available for the first five indicators of Target B: relative number affected in the population (B-1), ill or injured people (B-2) and damaged and/or destroyed dwellings (B-3, B-4 and B-5). However, for the livelihoods indicator (B-6), it was possible to estimate the number of workers associated with losses in agriculture only, not in other sectors. As more countries report in the monitoring system, including better reporting on productive assets lost (Indicators C-2 and C-3), these indicators will be able to account for more of the affected people.

Figure 8.12 shows the calculated number of affected people relative to population size over 16 years. Data from 83 countries that had highly consistent reporting for 2000–2015 is shown. No clear trend emerges from the figure, and high ratios must be treated with caution – for instance, 2015 is dominated by the earthquake in Nepal and fewer countries reported data for this year.

Figure 8.12. Indicator B-1a, number of people affected, in SFM 83 countries with 2000–2015 data



(Source: UNDRR data)

This contrasts with Target A, where relative trends are showing a decrease in mortality. This may be a reflection of the good results on reducing mortality risk, achieved with preventive measures such as evacuations, better EWSs and less vulnerability in many exposed elements, most notably in the housing sector (Figure 8.20, showing the trend of relative losses in this sector). However, other impacts that are included in the calculation of affected people, including injuries and disruption of livelihoods, especially agriculture, and the economics of the associated damage seem to be growing in contrast to the decrease in mortality.

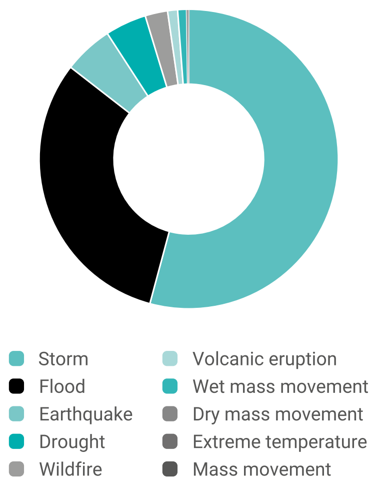
People affected and systemic risks – the face of displacement

As demonstrated throughout this GAR, a single unavoidable natural event may trigger preventable repercussions across sectors and systems that expand the breadth, duration, scale and size of adverse consequences. These negative impacts may come in the form of internal and cross-border population movements, preventable business disruption, economic distress, social unrest, hunger, poverty and diseases, to name just a few.

Over the period 2008–2018, disasters stemming from natural hazards have displaced an average of 23.9 million people each year.[30] Disasters, which are the main triggers of forced displacement recorded – show no signs of abating.[31] People choose to respond to disaster impacts with a web of in situ and ex situ strategies, including mobility. They may flee to other areas within their country or cross borders[32] in search for a safer and less exposed place. Other forms of human mobility – including forced displacement, voluntary migration and planned relocation – are occurring in response to hazards and environmental degradation, or in anticipation of those. Economic motives pay a key role as push and pull factors shaping migration paths from rural to urban centres.

On a global scale, the Internal Displacement Monitoring Centre (IDMC) counted 17.2 million people as newly internally displaced due to climate-related disasters and natural hazards in 2018. Displacement in the context of disasters is a global and increasingly alarming reality. According to the UNHCR Protection and Return Monitoring Network, around 883,000 new internal displacements were recorded between January and December 2018, of which 32% were associated with flooding and 29% with drought. Many more people are believed to be on the move, resulting from the slow-onset effects of climate change and environmental degradation.[33] The effects of climate change are predicted to increase the irregularity and intensity of extreme weather events, as well as to drive slow-onset disaster displacement risk through exacerbating existing natural resource scarcity such as water stress. The situation in Yemen, one of the world's most severely water-stressed countries, is a clear example and reminder of the face of displacement over dwindling resources.

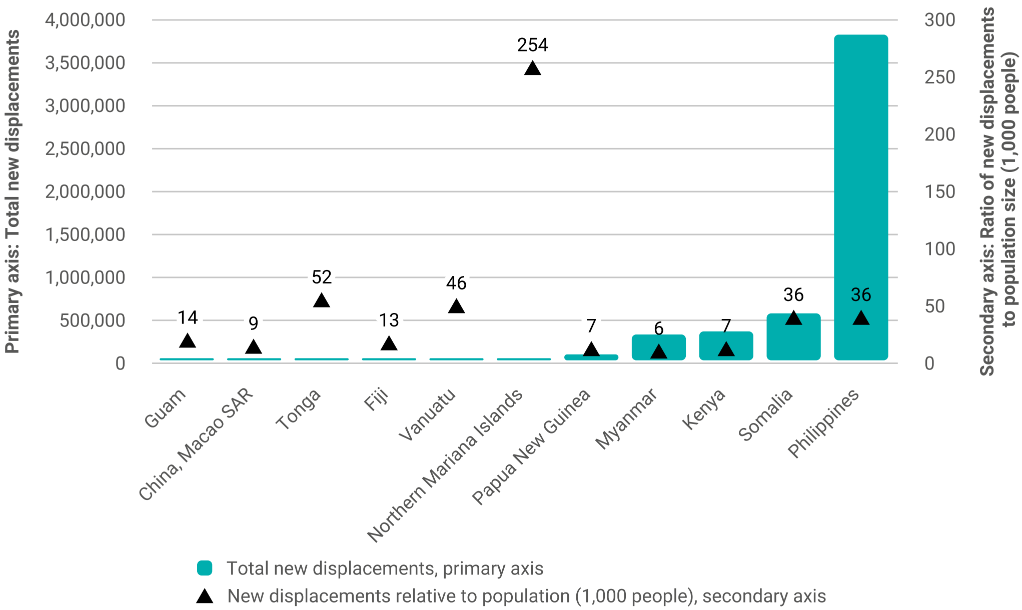
Figure 8.13. Disaster-related new displacements by hazard category



(Source: IDMC data 2019)

30 (Irish Red Cross 2018)
31 (Internal Displacement Monitoring Centre 2017)
32 (The Nansen Initiative 2015)
33 (Internal Displacement Monitoring Centre 2018)

Figure 8.14. Total new displacements in absolute and relative terms, 2018

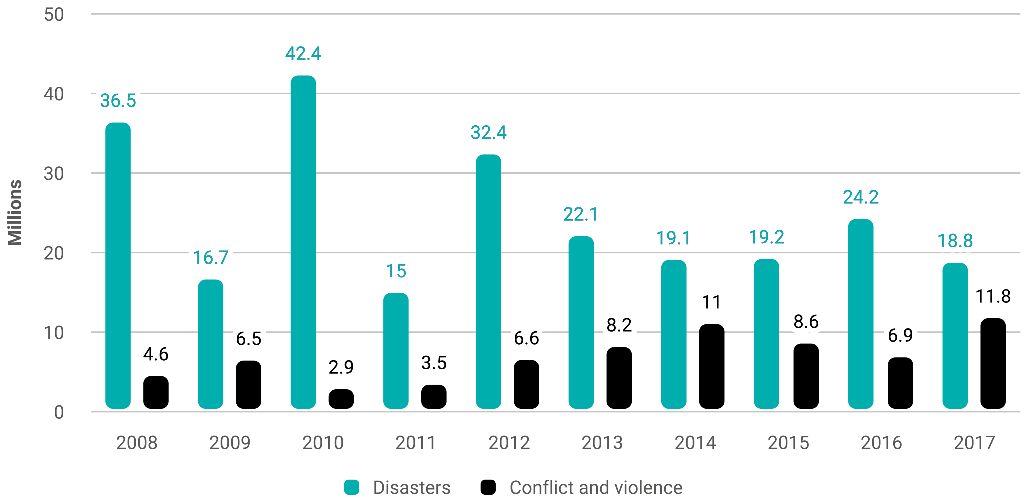


(Source: UNDRR with data from IDMC 2019)

In an increasingly interconnected and interdependent world, displacement may exacerbate vulnerabilities by exposing people to new risks and challenges such as inequality, climate change, poverty, under/unemployment and fast-paced urbanization. Fleeing home to escape the impacts of a hazard is often a decision between life and death. But disaster displacement – which includes evacuation and, in some cases, planned relocation following environmental stressors – often has severe and long-lasting social, economic and legal impacts, particularly in protracted contexts.[34] Climate change effects and poor natural resource management, leading to the gradual erosion of livelihoods, are often decisive factors for alternative household strategies, to diversify risks of environmental stressors and disaster impacts. Fast-paced and unplanned urbanization comes with new risks. Employment opportunities for IDPs are often confined to poor-quality daily labour, which has a negative impact on household budgets, savings and spending, and compounds IDP ability to further manage risks and cope with negative shocks.[35] In addition, IDPs are often obliged to settle in high-risk areas – such as floodplains, subsiding land or hillside slopes – which are less controlled and often the most affordable yet hazard-prone areas. This further increases the likelihood of secondary displacement risk.[36]

The Sendai Framework pays due attention to the systemic complexities of population movements as drivers of risk, but also as opportunities for strengthened resilience. It highlights consequences of disasters in terms of displacement, but equally acknowledges the contributions that migrants can make – through remittances, networks, skills and investments – in addressing root causes and promoting resilience. The relationship between DRR and disaster displacement has also been recognized by the Global Compact on Migration, aiming to mitigate the adverse drivers and structural factors that hinder people from building and maintaining sustainable livelihoods.

Figure 8.15. **New displacements due to disasters and conflict, 2008–2017**



(Source: IDMC data 2018)

However, Figures 8.13–8.15 demonstrate that advancements in the development of global normative frameworks and policies have not been matched by implementation and adequate investment in preventing and addressing disaster-induced displacement challenges.[37] Without scaled-up action to reduce risk and strengthen resilience, vulnerability and exposure will continue contributing to driving disaster risks upwards over the years to come.[38]

8.2.4

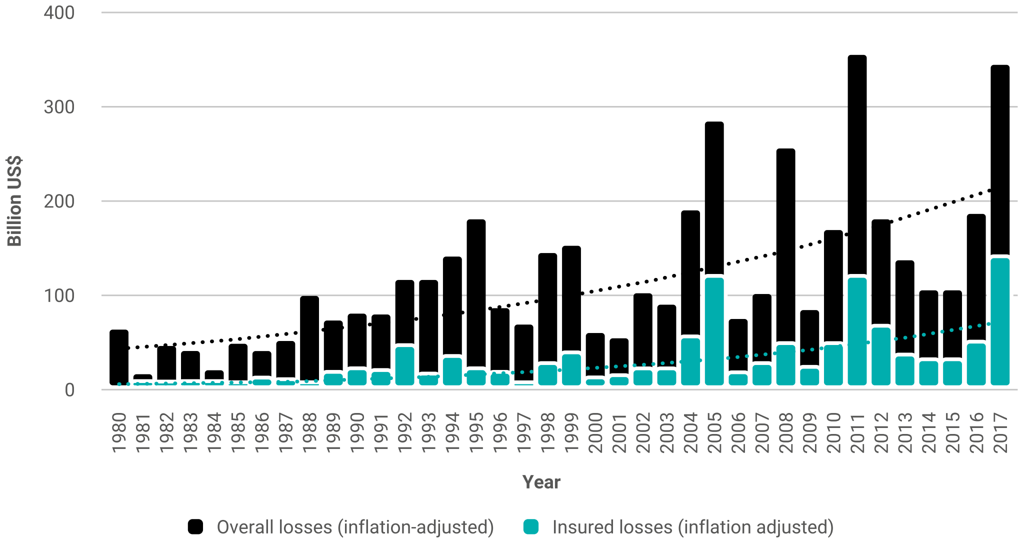
Target C – direct economic loss

Absolute and relative loss data

For a long time, statements such as "losses are growing exponentially" and "rising losses reached unprecedented levels" have dictated discussions of economic losses due to disaster. These estimates are useful for indicating the "stocktake" of average losses. Figure 8.16 demonstrates that overall losses and insured losses, adjusted to take into account inflation, significantly increased from 1980 to 2017. However, these figures fail to determine and provide finer detail on how disaster losses affect people's lives.

34 (UNISDR 2018a)
35 (Santos and Leitmann 2016)
36 (UNISDR 2014)
37 (Internal Displacement Monitoring Centre 2018)
38 (UNISDR 2015a)

Figure 8.16. **Overall and insured disaster losses, 1980–2017**



(Source: UNDRR with data from Munich Re)

A somewhat different picture emerges from several studies that examined economic losses by relating the data to the size of the population or the economy. This approach looks at losses relative to exposure, be it size of population, GDP, capital stock, etc., as well as changes in the size and shape of the economy driven by forces such as inflation and wealth growth.[39]

The Sendai Framework mandates a certain type of methodology for economic loss data by stating that Target C is to be the reduction of direct disaster economic loss in relation to global GDP by 2030. When figures of losses are divided by GDP, a different perspective on relative damage emerges, as shown later in this section.

Increases in the level of recorded loss in current data may occur because the monetary value of the exposed elements is higher and because more of these valuable assets are exposed. These factors should not be confused with higher risk. Individual assets have a specific level of risk, which is independent of the value of the asset, and is independent of the existence of other assets also being exposed. Dividing losses by GDP also reflects better the changing levels of risk.

Using the available date, the following sections measure the extent to which Target C is being achieved by participating countries, and show the behaviour of economic losses. As with the case of mortality, there is a group of countries that has complete data for the years of the baseline (2005–2015), and a different set of countries that reported only for 2016 and 2017. This hampers the possibility of a full-period consistent analysis.

It is also important to recall that Target C does not explicitly set a minimum period of data to be analysed. If the results being monitored are to correspond to those of the Sendai Framework period, then waiting until year 2030 to analyse trends between 2015 and 2030 could be too late. However, the work of countries on reducing risk did not start in 2015. The HFA period should also be taken into

39 (Barthel and Neumayer 2012); (Barredo 2009)

40 (Zapata Martí and Madrigal 2009)

account, and even some years before the two frameworks (a period when DRR was less high in government agendas), to obtain the trends that can demonstrate the effectiveness of the actions recommended in both frameworks.

Data and methodology for economic loss assessment

Economic model

The economic model built for the Sendai Framework Monitoring to assess direct economic losses caused by disasters is under development. It started from concepts and methods of more detailed and refined models such as the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) methodology, but was simplified to respond to the challenge of evaluating hundreds or thousands of events around the globe[40] that did not have a proper economic assessment of economic damage in the field and improved with the development of the technical guidance notes for targets and indicators.

The methodologies proposed for SFM started with simplified versions developed for GARs. The number of items considered has increased, from just a few in GAR11, adding generic crops and livestock in GAR15, to today's list of over 200 variables. Though the proposed set of methodologies is relatively simple, the lack of available information needed for many indicators has made this a challenging analytical task. However, as more countries report aggregated and disaggregated data, the outcome will become a better and more realistic economic loss model that can be used to assess present and past disaster losses.

Agriculture

The Food and Agriculture Organization of the United Nations (FAO) developed, jointly with UNDRR, a revised methodology for the estimation of losses in the agricultural sector. This makes extensive use of national agricultural statistics, including planted area, yields by crops and other information specific to the sector. The economic impact of disasters on the agricultural sector has been divided into several subsectors (crops, livestock, forest, aquaculture, fisheries, stocks and assets) to better reflect the different particularities of each. In the case of agricultural crops and animal produce, the

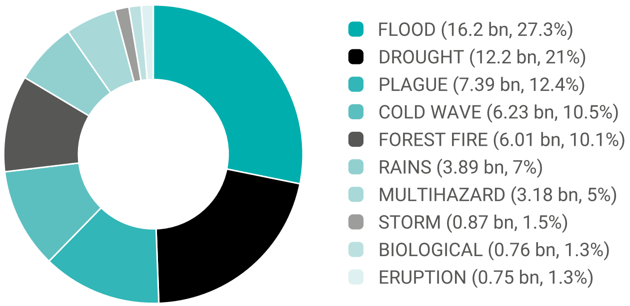
Reducing risk and vulnerability to climate change in the region of La Depresión Momposina in Colombia
(Source: UNDP Colombia)

values countries are requested to report on – hectares and number of animals, respectively – must be transformed to match the units of the available economic value. This is possible to calculate when enough data is available. For example, for a particular year and crop, the number of lost hectares is multiplied by the expected yield by the average value per tonne.

Unfortunately, information on prices and yields is not always locally available for all countries, crops and years. In many cases, data can be drawn from FAOSTAT information, but there will still be important data gaps. To fill these, regional clusters of prices are estimated based on similar GDP per capita (GDPPC). When any country has missing information, the respective cluster data is used. In extreme cases, the world average must be used. In the case of animal product, a similar logic is followed, with the only difference being the yield, for which an international effective weight average has been provided by FAO statistical offices. Another particularity occurs when disaggregation has not been provided, that is, when crop and livestock have not been individually reported. In this case, a weighted average is calculated based on the available area harvested and the crop prices.

Despite possible data gaps, the triangulation of sources possible through the SFM functionality enables broad analyses of agricultural sector disaster losses, such as in Figure 17.

Figure 8.17. Direct agricultural losses by hazard type, 2005–2015



(Source: UNDRR, SFM reported by 83 countries, March 2018 data, in constant 2010 $)

Productive assets and housing sector

SFM implements a basic methodology to assess the economic value of built elements as described in the technical guidance notes. This methodology assigns a value of a built element (e.g. a house or school, or a building in general) based on construction costs (expressed per square metre), the average size of the building, an overhead to account for the contents of the building (furniture, appliances and equipment) and another to account for the associated physical infrastructure (urban and network infrastructure such as driveways, sewerage, water and electricity connections).

Value= Number of assets × average asset size × construction cost per M^2 × equipment ratio × infrastructure ratio

For the practical implementation of the methodology, a database of costs for an important number of types of assets has been prepared based on the International Standard Industrial Classification of all economic activities (ISIC, Rev. 4).[41] This list contains items for almost all types of buildings corresponding to major economic sectors, leaving it to the discretion of each country to add more specific classes, and to refine the construction prices initially proposed.

Following analysis advanced in GAR13 and GAR15, the housing sector is initially assessed using the concept of social housing units (i.e. the default economic assessment estimates the cost of houses using as its average the size of social housing units required to provide basic shelter to the families in need). This average size can be modified by countries to obtain a more accurate and contextualized value. In a similar fashion, sizes for educational and health facilities are initially set as the size of small facilities of each type, thus providing a conservative estimate of value. Similarly, as with procedures used in agricultural losses, the methodology makes use of the clustering of country data by GDPPC to obtain a construction value per unit area in countries where no data was found.

Member States can modify all of the provided parameters for each item, based on regional or national preferences, such as the average area of the assets, the construction costs per type of asset, the percentage of equipment in relation to construction cost, the percentage of related infrastructure in relation to construction cost and the average repair cost damage ratio of damaged assets. This provides an extremely flexible tool that is fully adjustable to the context of each country.

Critical infrastructure

The OEIWG report on terminology related to DRR defines critical infrastructure as the physical structures, facilities, networks and other assets that provide services that are essential to the social and economic functioning of a community or society. The types of assets listed under the section "Proposed UNDRR Classification of Infrastructure sector", given in the technical guidance notes for Target D as critical infrastructure, cover a wide scope of facilities and networks. They include health centres, hospitals and educational facilities, as required by the target itself, and also specific structures in other sectors such as power plants, government facilities, transportation networks, and water, sewerage and solid waste treatment facilities. Critical infrastructure buildings (e.g. health and education facilities) are assessed in a similar fashion to the productive assets described in the previous section, although their role as critical service providers is accounted for differently under Target D.

The technical guidance notes methodology has simple recommendations for the economic assessment of linear networks, in particular for roads. The methodology is based on either the cost to build a linear unit (metre) of the network or the cost of rehabilitation of the same. In the case of roads, default conservative values for rehabilitation and reconstruction of unpaved and single lane paved roads are provided, based on data and statistics of the World Bank.

The types of assets listed also include more specific structures such as power plants and water treatment facilities. No default values are provided for these items, given their enormous variability, which must be priced specifically for each country. This is particularly important as each one of these types of asset is subject to local regulations, and is bounded by unique regional geographic, climatic and environmental characteristics.

Cultural heritage

Cultural heritage sites relate to monuments, traditions and places of worship, and also to the affected communities whose identity, culture and livelihoods are directly linked with those sites. Cultural heritages vary vastly within and among countries, which makes standardized methodologies to assign economic value challenging. Most losses associated with cultural heritage are intangible losses (i.e. those associated with the historical and/or artistic value of cultural heritage assets). Also, a good part of economic losses associated with cultural assets are indirect losses, mainly connected to future income losses associated with tourism, culture and recreation.

41 (UN DESA 2008)

However, to calculate at least a portion of the direct economic loss, it is suggested that Member States report the cost of rehabilitating, recovering and restoring the assets to a standard similar to that of the pre-disaster situation. This is feasible for fixed assets (buildings, monuments and fixed infrastructure of cultural heritage assets) and for movable assets such as paintings, documentation and sculptures. When cultural assets are totally lost, economic assessment is extremely difficult, as there is simply no way to assign the value of what is recognized as priceless cultural artefacts. In some cases (and whenever available), the inflation-adjusted acquisition price or market value of movable cultural heritage destroyed or totally lost can be used, as can the cost of building replicas of these assets.

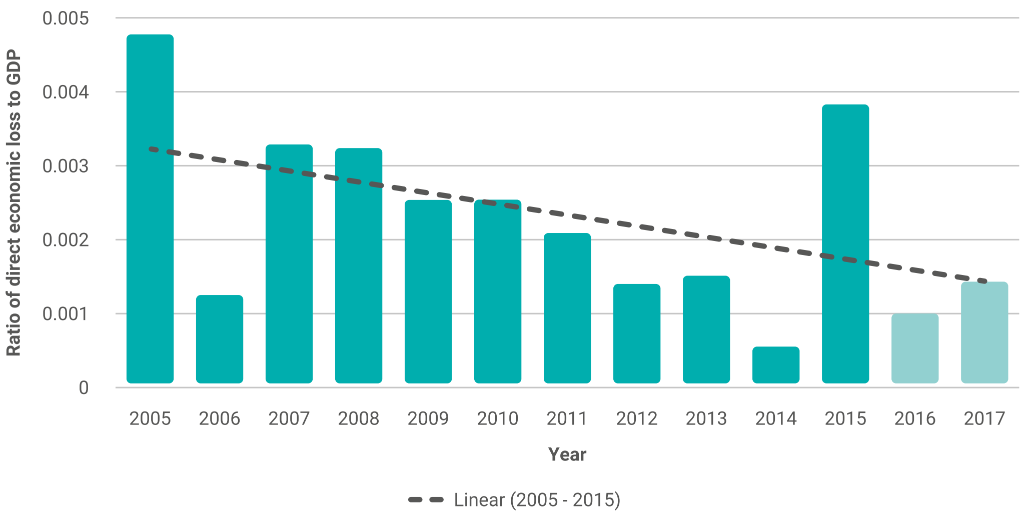
Trends and figures of economic loss

Relative loss is presented in Figure 8.18, where each year contains the sum of losses from all 83 countries, divided by the sum of GDPs of all the same 83 countries. As GDP is often expected to increase from one year to the next, the net result in the baseline period of 2005–2015, which corresponds with HFA, is a steep trend downwards. This apparently demonstrates that countries were doing well reducing risk during that period, as it shows a reduction in economic losses from disasters in relation to GDP. But, as noted above, outliers are key in the analysis of trends (see Box 9.1). In any time series with loss values, the location of the outliers (in this case, large-scale disasters) can completely change the trend. Furthermore, with such a short time series, adding one year before or after could similarly disrupt the trend line.

It is well known that 2017 was particularly disruptive in terms of economic loss. According to Swiss Re, it broke several records:[42]

- Total global economic losses from natural hazards and man-made catastrophes were $337 billion in 2017
- Global insured losses from disaster events in 2017 were $144 billion – the highest ever recorded
- Hurricanes Harvey, Irma and Maria resulted in combined insured losses of $92 billion, equal to 0.5% of GDP in the United States of America

Figure 8.18. Indicator C-1, direct economic loss relative to GDP, 83 countries with baseline in SFM, 2005–2017



(Source: UNDRR data)

- Insured losses from all wildfires in the world totalled $14 billion in 2017, the highest ever in a single year
- More than 11,000 people died or went missing in disaster events in 2017

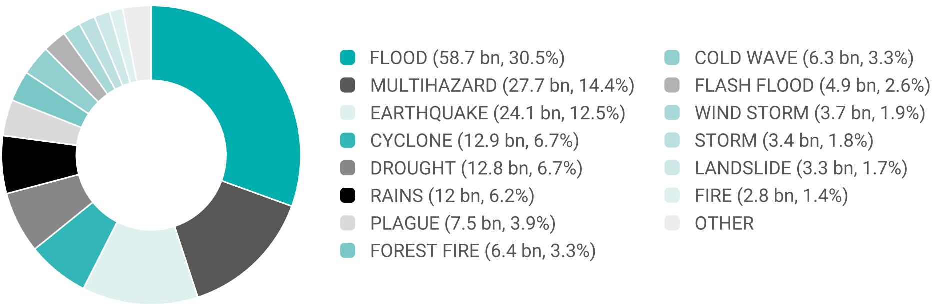
Unfortunately, the data sample in the monitoring system has different countries reporting for 2016 and 2017 than for the baseline years 2005–2015. Also, in 2011 and 2017, most losses occurred in the United States of America, which is not included in the sample of reporting countries. Nevertheless, including 2016 and 2017 in the relative loss calculations still does not alter the downward trend in economic losses.

Hazard distribution of economic damage

Different hazards affect exposed assets in different ways. In the following paragraphs, due to data limitations, only the total loss, losses to agriculture and losses in the housing sector are presented. Agriculture and housing are the two sectors for which highest losses have been reported among all sectors.

Figure 8.19 shows that weather-related hazards are the cause of most economic loss, with floods as the costliest hazard, bearing 30.5% of all losses, followed by multihazard events and earthquakes with 12.5%. Notable in the extended data set compliant with the Sendai Framework is the appearance, in seventh place, of a biological hazard (epidemic).

Figure 8.19. Distribution of total economic loss (constant 2010 $) in 83 countries by hazard, 2005–2015



(Source: UNDRR data)

Housing sector damage is dominated by the same three hazards (floods, earthquakes and cyclones). Despite the housing sector being one of the most affected and critical sectors for populations, available data about the global impact of disasters in the housing sector is scarce and scattered among many sources.

Using the data from SFM, the importance of the housing sector is apparent. In the sample of 83 countries for the period 2005–2015, losses in the housing sector represented 62% of all economic losses. While the proportional size of housing losses may reduce when better data on other sectors and more countries is available, it is nevertheless representative of the importance of this sector. For the year 2017 alone, when a different set of 81 countries (including China and a large group

42 (Swiss Re 2019)

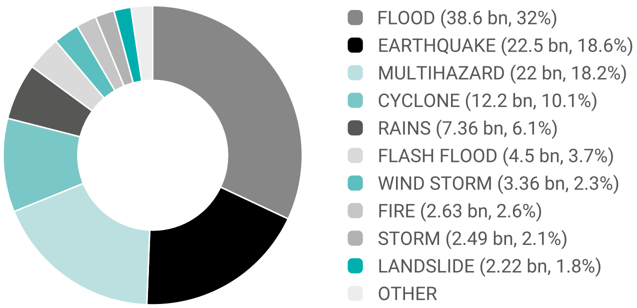
of developed countries) reported, the weight of the sector was similar: 60.65%.

National disaster loss databases, and more recently SFM, are allowing Member States to collect detailed data in these and other economic sectors. Data on the housing sector is important during emergency response (e.g. for calculation of shelter needs and affected population) and is an important input in risk assessments, which may use loss data as a calibration point.

Identifying patterns and trends of damage in the housing sector is crucial in policymaking, given that most populations, especially the poor, are affected by their houses, which are the shelter they depend on and also the place where livelihoods are anchored. Additional factors underlining the importance of the housing sector are: the understanding of risk in cities, which are particularly vulnerable due to rapid and chaotic urbanization; the uneven concentration of economic wealth in cities, rendering large segments of the population with high levels of vulnerability; the expansion of slums (often into hazardous locations); and the failure of urban authorities to enforce building codes and land-use planning.

The OEIWG report noted that data on housing damage, along with data about who live in those houses, will be used in the indicators to measure the achievement of Target B, the reduction of number of affected people. As with other data requirements, it is up to Member States to meet the challenge of properly accounting for this data. This will ultimately be a beneficial asset in the hands of those in charge of reducing risk through evidence-based information.

Figure 8.20. Housing sector losses (constant 2010 $) in 83 countries by hazard, 2005–2015



(Source: UNDRR data)

Agricultural losses mostly driven by floods, droughts and biological hazards

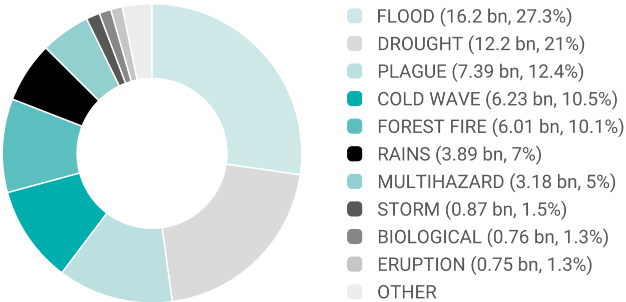
Agricultural losses are mostly driven by floods, droughts and biological hazards in the 83 countries of the sample with baseline data.

A 2017 report from FAO on the impact of disasters in this sector recognizes that impacts on agriculture "are seldom quantified or analysed in depth, yet agriculture tends to be one of the main economic activities in developing countries, contributing on average between 10 and 20 percent of national GDP in lower-middle-income countries and over 30 percent in low-income countries".[43] The same report, and after a review of 74 PDNAs, found that losses in the agriculture sector represent 23% of all loss attributed to medium- to large-scale disasters and 26% of losses due to climate-related hazards, stating that "Almost one third of all disaster loss is accrued in the agricultural sectors." The data in the 83-country baseline is consistent with this figure, showing 31% of losses are in the agricultural sector.

The FAO report and the data of the sample concur in that the most damaging hazards are droughts and floods. However, the relative size of damage by drought in the FAO report is much bigger, reaching more than 83% of the total. This disparity results from limitations of data and the lack of countries highly affected by drought in the 83 countries in the baseline sample. Many of the drought-affected countries of Africa, the Americas and other continents do not actively report losses to SFM and are not part of the group of countries that have completed their baseline data (2005–2015). These data gaps will reduce as Member States proactively monitor and account for their losses.

Another difference comes from the accounting of extensive risk. FAO data is from PDNAs, which are conducted only for large-scale disasters, most of which have been droughts in the past few years. Considering extensive risk impacts (small- and medium-scale disasters) would likely change the final composition due to hazards of agricultural damage.

Figure 8.21. Agricultural losses (in constant 2010 $) in 83 countries by hazard, 2005–2015



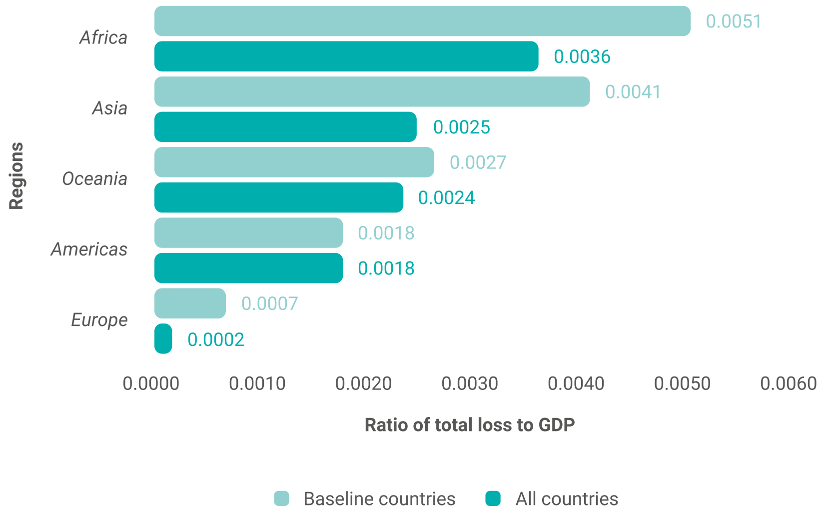
(Source: UNDRR data)

Regional distribution of economic damage and analysis by income group

In terms of geographic distribution of relative to GDP loss over the period 2005–2017 (Figure 8.22), Asia and Africa continue to outpace others, demonstrating the gravity and magnitude of the impact of disasters in comparison with other regions. For example, ESCAP reports that between 1970 and 2016, Asia and the Pacific lost $1.3 trillion in assets.[44] A significant part of those losses was the result of floods, storms, droughts and earthquakes including tsunamis. Forecasts for the future are equally alarming with 40% of global economic losses from disasters being projected to be in Asia and the Pacific, with the greatest losses in the largest economies: Japan and China, followed by the Republic of Korea and India. Yet, when analysing those figures as a proportion of GDP, the burden is disproportionately high in countries with special needs, in particular SIDS, which are forecasted to have average annual losses close to 4% of their GDPs.[45] The impact in terms of losses and deaths is probably much higher than the data suggests, as disasters in several of these countries remain underreported.

43 (FAO 2017c)
44 (UNESCAP 2017)
45 (ESCAP 2017a)

Figure 8.22. **Yearly average total loss relative to GDP, by region, 2005–2017**



(Sources: UNDRR and World Bank)

While disaster risks are widespread throughout the Asia and Pacific region, analysis points to cross-border hotspots where higher likelihood of change coincides with high concentrations of exposure and vulnerability, and thus impact.[46] For example, river deltas such as the Mekong and the Ganges–Brahmaputra–Meghna deltas will be affected by sea-level rise due to subsidence, deteriorating water quality, decreases in sediment supply and increases in groundwater salinity.

In terms of regional cooperation in DRR, the Asia and Pacific region has been particularly active in improving collective disaster preparedness and exchanging good practices on building back better. The ASEAN Humanitarian Assistance Centre in Indonesia is actively promoting regional cooperation by providing policy advice, research, strategic learning and exchange of information for effective DRR. In addition, within the existing regional groupings such as ASEAN, there has been growing emphasis on conducting joint exercises for improved disaster preparedness through strengthened risk management capacities and enhancing the resilience of critical infrastructure against natural hazards with cross-border spillover effects. Post-disaster recovery programmes have also been used often as opportunities for exchange of good practices, particularly in housing reconstruction. ESCAP has established a Regional Trust Fund on Tsunami, Disaster and Climate Preparedness, which could be used as an effective vehicle for sharing data, tools and expertise to support disaster resilience in high-risk countries of the Asia and Pacific region. ESCAP has also recently established the Asian and Pacific Centre for the Development of Disaster Information Management to provide member countries with advisory services and technical cooperation on transboundary disasters such as earthquakes, droughts, sandstorm and dust-storms.

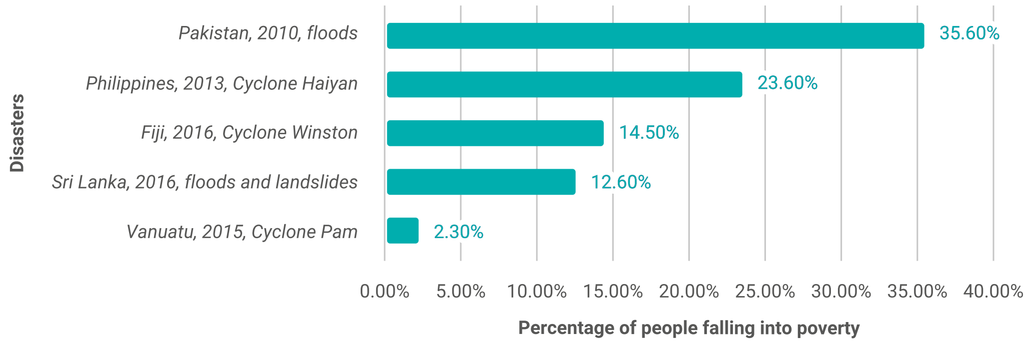
Narrow the gaps, bridge the divides. Rebuild trust by bringing people together around common goals.[47]

Disasters discriminate along the same lines that societies discriminate against people. This GAR has highlighted that headline figures on economic losses and deaths hide fragilities and setbacks in many countries. Despite significant progress over the last two decades, more than 700 million people remain below the extreme poverty line, thus highlighting the relationship among vulnerability, poverty and exposure. After a prolonged decline, the number of undernourished people rose from 777 million in 2015 to 815 million in 2016, mainly due to droughts, conflicts and disasters linked to climate change.[48] The United Nations forecasts that further declines or weak per capita income growth are anticipated in 2019 in Central, Southern and West Africa and Latin America and the Caribbean. These are home to nearly a quarter of the global population living in poverty and often those facing the highest risks of adverse consequences from climate change and extreme weather events.[49]

People living in poverty suffer disproportionally in the wake of a disaster. They are less able to cope as they rarely benefit from social protection schemes, have fewer or no savings to smooth the impacts, their livelihoods depend on fewer assets, and they are more likely to live in low-value, hazard-prone areas in urban centres or depend on vulnerable ecosystems in rural areas. They are locked in protracted cycles of poverty, translated into irreversible effects on education and health, which can strengthen the likelihood of intergenerational transmission of poverty. For example, in Peru, the effects of the 1970 Ancash earthquake on educational attainment can be traced back to the children of mothers affected at birth, highlighting that the effects of large disasters can extend to future generations.[50]

Even though causality should be analysed in finer detail, there is a close two-way relationship between disasters and poverty. Disasters aggravate the depth and breadth of poverty, while poverty exacerbates the way people experience, cope and recover from disasters. ESCAP estimates a significant segment of the Asia–Pacific population fall into poverty from selected disasters (Figure 8.23). This is a reality for several countries across the globe. Previous studies point to similar findings in Latin America where, among the Guatemalan households hit by Tropical Storm Agatha in 2010, per capita consumption fell by 5.5%, increasing poverty by 14%.[51] In Senegal, it is estimated that impacts of disasters between 2006 and 2011 affected households, with 25% more likely to fall into poverty.[52] Similarly, according to World Bank analysis, estimates for 89 countries found that if all disasters were to be prevented next year, the number of people in extreme poverty – those living on less than $1.90 a day – would fall by 26 million.[53]

Figure 8.23. Estimated percentage of people falling into poverty from selected disasters in the Asia–Pacific region



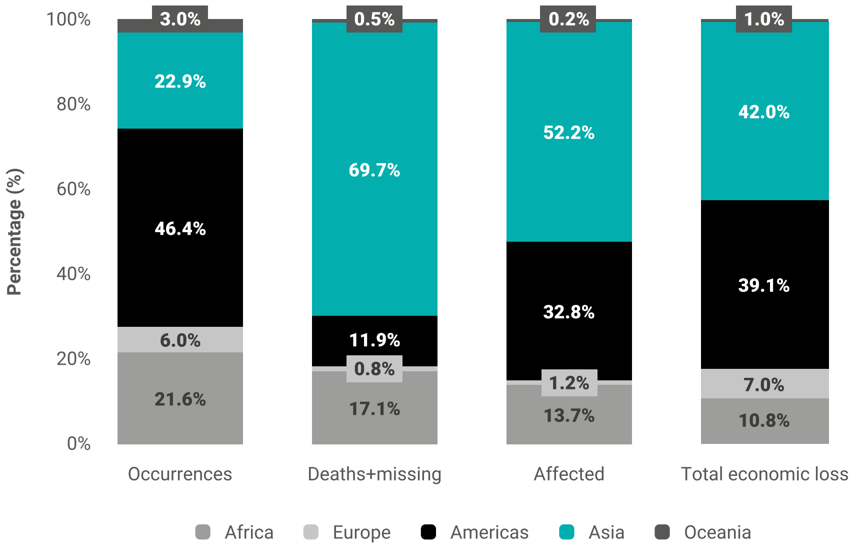
(Sources: ESCAP statistical database and country post-disaster damage assessments, Asia-Pacific Disaster Report 2017)

46 (ESCAP 2017a)
47 (United Nations Secretary General 2018)
48 (United Nations 2019a)
49 (United Nations 2019b)
50 (Caruso and Miller 2015)
51 (Baez et al. 2017)
52 (Dang, Lanjouw and Swinkels 2017)
53 (Hallegatte et al. 2017)

Four years after the adoption of the 2030 Agenda, countries have taken bold steps in terms of reporting, particularly when it comes to indicators used for measuring poverty and inequality (SDGs 1 and 10). Disaster loss data could be analysed against poverty and inequality data to understand, in finer detail, how disasters affect people's lives and direct interventions to reduce poverty and disaster risk in a complementary way, without adding additional reporting burden for countries. This means seeking out high-quality data that can be applied to compare outcomes and changes in poverty, inequality and impact of disasters over time, among and within countries, and investing in doing so year after year. It also means making this data available, raising awareness and building trust in its use while strengthening people's ability to use it, so that their needs are at the core of such processes.[54]

Figure 8.24 reports the distribution of absolute data, namely the total number of disaster occurrences, the total number of deaths and missing persons, the total number of affected people and total economic losses from 2005 to 2017, among the different geographic regions. In terms of geographic distribution, it again becomes apparent that, despite accounting for 23% of disaster occurrences, Asia incurred 42% of the total economic losses recorded at the global level between 2005 and 2017, carrying a disproportionate burden in terms of disaster occurrences and impacts. The Americas, where 46% of disasters occurred, ranks second as far as total economic loss is concerned, but accounts for 12% of the total number of deaths and missing people. Differences in terms of socioeconomic development, preparedness plans and resilience among and within regions can explain this disparity.

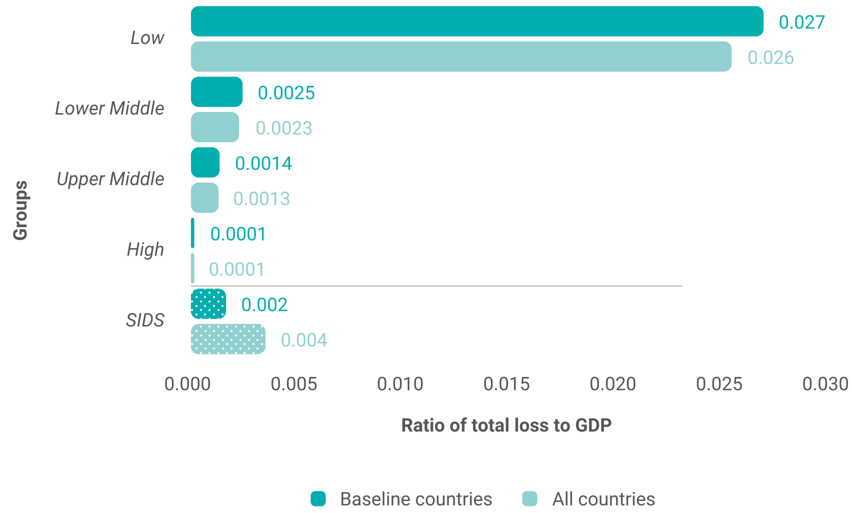
Figure 8.24. Distribution of disaster occurrences and impacts, by region, 2005–2017



(Source: UNDRR with data from DesInventar and World Bank)

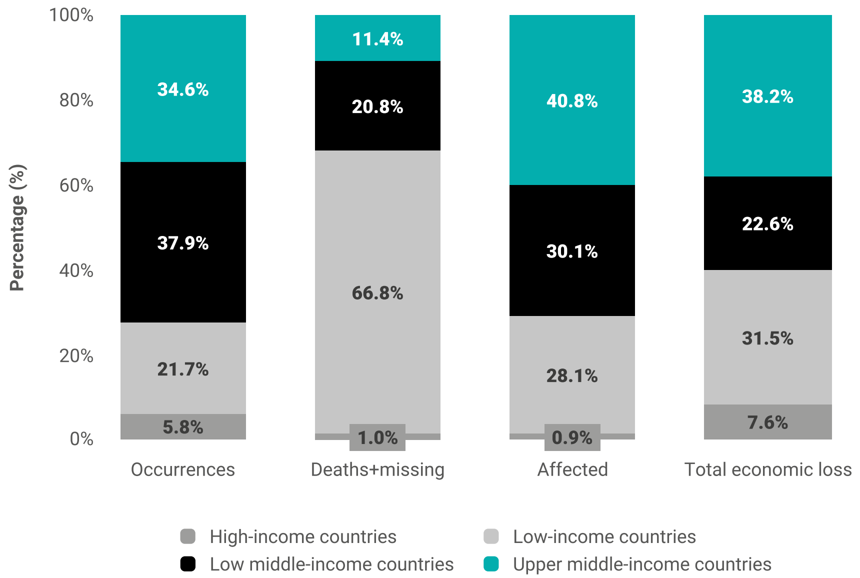
Figure 8.25 reports yearly average losses relative to GDP for different income groups over the period 2005–2017. Again, the ratio is significantly higher for low-income countries compared to other income groups, highlighting the gross inequality of burden sharing among income groups, with the lowest-income countries shouldering the greatest impact of disasters. When compared to economic losses, the picture is somewhat different: upper–middle-income and high-income countries account for 46% of economic losses and low-income countries account for the bulk of total mortality in the period 2005–2017 (Figure 8.26). The higher monetary value and more complete data on assets in upper–middle- and high-income countries, where 41% of disasters reported in the database between 2005 and 2017 occurred, can explain the larger extent of economic losses.

Figure 8.25. Yearly average total loss relative to GDP, by income group and SIDS, 2005–2017



(Source: UNDRR with data from DesInventar and World Bank)

Figure 8.26. Distribution of disaster occurrences and impacts, by income group, 2005–2017



(Source: UNDRR with data from DesInventar and World Bank)

54 (IEAG 2014)

Economic loss trends in global data sets

These are the disparities that headline figures mask where higher registration of disasters and more complete figures on insured losses account for the higher registration of costs. Such figures are misleading as they fail to demonstrate and provide finer details on how disasters affect people's lives. In absolute terms, high-income households lose more because they have more to lose, and those losses are more visible as they tend to be insured and better reported. The 32% of total economic losses that low-income countries in Figure 8.26 experience will be far more challenging to overcome than similar percentages in upper–middle-income or high-income countries. An important issue in disaster loss analysis is the proportion of income or assets lost, as the severity of losses depends on which households experience disasters and how. Proxy indicators and combination of data sources on poverty, inequality, health and sanitation, and education outcomes are useful for adding finer detail and a more comprehensive picture in the analysis, accounting for the real costs of disasters and directing funding to the appropriate initiatives to address the systemic nature of risks.

8.2.5

Target D – damage to critical infrastructure and public services: an encouraging decline in recent years

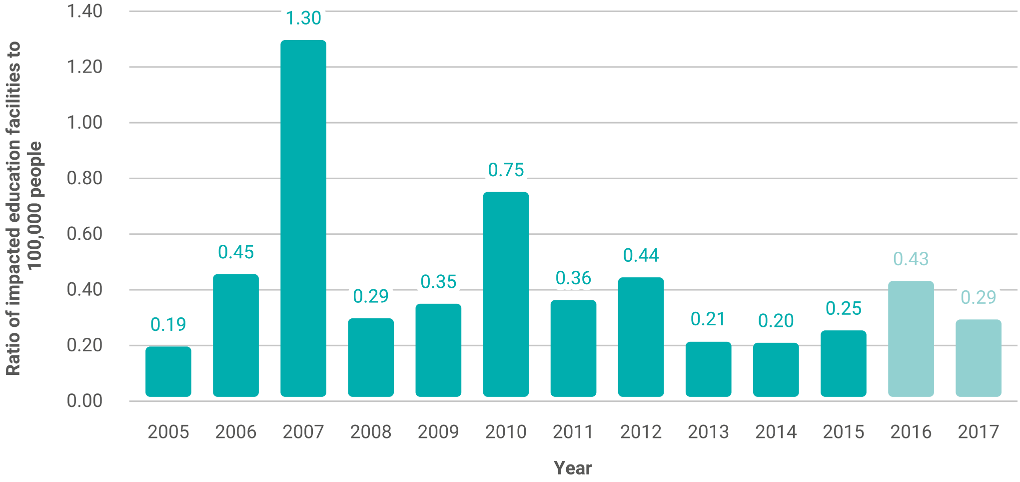
The Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR) in 2018 discussed the critical importance of the problem of infrastructure,[55] highlighting that "half of the infrastructure needed in Asia by 2050 has yet to be built". In addition, the whole urban infrastructure should be treated as an interconnected and unique entity in terms of resilience, including the housing, industrial and commercial infrastructure that provides basic services to a growing population in urban areas. A holistic and multisectoral approach is needed when planning critical infrastructure. It should look beyond physical infrastructure and take into account the interdependent nature of services that urban infrastructure provides to society, including energy, water supply, transportation, telecommunications and other critical services.

While the private sector needs to be involved and regulated via policy instruments (including building codes and land-use planning), the responsibility of governments in creating new resilient, risk-informed critical infrastructure is undeniable. Indicators of loss in critical infrastructure in the Sendai Framework will continue to monitor the outcomes of impacts that are usually the direct responsibility of, and executed directly by, governments. This promotes evolution of existing critical infrastructure towards sensible, risk-informed public investments that should result in resilient critical infrastructures serving resilient societies.

Examining long-term trends for infrastructure damage is challenging due to data limitations. Upward trends are particularly susceptible to outliers. For example, 2015 is an outlier in relation to damage to the education and health sectors. This is due to the large impact of the earthquake in Nepal during that year, which caused enormous damage to the built environment, health and education infrastructure. However, data attrition about the amount of damage reported in national databases is becoming a less-significant problem as more damage is reported compared to previous periods.

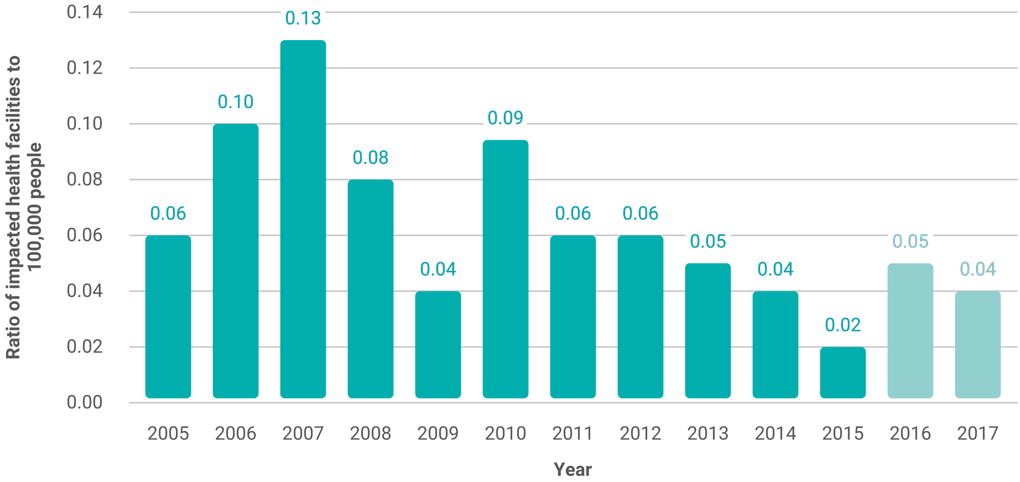
If shorter-term trends are examined (e.g. 2005–2017), the view is different and appears more optimistic. Figures 8.27 and 8.28 show the ratio of affected education facilities and the number of affected health facilities to 100,000 people, respectively, for baseline countries. These figures examine extensive risk only, which limits outlier-related issues. The numbers reported for 2016 and 2017 in Figures 8.26–8.28 are highlighted in different colours as the countries for which data is available is usually different from the baseline period and their number is smaller. Figure 8.29 shows the ratio of damaged roads to the total length of the road network. Health and education damage relative to population size have a downward trend, as shown in the figures. The same is true as far as relative damage to road is concerned, at least before 2016.

Figure 8.27. **Damage to education facilities relative to population size, HFA and Sendai Framework period, extensive risk in 83 baseline countries, 2005–2017**



(Source: UNDRR with data from DesInventar and World Bank)

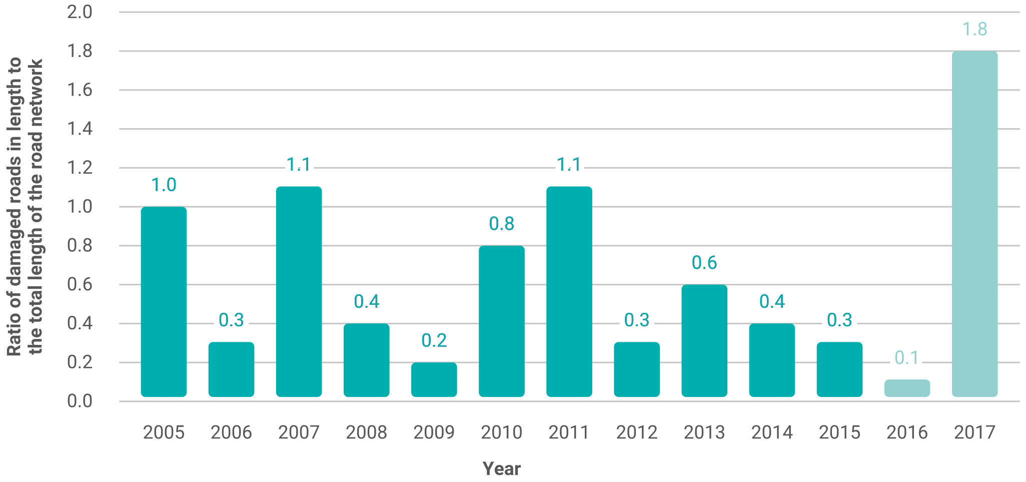
Figure 8.28. **Damage to health facilities, HFA and Sendai Framework period, extensive risk in 83 baseline countries, 2005–2017**



(Source: UNDRR with data from DesInventar and World Bank)

55 (Fuller 2018)

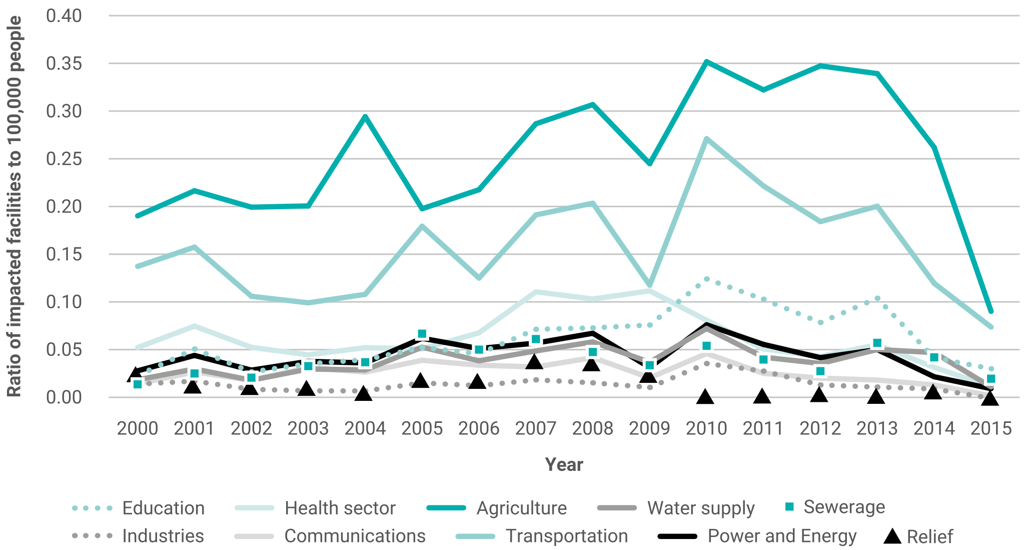
Figure 8.29. Damage to roads relative to total length of road network, HFA and Sendai Framework period, extensive risk in 83 baseline countries, 2005–2017



(Source: UNDRR with data from DesInventar and CIA World Factbook on global road infrastructure)
Note: Countries included in the reporting for 2016 and 2017 in the Sendai Framework period may differ.

Disruptions to basic services, the second part of the target, also exhibit downward trends in recent years. Figure 8.30shows the number of facilities affected by disaster in several sectors, relative to population size. Shorter-term trends (since the start of HFA) show a tendency to decrease in the case of all services.

Figure 8.30. Disruptions to public services relative to population size, 2000–2015



(Source: UNDRR data)

These trends are occurring despite the existence of a big outlier at the end of the series, in 2015, which influences all trends upwards. This is something that must be taken into consideration when analysing trends, as a large-scale disaster can happen at any time and the reading of the data may completely change.

Some of these downward trends in the last 15 years can be explained by DRR efforts of many countries. Campaigns such as Safe Hospitals and Safe Schools have had an important effect on reducing overall damage. Development generally reduces risk. For example, in countries where the percentage of paved roads is growing every year, roads are becoming more resilient.

8.2.6

Targets A–D: extensive risk analysis for the period 2005–2017: surprising facts of extensive risk in recent years

Box 8.1. Basics of extensive risk

Previous GARs (in 2013 and 2015) have defined extensive risk as the set of frequent disasters associated with relatively low intensity hazards. In general terms, extensive risk is the idea of widely spread and relatively frequent small- and medium-scale disasters.

Extensive risk manifests as large numbers of recurrent, low-to-medium-severity disasters, which are mainly associated with localized hazards such as flash floods, landslides, urban flooding, storms, fires and other time-specific events.

When HFA was adopted, the mortality, physical damage and economic loss from extensive risk had not been accounted for in national or international reports, except in a few Latin American countries. As a result, this risk layer remained largely invisible to the international community. However, the sustained efforts from the United Nations system and partners to assist countries in systematically recording local disaster losses has generated systematic and comparable evidence regarding the scale of extensive risk, with data now covering more than 100 countries.

Given most of these data sets have been built using the same indicators, a comparable approach and similar methodology, it is possible to analyse these local records at a global level of observation. Unlike intensive risk, extensive risk is more closely associated with inequality and poverty than with physical features such as earthquake fault lines and cyclone tracks.

Extensive disaster risk is thus magnified by risk drivers such as badly planned and managed urban development, environmental degradation, poverty and inequality, vulnerable rural livelihoods and weak governance. This layer of risk is not captured by global risk modelling, and its losses are not reported internationally in global data sources.

One key feature of previous GARs has been to highlight the contingent liabilities associated with this risk layer, which tend to be absorbed by low-income households and communities, small businesses, and local and national governments, and which are a critical factor in poverty.

This section presents an update to the extensive risk analysis featured in previous GARs. Extensive risk is important for many reasons. However, the main one is that extensive risks are responsible for most damage to infrastructure and livelihoods, perhaps for most economic loss (as shown below) and represents an erosion of development assets such as houses, schools, health facilities, roads and local infrastructure. GAR efforts to reveal extensive risk aim at making the cost visible, as extensive risk losses tend to be underestimated and are usually absorbed by low-income households and communities.

For this GAR19, a focused analysis of extensive/intensive risk has been conducted. It is now limited to the period of the monitoring of the two frameworks – HFA (or the baseline) and the Sendai Framework – meaning the latest 12 years of data. In previous GARs, a longer period was researched, which may have introduced biases due to less data reporting in the initial years covered by the databases. While the period of the research is now shorter, the number of records analysed is high, with 320,000 disaster records, and includes a higher number of countries (104), which add to its strength as a statistical sample.

There is now a broader scope of hazards included in this sample, because of the call in the Sendai Framework to also address biological and environmental hazards (grouped under "biological") and human-induced (technological) hazards. This sample therefore includes all reported epidemics, industrial accidents and deforestation.

Table 8.1. Extensive risk figures disaggregated by hazard family, 2005–2017, summarizing the main figures obtained in the analysis

Risk type	Hazard type	Number of disasters recorded	Number of deaths	Number of houses destroyed	Number of houses damaged	Number of education centres affected	Number of hospitals affected	Area of damage to crops (ha)	Indicator C-1a – total economic loss ($)
Extensive	Hydrometeorological	210,838	42,563	513,493	5,123,026	26,617	3,241	90,331,709	108,471,332,292
	Geological	7,687	1,248	47,468	293,685	3,157	267	473,679	4,088,850,199
	Biological	73,783	23,164	289	50,926	48	147	9,467,320	9,164,221,167
	Man-made	23,406	15,895	3,709	127,621	1,232	68	496,989	1,346,163,360
	Subtotal	315,714	82,870	564,959	5,595,258	31,054	3,723	100,769,697	123,070,567,018
	Percentage	99.60%	29.59%	22.52%	82.01%	69.32%	68.21%	94.45%	68.22%
Intensive	Hydrometeorological	890	127,996	1,423,289	908,427	10,132	1,364	5,685,515	42,481,666,285
	Geological	155	44,748	520,046	316,253	3,597	364	57,000	14,776,671,307
	Biological	185	17,241		67	2	3		670,581
	Man-made	47	7,249	180	2,291	15	4	174,176	68,693,954
	Subtotal	1,277	197,234	1,943,515	1,227,038	13,746	1,735	5,916,691	57,327,702,127
	Percentage	0.40%	70.41%	77.48%	17.99%	30.68%	31.79%	5.55%	31.78%
TOTAL		316,991	280,104	2,508,474	6,822,296	44,800	5,458	106,686,388	180,398,269,145

(Source: UNDRR data)

It is important to note that year aggregates of economic loss cannot be classified as extensive or intensive because they are not records of individual disasters. In general, the annual consolidate surpasses the threshold of extensive risk, so most consolidated data would come under the category of intensive.

The weight of extensive risk in the economic losses area, using this sample of data, is much higher than that found in previous research periods: 68% of all economic losses in this period are caused by small and medium, localized and frequent disasters. This contrasts with previous findings of 42% of economic loss, and is perhaps a confirmation that after many achievements made by Member States in reducing intensive risk, their attention should now shift to addressing extensive risk.

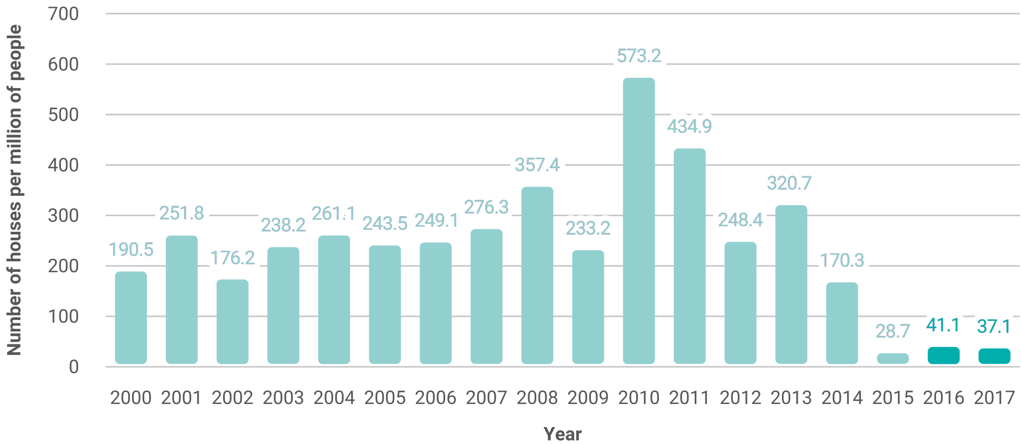
Monitoring extensive and intensive risk

Extensive risk shows different trends from those that are apparent in the full sample of data. This is a consequence of the absence of outliers produced by large-scale disasters. In the case of the HFA and Sendai Framework eras, there were some outliers, especially in 2015 with the earthquake in Nepal, and with a generally damaging year in 2011. Had the sample included the United States of America, there would be bigger outliers in 2011 and 2017. The trend without the outliers is important because it shows how risk is affecting a huge proportion of the world – most importantly, the poor.

Figure 8.31 shows relative losses in the housing sector, which dominate the overall losses, along with agriculture, in all SFM countries from 2000 to 2017. Relative losses are calculated by dividing the number of damaged or destroyed houses by population. Against steady increases in the first 10 years, losses have significantly declined since 2010. However, data for years 2015, 2016 and 2017 should be taken with caution as the number of disasters for which data on the number of damaged or destroyed available in the database is significantly smaller than in previous years.

One of the conclusions is that economic loss, in absolute terms, continues to grow in disasters at all scales. However, despite the high number of extensive risk disaster records (99.6% of all data) and a higher contribution to overall economic loss, the impact of extensive risk is slowly receding within the data available at this time. This reduction of economic impact is visible at a global scale and is reflected in similar trends in the relative losses of the set of countries reporting to the Sendai Framework Monitoring system.

Figure 8.31. Number of houses damaged/destroyed relative to population size, extensive risk in all SFM countries, 2000–2017



(Source: UNDRR with data from DesInventar and World Bank)

8.3

Target E: Progress on disaster risk reduction strategies for 2020

Two years before the deadline of Target E, there is no comprehensive picture of all strategies in place. The target speaks plainly about "national and local disaster risk reduction strategies", but the indicators that will measure this target are more difficult to quantify. Indicator E-1 requires national strategies to be "in line with the Sendai Framework", and local strategies to be "in line with National Strategies". It could be inferred therefore that local strategies should also be aligned with the Sendai Framework.

Some strategies are limited in scope and action, taking into consideration the specific context and capacity of the country. Therefore, DRR strategies are considered as a set of policy documents on relevant policy areas, from sectoral perspectives, or of targeted specific hazards. Measurement of compliance with the Sendai Framework should consequently be loosely interpreted.

The technical guidance notes proposed that the alignment of strategies with the Sendai Framework could be measured by a simple system of assigning scores, which, despite their subjectivity, could identify the alignment of a national strategy to the Sendai Framework. Box 8.2 shows the 10 criteria used for monitoring the progress of national DRR strategies where Member States conduct their own self-assessments. It should be underlined that attributed scores are for the alignment of national strategies to the Sendai Framework only, and do not offer any assessment on implementation of the strategy.

As with other targets and indicators, there are several data sources, which gives nuance to the conclusions to be drawn. In order of priority, these data sources are: the monitoring system, the UNDRR survey on implementation of the Sendai Framework, the Data Readiness Review and the results of the last rounds of reporting of HFA.[56]

This section presents the results of the officially reported data available in the online Sendai Framework Monitoring system. By expanding on facts and figures from other data sources, it provides the best available overview of how Member States are progressing on DRR strategies.

Box 8.2. Key elements in DRR strategies used to assign a score to Indicator E-1, Number of countries that adopt and implement national DRR strategies in line with the Sendai Framework

- **i.** Have different timescales, with targets, indicators and time frames
- **ii.** Have aims at preventing the creation of risk
- **iii.** Have aims at reducing existing risk
- **iv.** Have aims at strengthening economic, social, health and environmental resilience
- **v.** Address the recommendations of Priority 1, Understanding disaster risk
- **vi.** Address the recommendations of Priority 2, Strengthening disaster risk governance to manage disaster risk
- **vii.** Address the recommendations of Priority 3, Investing in disaster risk reduction for resilience
- **viii.** Address the recommendations of Priority 4, Enhancing disaster preparedness for effective response and to build back better in recovery, rehabilitation and reconstruction

ix. Promote policy coherence relevant to DRR such as sustainable development, poverty eradication and climate change, notably with SDGs and the Paris Agreement

x. Have mechanisms to follow up, periodically assess and publicly report on progress

Each element is weighted equally with the following criteria:

i. Comprehensive implementation (full score): 1.0

ii. Substantial implementation, additional progress required: 0.75

iii. Moderate implementation, neither comprehensive nor substantial: 0.50

iv. Limited implementation: 0.25

v. If there is no implementation or no existence: 0

(Source: UNDRR 2018b)

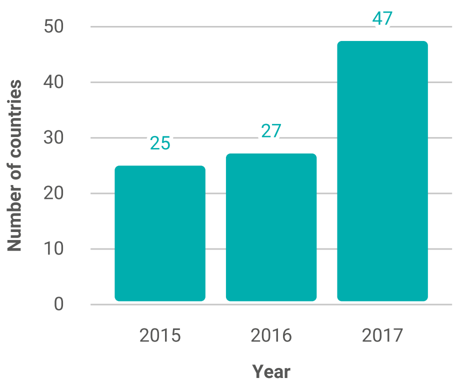
8.3.1

Data from the online Sendai Framework Monitoring system

The first important figure is the number of countries that reported on their progress on their strategies. In 2017, 47 Member States reported the status of their national and local DRR strategies. In 2016, only 27 countries reported, and 25 did so for 2015. The fact that more data was reported for 2017 than previous years reflects that the online monitoring system was launched in March 2018 and the technical guidance notes were developed over the course of 2016. Among the 47 reporting countries, only 6 reported that they have national DRR strategies in comprehensive alignment (100% compliance) with the Sendai Framework, according to the 10 criteria of the national DRR strategies in line with the Sendai Framework. Seventeen countries reported that their national DRR strategies have substantial alignment with the Sendai Framework (E-1 score of 0.67–0.99), while 10 countries have limited or no alignment (score of 0–0.33).

As of October 2018, the overall average compliance of alignment with the Sendai Framework is 0.60.

Figure 8.32. Indicator E-1, number of countries reporting on national DRR strategies, 2015–2017



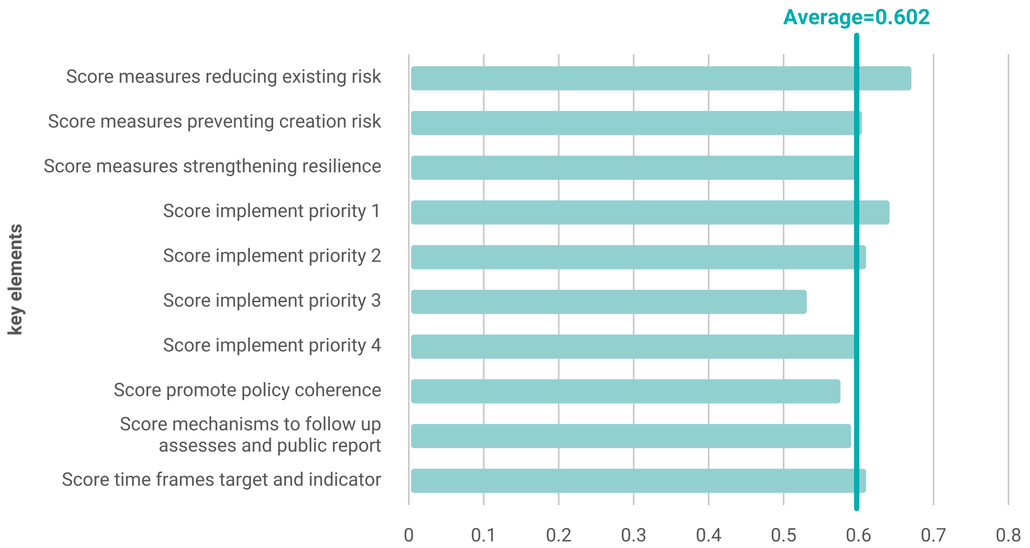
(Source: UNDRR data)

On closer examination, more Member States report that their national DRR strategies have better ratings in elements of measuring reducing existing risk (0.67 average) and in Priority 1, Understanding risk (0.64 average), than implementing Sendai Framework Priority 3, which seems to be more challenging (0.53 average). In the Readiness Review, conducted in early 2017, having indicators in the national DRR strategies seemed the biggest

56 (United Nations 2017a)

challenge for countries. One third of reporting countries answered they did not have indicators, while by October 2018, about one quarter of reporting countries did not have "different timescales, with targets, indicators and time frames" (0.60 average).

Figure 8.33. **Average scores of the 10 key elements for national DRR strategies to be in line with the Sendai Framework**



(Source: UNDRR data)

Several countries have reflected recent progress to improve their national DRR strategies in line with the Sendai Framework in currently reported values. For example, Namibia already had national DRR strategies in 2015, with a low alignment to the new Sendai Framework at that time. The strategy has been improved over three years (score of 50% in 2016). With the National Strategy for Mainstreaming Disaster Risk Reduction and Climate Change Adaptation into Development Planning in Namibia 2017–2021, the set of DRR strategies and policies is in comprehensive alignment with the Sendai Framework (self-score of 100% in 2017).

Czechia did not have a DRR strategy in 2015. National DRR strategies have been implemented since 2016 (score of 90% in 2016). In 2017, the country added full compliance to subindicator (x) – embedded mechanisms to follow up – increasing its score to 92.5%.

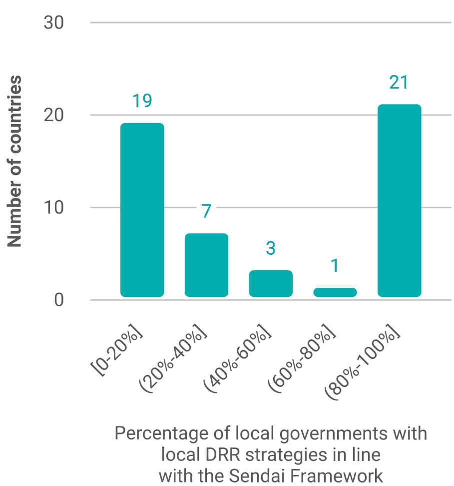
8.3.2

Indicator E-2

Another important figure to highlight is the number of countries that reported on their local DRR strategies. In 2017, 42 Member States reported the proportion of local DRR strategies available in local governments, while only 21 Member States reported so in 2016 and 18 in 2015. Note that local government is defined as a form of subnational public administration with responsibility for DRR – to be determined by countries. Among 35 countries that reported the status of their local DRR strategies, 17 reported that all of their local government bodies have local DRR strategies in line with their national DRR strategies, while 7 countries reported no local DRR strategies or without alignment to their national strategies.

Several countries have reflected recent progress in increasing the proportion of local governments having their local DRR strategies. For example, in Montenegro, in 2015, there was no DRR strategies; however, the number of local governments with local DRR strategies in line with the national DRR increased from 2 (9.1%) in 2016 to 6 (27.3%) in 2017, out of all 22 local governments. In Eswatini, the number of local governments with local DRR strategies in line with the national DRR is gradually increasing over time: 115 (32.6%) in 2015, 119 (33.7%) in 2016 and 121 (38.3%) in 2017, out of all 353 local governments.

Figure 8.34. Indicator E-2, number of countries with local DRR strategies in line with their national DRR strategies, 2017



(Source: UNDRR data)

Box 8.3. Complementing SFM with other data sources

As in the previous section on analysis of monitoring data, 47 countries have reported on Target E (Indicator E-1) on national DRR strategies. Taking into account that this number should not be treated as representative, the information was complemented with other sources. The following sources of information were analysed in order of hierarchy: data from SFM, a survey questionnaire and UNDRR support to Member States, complemented by countries who reported in the Readiness Review but not covered in the earliest lists.

At the time of the Readiness Review that UNDRR conducted at the beginning of 2017, out of the 87 countries who responded, 50 said that they either had a national strategy or were working on a strategy at different levels of progress. A survey was also conducted among Member States in the fourth quarter of 2018 to get a snapshot of country reported progress in implementing the Sendai Framework, including progress on Target E. Information of 42 countries was collected in this process. UNDRR has also been engaging with some Member States to support them in their progress on Target E.

Based on the above, a triangulation of information from all these sources was conducted. This provided information for 121 unique countries as available in one or more of these sources. Out of these 121 countries, 82 reported that they have made substantive or full progress in the development of national strategies aligned to the Sendai Framework. The remaining 39 countries have thus far made medium or low progress. Regrettably, these sources of information do not allow for extrapolation, meaning that with the data available, it is not possible to estimate the progress of the remaining 70 Member States.

SFM remains the main and official source of information for tracking progress on the implementation of the Sendai Framework. Hence, all Member States are encouraged to continue reporting through the monitor. All other sources are complementary and will not be used when a sufficient level of reporting is achieved in the official system.

8.4

Target F: Measuring international cooperation – too early for conclusions

In the Data Readiness Review study, Member States were asked to assess the availability and feasibility of providing data on the key indicators. This revealed that only 38% of Member States (33 out of 86 participating countries) would be capable of reporting on Indicator F-1: "Total official international support (official development assistance (ODA) plus other official flows), for national disaster risk reduction actions"; similar or lower numbers were reported for other indicators. For example, only 23% stated they would be able to report Indicator F-4: "Total official international support (ODA plus other official flows) for the transfer and exchange of disaster risk reduction-related technology". Participation in the first cycle of the monitoring exercise confirms this sparse availability of data. The average reporting rate for Indicator F-1, by far the best for Target F, reached only 25% of Member States. No analysis is provided for the rest of the indicators of Target F due to the low participation in monitoring.

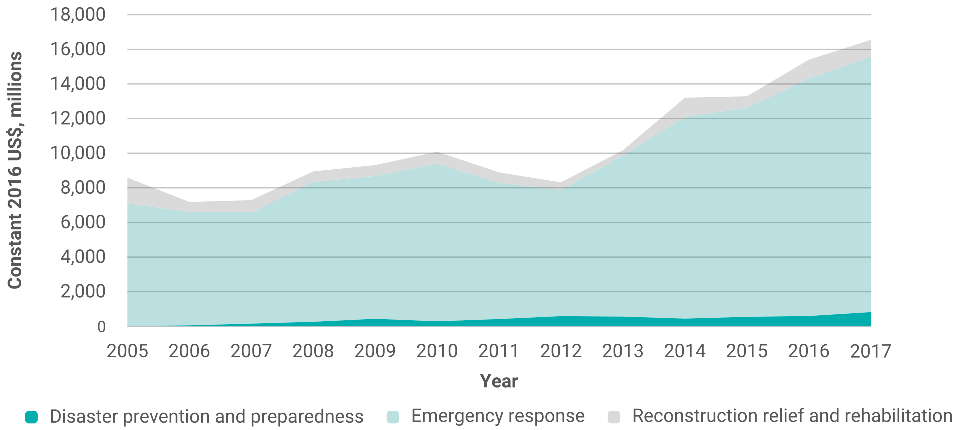
The data available for tracking ODA and DRR expenditure and to fully account for these costs remains incomplete at a global scale. For instance, OECD reports that where such information exists, it is not gathered on a regular basis due to accounting and administrative fragmentation across sectors and levels of government collecting and processing such data.[57] Macrolevel data on the global disaster risk financing gaps, and national and subnational data are necessary. To achieve this, improvements in reporting are required immediately. The renewed attention through the Sendai Framework provides an excellent opportunity for countries to report on national data and better understand the interplay between national and international sources in disaster risk financing. Providing a more comprehensive picture on where disaster aid and spending flows will help to build the evidence base for improved prevention, mitigation and preparedness funding. It is possible to start forming a global picture of financing for DRR using proxy indicators. In coming iterations of reporting for SFM, the availability of nationally reported figures will grow, and the use of proxies will complement increasingly granular data.

Analysing data from other sources such as OECD DAC[58] shows that, for instance, development assistance for DRR has remained a persistently small fraction of the total international aid financing landscape, and that disaster expenditure is predominantly ex post.[59] Data on development assistance for disasters can be captured – but is not limited to – three types of ODA: disaster prevention and preparedness, reconstruction relief and rehabilitation, and emergency response (Figure 8.35). The figure of $5.2 billion for DRR represents 3.8% of the spending in the period 2005–2017, which is a marginal fraction of the total amount. Most of the finance, $122 billion (89%), flows to emergency response, while $9.84 billion goes to reconstruction relief and rehabilitation (Figure 8.35).

Resource gaps continue to be significant and disproportionally borne by countries most in need. In addition, most efforts are concentrated in supporting preparedness and recovery, at the expense of funding dedicated to understanding the underlying vulnerabilities contributing to disasters. As captured in previous GARs, the increasing gap between demand for response to disasters and available global funding stresses the need for effective integrated measures that support DRR in the framework of sustainable development.

Although there is an increasing convergence between international development and humanitarian funding, financing gaps for disasters also support the above findings. Figure 8.36 demonstrates the difference between funding requested and the funding provided by the global humanitarian community; pointing to an eightfold increase in terms of financing gaps. In other words, and aligned

Figure 8.35. **Share of DRR in international aid for disasters (constant 2016 $, millions), 2005–2017**



(Source: UNDRR with data from OECD)

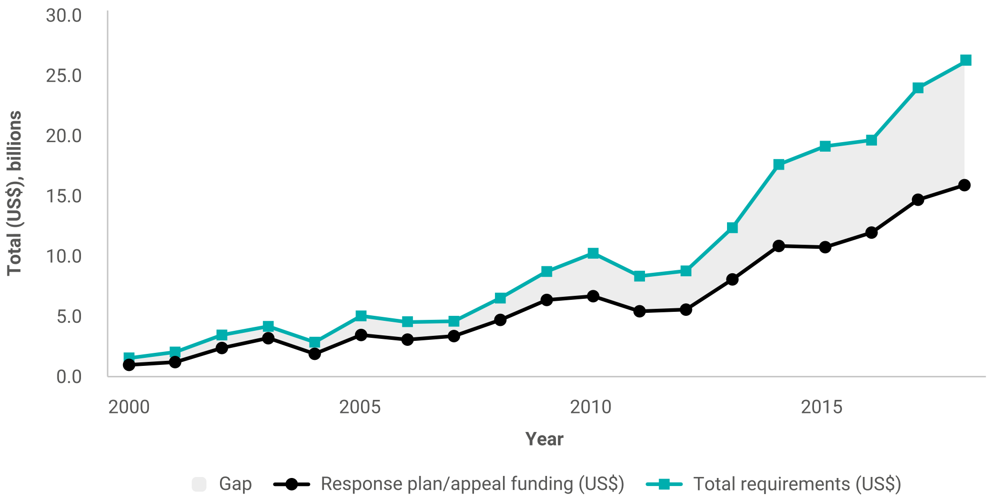
with previous GAR findings, global funding requirements are increasing, while the national and international capacity to address them is not growing in proportionate terms. This finding should be treated with considerable caution given pressures on traditional funding sources and sustained concern for the millions of people affected by disasters each year, who do not receive the assistance and protection required to rebuild their lives.[60] A previous study on 20-year trends of ODA[61] demonstrates that where the economy is at risk, volumes of financing tend to be more timely and substantially higher; where predominantly populations are at risk, volumes are often lower.

Deliberations in AAAA reiterated the need for renewed attention to financial instruments and innovations designed to reduce vulnerability to risk. For instance, scaling up the use of State contingent debt instruments – debt contracts that link debt service payment to a country's obligation to service it – linked to disasters could be an alternative measure. Such approaches need to be integrated in a broader package of efforts that seek to ensure countries have access to a risk-informed approach to finance on terms and conditions commensurate with their circumstances.

A positive international development in funding for disaster risk is the burgeoning field of disaster risk financing – a term that covers a wide range of global, regional and national risk-sharing and risk-transfer systems and products (public and private). The quantification of disaster risk for insurance and risk-sharing purposes is another form of incentive to reduce risk, although its focus is to produce better outcomes in socioeconomic development. Again, the financial flows related to these are unlikely to be counted in ODA figures. The complexity of this field requires a much more detailed treatment than can be done in this GAR, but these developments are important to note for future consideration in reporting on F-1 (total international flows), F-2 (multilateral organization flows)

57 (OECD 2018a)
58 (OECD 2018b)
59 (Watson et al. 2015)
60 (OCHA 2019)
61 (Kellett and Caravani 2013)

Figure 8.36. Funding received and funding requested through United Nations appeals, constant 2017 $, billions, 2000–2018



(Source: UNDRR with data from OCHA Financial Tracking Service)

and F-3 (bilateral flows). For example, concerning multilateral organizations, GFDRR,[62] the World Bank[63] and its Global Risk Financing Facility,[64] and regional development banks such as the Asian Development Bank (ADB)[65] provide national project funding, grants and loans specifically targeted at disaster risk financing. They also focus on capacity development to reduce risk, to track expenditure on DRR and to promote integration with CCA and climate change mitigation.

8.5

Target G: Multi-hazard early warning systems, – progress and challenges observed

Target G addresses the availability of, and access to, MHEWSs and disaster risk information and assessments. Indicators G-2 to G-4 are based on the four key elements of EWSs, informed by an international network on MHEWSs,[66] namely: (a) disaster risk knowledge based on the systematic collection of data and disaster risk assessments (G-5); (b) detection, monitoring, analysis and forecasting of the hazards and possible consequences (G-2); (c) dissemination and communication, by an official source, of authoritative, timely, accurate and actionable warnings and associated information on likelihood and impact (G-3); and (d) preparedness at all levels to respond to the warnings received (G-4). Indicator G-1 is a compound indicator of the four indicators and stands for a fully fledged MHEWS with four key elements taking the values 0–1.

Reporting against Target G has been a challenge for Member States, although indicators were developed to take into account the global feasibility of reporting. Thirty-four Member States have reported at least one indicator for 2015–2018 (mostly related to Indicator G-3), while the smallest number reported on G-2 and G-5, which require a multi-hazard approach and specification of major hazards.

Among the 34 reporting countries, 14 have reported a complete set of indicators from G-2 to G-5, which enables calculation of G-1. Despite a small number of reporting countries, the results reveal room for improvement on this target in most countries. Above all, reporting against G-5, with the lowest average among G-2 to G-5, demonstrates that most countries need comprehensive risk assessment for their defined major hazards.

Indicator G-2 refers to multi-hazard monitoring and forecasting systems. This indicator requires defining major hazards targeted for monitoring and forecasting systems. As shown in Table 8.2, there are two peaks at the upper and lower ends. In other words, several countries have multi-hazard monitoring and forecasting systems that cover major hazards well, while other countries do not. For example, Lebanon identified a wide variety of major hazards, including biological hazards, to be monitored and forecast. As some institutions are involved in MHEWSs, Lebanon is working on the development of an early warning platform, which will contribute to standardized processes and clear roles and responsibilities. Warning messages of several types of hazards would be further improved to include risk information to trigger response reactions disseminated in a timely and consistent manner.

Indicator G-3 relates to coverage of early warning information or penetration rate of communication modes. Among 31 reporting countries, 10 reported their targeted population is fully covered. In the case of Namibia, penetration ratios of local communication and mass media increased from 2015 to 2017, which has enabled early warning information to reach the whole population. Reported penetration rates show that mass media can reach more people than local communication systems such as sirens and public bulletin boards.

Indicator G-4 relates to local plans to act on early warnings, which are related to preparedness. Among

Table 8.2. **Target G, number of countries by total score for each dimension of Indicators G-2 to G-6**

Number of reporting countries and average score by indicator for Target G		
Indicator	***Number of reporting countries***	***Average score***
MHEWS (G-1: report all of G-2 to G-5)	14	0.45
Multi-hazard monitoring and forecasting systems (G-2)	19	0.58
Coverage of early warning information (G-3)	31	0.72
Local governments with plans to act on early warnings (G-4)	23	0.64
Disaster risk information and assessment (G-5)	17	0.38
Protected population through pre-emptive evacuation (G-6)	7	0
Any of indicators for Target G (G-1 to G-6)	34	–

62 (Hallegatte, Maruyama and Jun 2018); (De Bettencourt et al. 2013); (GFDRR 2018b)
63 (Alton, Mahul and Benson 2017)
64 (Global Risk Financing Facility 2019)
65 (Juswanto and Nugroho 2017); (ADB 2019)
66 (UNISDR 2006); (WMO 2017)

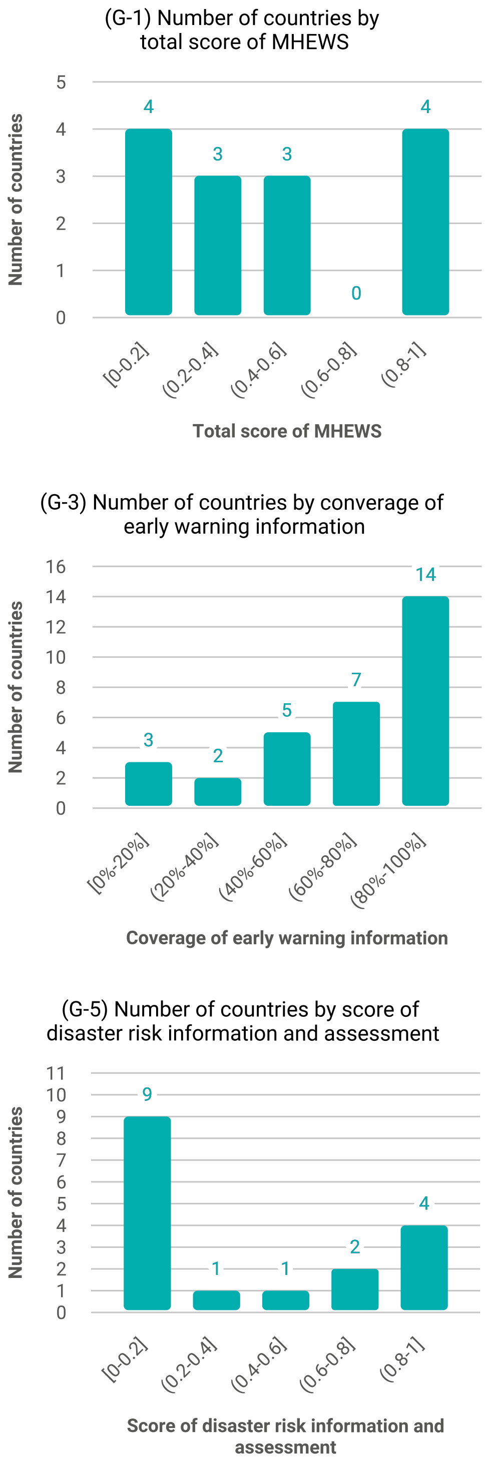
23 reporting countries, 12 reported that all of their local governments have a plan to act on early warnings, while 4 reported no plan to act on early warnings at the local level. To improve preparedness and respond to the warnings received at the local level, all local governments need such plans to act on early warnings.

Indicator G-5 is related to risk information and assessment. Only 3 out of 17 countries have available disaster risk information and assessment for their defined major hazards. Myanmar reported the existence of risk information and assessment for seven major hazards. The data demonstrates that Myanmar has high-quality risk information and assessment systems against cyclones, earthquakes, floods, heavy rainfalls and tsunamis.

Indicator G-6 relates to population protected through pre-emptive evacuation following early warning. This indicator can measure a positive aspect of evacuated people with a focus on saving lives. However, data collection and reporting against this indicator is a challenge. Among six reporting countries, only the United Republic of Tanzania reported data for this indicator, while another three countries reported nothing and the other two reported partially on the number of people protected through pre-emptive evacuation (or a proxy as evacuated people).

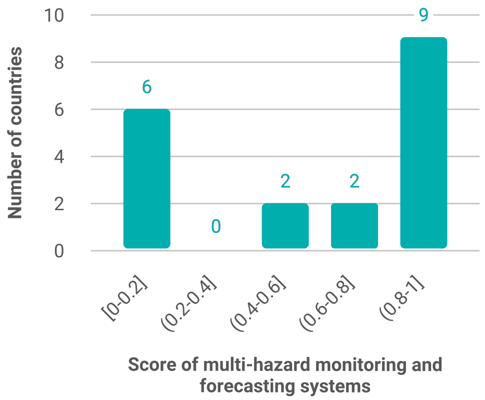
Several countries reported their recent progress on improving their MHEWSs from 2015 to 2017. For example, Czechia has improved monitoring and forecasting systems and risk assessment against drought from 2015 to 2016, which can be observed by increasing scores of G-1, G-2 and G-5. The United Republic of Tanzania has continuously improved its MHEWSs over this period in all areas of the four key elements. It is piloting implementation of MHEWSs, which can provide warning information on natural hazards such as extreme temperatures, landslides, floods, strong winds and storm surges/tsunamis. Progress is reflected in increasing scores on the five indicators G-1 to G-5.

Figure 8.37. Number of countries reporting on Indicators G-1 to G-5

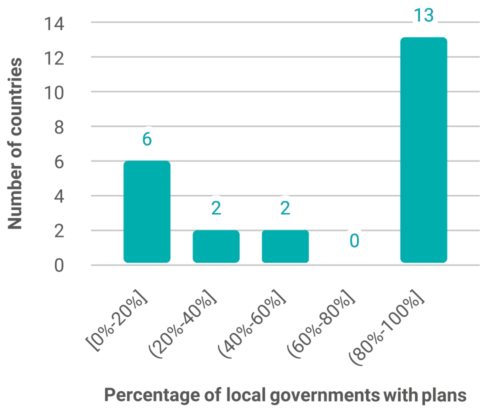


(Source: UNDRR data)

(G-2) Number of countries by score of multi-hazard monitoring and forecasting systems



(G-4) Number of countries with local plans to act on early warnings



8.6

Conclusions on the first reporting data for Sendai Framework Targets A–G

This GAR is informed by the latest disaster data available and infers early lessons on where the global disaster risk landscape currently stands. In terms of data infrastructure, there has been growing awareness since 2015 on the need for better and more comparable data, and SFM represents a unique opportunity to streamline interoperable data on disaster losses. While the observed period is still too short to reach definitive conclusions on a global scale, it is possible to observe certain patterns in terms of magnitude, geographic and socioeconomic distribution of disaster impacts and abstract several departure points of where and how countries have managed to do better in reducing disaster risk:

a. In the broader picture, in terms of losses, there are severe inequalities of burden sharing between low- and high-income countries, with the lowest-income countries taking the highest toll and greatest costs of disasters. Asset and human losses tend to be higher in countries that have the least capacity to prepare, finance and respond, such as SIDS. However, the good news is that there has been an increase in the percentage of reporting containing economic loss data, for all income groups, particularly in the last four years, in contrast to former declining trends.

b. Mortality relative to population size has declined in the long term. However, since 1990, 92% of mortality attributed to internationally reported disasters associated with natural hazards has occurred in low- and middle-income countries, persistently concentrated in the Asia–Pacific region and Africa.

c. Geophysical hazard events (e.g. earthquakes and tsunamis) have taken the highest toll on human lives. Occurrences of reported disasters associated with biological hazards have decreased, while the number of disasters associated with natural hazards has slightly increased, over the past two decades. In terms of affected people, multi-hazard disasters affected 88 million people in SFM countries, followed by floods affecting 76 million people, in the period 1997–2017.

d. Disasters stemming from natural hazards have displaced an average of 23.9 million people each year over the last decade.[67] Disasters – the main triggers of forced displacement recorded – show no signs of decreasing.

e. Intensive risk continues to dominate fatalities, but the participation of extensive risk in mortality seems to be increasing. Most economic losses in the period 2005–2017 were caused by disasters associated with extensive risk, with 68.5% of all economic losses attributed to extensive risk events. With disasters becoming increasingly frequent, the cumulative damage, especially for people living in poverty, is often greater for extensive disasters such as droughts, than small- and medium-sized shocks that deliver low intensity but more frequent and recurrent shocks.

f. In line with the analysis in previous GARs, extensive risks represent an ongoing erosion of development assets, such as houses, schools, health facilities, roads and local infrastructure. However, the cost of extensive risk continues to be underestimated, as it is usually absorbed by low-income households and communities.

g. Weather-related hazards take the lead in economic losses, with floods being the costliest hazard, followed by earthquakes. Meanwhile, losses in the housing sector account for two thirds of total economic losses.

h. Losses in agriculture, the second most-affected sector, are again significantly higher and more persistent in low- and low–middle-income countries, with increasing frequency and severity of floods, droughts and tropical storms. The relationship between drought and agriculture deserves special attention, as 84%[68] of the damage and losses caused by droughts resides therein. Beyond the obvious production losses, disasters have a significant impact on rural livelihoods, food value chains, trade flows of agricultural commodities, and food and non-food agro-industries. Initiatives to support diversification of livelihood opportunities, farm and non-farm activities, and more sustainable (self-) employment are critical. Expanding financial inclusion, providing social protection and adaptive safety nets, contingent finance and forging ownership by supporting rural communities to invest their savings into economic ventures of choice can place households in a better position to cope with disasters and build back better.

i. Financing for DRR has been highly volatile, ex post and marginal. A total of $5.2 billion for DRR represents 3.8% of total humanitarian financing between 2005 and 2017 – less than $4 for every $100 spent – a marginal fraction of the total amount. Global funding requirements are increasing, while the national and international capacity to address them is not growing in proportionate terms, leaving millions of affected populations behind.

j. Member States reporting on the status of their national and local DRR strategies are gradually increasing, yet improvements for a full coverage on a global scale are to be made, one year ahead of the deadline.

k. Economic losses from disasters totalled $75 billion in 2017 (UNDRR data), and over $300 billion from other sources (Munich Re and Swiss Re). The $75 billion estimate of the average annual losses deviates substantially from other observations, as data is imperfect and disasters remain significantly non-/underreported, compromising accurate calculations of the true impacts of disasters. Eleven years ahead of the 2030 deadline, a sense of urgency should be injected into improving reporting across indicators and targets, enabling the engineering of evidence-based solutions for disaster-affected populations.

l. While useful for illustrating the stocktake of average losses, average estimates often fail to provide finer details on how disasters affect people's lives. In absolute terms, high-income households lose more because they have more to lose, and those losses are more visible because they tend to be insured and better reported. Previous GARs have repeatedly argued that what matters most in disaster loss analysis is the proportion of income or assets lost, as the severity of losses depends on households and how they experience disasters.

m. This GAR argues that as data-collection efforts across different global frameworks are embarked upon, it is necessary to look at indicators afresh across goals and targets. It is also necessary to establish metrics for those dimensions of disaster impacts that accrue to the most vulnerable by delving deeper into distributional analysis, moving away from regional, national and subnational data to the household level. The goal is to first learn in finer detail how disasters affect people's lives in a systemic way and then support countries to engineer solutions and influence human behaviour to successfully rebound from disasters.

67 (Internal Displacement Monitoring Centre 2019)

68 (FAO 2015b)