Chapter 9: Review of efforts made by Member States to implement the Sendai Framework

The Sendai Framework represents a risk-informed approach to sustainable development and is closely associated with specific demands regarding data collection and analysis. Renewed commitments and demand for robust and evidence-based guidance on DRM require the transformation of behaviour and practice in multiple dimensions. These include data, policy, planning protocols, collaboration mechanisms for effective decision-making, and technical and functional implementation capacities. The data requirements to meet these goals require coordination among relevant stakeholders, which has traditionally not been a reality.

The 2017 Sendai Framework Data Readiness Review, with contributions from 87 countries, assessed countries' readiness to monitor and report, in addition to the availability of national disaster-related data and requisite gaps in terms of financial resources and technical expertise. Within the group of countries participating in the review, a quarter reported no or only preliminary progress on national and local DRR strategies and plans aligning with the Sendai Framework (Target E), 72% reported medium to substantive progress on alignment and 3% reported full implementation. The review concluded that effective reporting of progress towards the global targets of SDGs and the Sendai Framework would require the use of multiple types of data, including EO and geospatial information. Advances in national reporting and data-collection practices offer useful standards, tools and approaches to guide countries efforts in bridging the gap between where they are today and where they need to be to support the goals of the Sendai Framework.

9.1 Disaster loss databases

The Sendai Framework and its predecessor, HFA, have explicitly recognized the importance and usefulness of collecting loss data as one of the actions that will help countries to increase knowledge about the risks they face. In addition to the loss data for Targets A–D outlined in the previous chapter, Sendai Framework Priority 1, Understanding disaster risk (para. 24), suggests that Member States:

> ***(d)*** *Systematically evaluate, record, share and publicly account for disaster losses and understand the economic, social, health, education, environmental and cultural heritage impacts, as appropriate, in the context of event-specific hazard-exposure and vulnerability information;*
>
> ***(e)*** *Make non-sensitive hazard exposure, vulnerability, risk, disaster and loss-disaggregated information freely available and accessible, as appropriate;*

The text of the Sendai Framework (para. 15) states:

> *The present Framework will apply to the risk of small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters caused by natural or man-made hazards, as well as related environmental, technological and biological hazards and risks. It aims to guide the multi-hazard management of disaster risk in development at all levels as well as within and across all sectors.*

There are several consequences of the wider scope of the Sendai Framework. The explicit recommendations of Priority 1 on loss data collection, and that the global indicators for Targets A–D require loss data, mean that countries are strongly encouraged to account systematically for disaster losses and damage for a wide spectrum of disaster scales and a broader set of hazards. For over a decade, UNISDR has been working with Member States to promote disaster loss accounting. Systematically accounting for losses translates, in technological terms, into the creation of national disaster loss databases that can record many loss indicators for disasters, at all scales, in a disaggregated manner. Priority 1 recommendations go even further, suggesting these databases and information should be publicly accessible.

While there are some reputable global disaster loss databases such as EM-DAT, NatCat from Munich Re, Sigma from Swiss Re and others,[69] it is important to note that any reporting process to the Sendai Framework Monitoring system has to be based on officially endorsed data, collected and validated by national governments. This data should comply with the requirements of the Sendai Framework. It should address small- and large-scale disasters, and slow- and rapid-onset events, cover a large number of hazards (including man-made hazards) and, most importantly, record data for a set of global indicators, some of which were not available in the global loss databases.

Furthermore, for effective implementation of the recommendations of the Sendai Framework, databases should be built gathering geographically disaggregated data that has to be usable at a subnational scale. As a minimum, data in the disaster loss databases should be disaggregated by event, hazard and geographic area. Aligning loss databases with the SDG principles, countries are encouraged to pursue even higher levels of disaggregation (by recording differences in socio-economic impacts based on sex and gender roles, household level, etc.). People experience disasters differently, even within the same household. Traditional measures are not able to capture these variations because metrics stop at the national, subnational or even household level. While data

69 (Centre for Research on the Epidemiology of Disasters 2018)

remains sparse, there is evidence that women and children are disproportionally affected by disasters in some – but not all – countries. Therefore, more surveys are needed to capture the underlying risks that can include, but go beyond, gender and age divides and inform policies on such disparities.

Box 9.1. Methodological aspects of statistical analysis of the first reporting years: outliers, and statistical strength in trends and recommendations for further research

The first review showed the need for more detailed, well-structured disaster loss databases at the national level, to enable measurement of outcomes under Targets A–D. This will be an area for focus on capacity-building and institutional coordination at the national level in the coming years. Such systems are valuable tools and data sets in their own right; they will contribute to a better understanding of risks and disaster impacts globally and at national level.

Methodological advice on disaster data and trends

Trend analysis is susceptible to manipulation to obtain desired results, especially when the data being analysed contains either highly dispersed values or outliers (i.e. data points that are much higher or lower than average). When data series contain dispersed values or outliers, there is high uncertainty that must be accounted for when analysing trends and reaching conclusions.

For example, patterns of economic loss from disasters may show a general trend towards growth or decrease over a certain period, but this pattern could be driven by the occurrence of large-scale disasters near the beginning or end of the series. In many respects, infrequent large-scale events can be viewed as outliers, compared with extensive risk events that are at a smaller scale, recurrent, more frequent and show more solid trends. Changing the number of years displayed, and including or excluding these outliers, can result in trends that look markedly different.

Good statistical analysis requires data covering an appropriate period. In general, the longer the period of the data sample, the more reliable the conclusions (and the lower the uncertainty). The Sendai Framework targets specify a period of time that starts in 2005 and carries on until the end of the period of the Sendai Framework in 2030 for analysis. The initial period, from 2005 to 2015, referred to as the baseline, is suggested for Targets A and B, but it is highly recommended that Member States produce data for all four loss-based targets over the baseline period.

Nevertheless, a period of 10 years (the baseline) or even the full 25-year timespan for the reporting exercise of the Sendai Framework are still short periods of time, which will probably not provide enough statistical strength to determine trends in a conclusive manner.

Another factor that deeply affects the quality of a trend analysis is the quality and completeness of all the data points across the sample. Unfortunately, in the case of the baseline, countries will need to conduct historical research going back in time to 2005, at the minimum, and ideally even further back, to reduce the uncertainty of the analysis. Gathering all this past data on the quality and completeness will be a challenge for Member States. In many cases, no data collection was put in place that would guarantee homogeneous gathering of all the data required.

Outliers and misleading trends

Outliers 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. This is particularly true for earthquakes. As a result, upward trends are more likely to be found if the outlier is in recent years; equivalently, downward trends are more likely to be found if the outlier event happened in earlier years.

Missing data in earlier years and upward trends

Trend analysis depends on the length of period being analysed, which should be as long as possible. In cases where quality of data is a challenge, taking a look at shorter periods of time when data availability and quality is better, might result in a more reliable analysis. Missing data points are more common in earlier years. Therefore, by taking absolute values by year, upward trends may be found that are the result of more data points being available in recent years. For example, data quality and coverage have a significant effect on determining trends of losses. In this case, recognizing that not enough good data exists for the years under review, thus underestimating losses that occurred far in the past, makes more recent losses appear relatively higher.

From the perspective of the international community working towards reduction of disaster losses, the need for data triggered by the Sendai Framework and the SDG monitoring processes represents a unique opportunity to build a bottom-up global disaster loss database. This would catalyse the process of global consolidation of data required to assess the progress in achieving the targets and consolidate a holistic, solid, evidence-based framework for DRR. From a country perspective, national disaster loss databases increase the capacity of countries to understand their risks and provide a solid evidence base upon which to assess and address their disaster losses and impacts, particularly those associated with climate and weather-related hazards. More specifically, loss databases may help to significantly improve the understanding of how disasters and risks affect the most vulnerable and could be a basis for better understanding trends in climate variability impacts and their true magnitude. The common aspirations of the global, national and subnational disaster risk community call for a better structured, effective, coordinated and harmonized way of collecting disaster loss data, alongside corresponding reporting

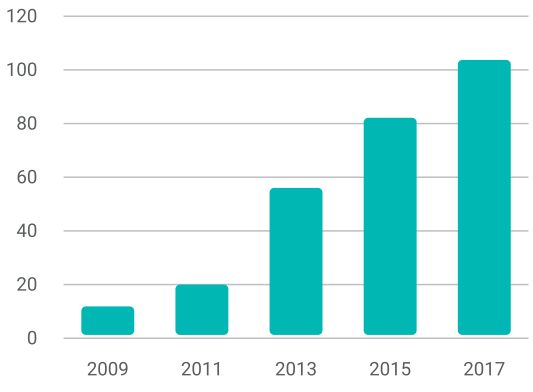
The landscape of disaster loss data is complex, as countries follow disparate approaches to collect, code and analyse data. Recent studies of the JRC Working Group[70] show that within the European continent, there are disparities in the types of data indicators, thresholds, hazards and resolution of data collected (which may range from building or asset level to national aggregates), including data-collection procedures. For example, some European countries collect data at the building/asset level for the purposes of compensation. In Spain, compensation from official funds in data is collected by the Defensa Civil Española, or in France from insurance policies with data collected by l'Observatoire National des Risques Naturels. Other countries such as Australia and Canada have developed property and publicly accessible data sets, with the same caveat of smaller sets of indicators. Those databases that are focused on financial compensation usually lack disaggregated human loss indicators, or even some of the main human loss indicators such as numbers of people injured or made ill.

70 (Marin Ferrer et al. 2018)

Despite the initial expectations that information-rich countries could easily comply with all of the requirements for the Sendai Framework Monitoring system, preliminary evidence demonstrates that most developed countries do not have integrated loss and damage information systems due to the large number of data sources that provide scattered sector or hazard-specific information. Even where national databases exist, they do not always contain most of the indicators required in OEIWG recommendations. Available databases, for example, in Australia, Canada and the United States, or other property loss databases, contain only a limited subset of the indicators proposed; a similar situation has been found in some European countries. For instance, no indicators are collected around critical infrastructure, injured/ill persons or affected people in many of these databases.

In most known loss databases, no matter their origin, software or age, there is little or no disaggregation of human loss data by sex, age or other criteria requested by the SDG data disaggregation work stream.

Figure 9.1. Number of countries covered in the DesInventar Sendai repository, 2009–2017



(Source: UNISDR)

As Member States continue their commitment to build, improve and align these loss databases, a consolidated global data set could be feasible within a few years. UNISDR has already been conducting consolidation exercises with data from a growing number of countries to build the data sets used for analysis posted in GARs. Starting with 12 countries in GAR09, then 21 in GAR11, followed by 56 in GAR13, 82 in GAR15 and now, for GAR19, a consolidated data set contains data for 103 countries.

9.2

Successes and challenges in establishing national monitoring capabilities

9.2.1

Expectations of Member States for monitoring Sendai Framework implementation

To understand the successes and challenges of Sendai Framework monitoring, it is important to put into perspective what Member States are expected to do, in terms of establishing the institutional mechanisms that are required to undertake reporting as well as substantive information to be collected and shared through the system. Though the Sendai Framework Monitoring system has many functions that are common to a standard reporting mechanism related to any area of international development, it also has certain distinctive points owing to the cross-sectoral nature of DRR.

Institutional structure

The first steps to be undertaken in the Sendai Framework monitoring process are to nominate a focal point for Sendai Framework monitoring, select institutions involved in the monitoring process, and define the roles and responsibilities of the selected institutions.

Every Member State is expected to nominate a main focal point for monitoring its implementation of the Sendai Framework and formally inform UNISDR. The focal point then has to undertake a selection of national institutions that will be engaged in the monitoring process. This enhances a decentralized and systematized process of monitoring through data sharing among various ministries and departments. It is also possible for the designated focal point to bring in institutions outside its jurisdiction, if deemed necessary for the monitoring progress. The last step involves the designation of roles to the individuals nominated by the selected institutions. Roles can include:

a. Coordinator: This role is usually assumed by the national Sendai Framework focal point. S/he has the responsibility of setting up national reporting for the global targets, which includes adding institutions/users, configuring metadata, and for custom reporting, setting up nationally determined targets and indicators. (Metadata refers to the additional demographic and socioeconomic parameters needed as an input into SFM by each country for calculations to be performed according to the technical guidance for monitoring and reporting on progress in achieving the global targets of the Sendai Framework, for example: currency foreign exchange rate, GDP and population.)

b. Contributor: Representative of institution assigned different indicators as per the area of focus of their parent institution. The main responsibility is to enter data for the indicators assigned.

c. Validator: This responsibility is usually held by the parent institution of the Sendai Framework focal point, but could be held by others as well. It is usually held within the government and at a high level of seniority. Only after a validator validates the data is it publicly available in the online system (under the analytics module).

d. Observer: An optional function that allows the holder to observe and make comments on the data entered. However, it does not come with rights for editing. Hence, this function could be held by any institution within or outside the government.

Technical requirements

Different institutions are made responsible for reporting against one or more of the 38 global indicators or national custom indicators based on the above-mentioned structure. Unlike the reporting process for HFA, there are no established cycles in Sendai Framework Monitoring. However, there are usually two milestones when a snapshot is taken: (a) every March, contributing to the SDG monitoring reporting in HLPF for global Targets A, B, C, D and E and (b) in October for GAR in one year or a stocktake of the reported progress in the other year, for all Targets A–G. In addition, each Member State is expected to develop its own set of nationally determined targets and indicators for implementing the custom reporting. However, the reporting requirements on this are the prerogative of the Member State and can be adjusted according to the needs and requirements of national DRR strategies.

Through a rigorous process of consultation, UNISDR has developed guidelines that are publicly available in all United Nations languages, including information on minimum data sets required, recommended optimal data sets (including disaggregation), challenges, temporal considerations, computation methodology (minimal to recommended data sets) and metadata: contents, methodology and other topics (coverage, representativeness and quality).[71] These technical guidance notes form the basis for the reporting process but allow parameters to be defined within their national contexts.

71 (UNISDR 2018b)

9.2.2

Successes in establishing national capabilities for monitoring Sendai Framework implementation

This section presents the successes that have emerged since the launch of the Sendai Framework Monitoring on 1 March 2018, regarding the scale of reporting, engagement of NSOs, capacity-development efforts, and cross-sectoral, multi-stakeholder partnerships in data collection and monitoring procedures.

Scale of reporting: nothing succeeds like numbers

The success of Member States in developing capabilities for the Sendai Framework Monitoring system can be gauged from the number of countries that have reported since the launch of the Sendai Framework Monitoring until the time when a snapshot of data was taken in October 2018. During this period, 80 countries reported on one or more of the reporting years since 2015. In addition, there are many others who have established the institutional structures described above. A review of these structures shows that 43 of the Member States have three or more ministries and departments to whom one or more of the roles have been assigned in the online system.

In terms of country reporting against at least one target in each of the years, there is an upward trend, with the number of countries gradually increasing from 43 to 75 countries between 2015 and 2017, against at least one target in each of the years.

Engagement of national statistical offices: vital statistics

Monitoring and data collection should be embedded in NSOs and support a culture of evidence-based learning at the national and subnational levels.[72]

As the gatekeepers of social, economic and environmental statistics, NSOs are well positioned to respond to important data needs arising from the Sendai Framework, the 2030 Agenda, the Paris Agreement and other global initiatives.

The integration of metrics for the global targets of the Sendai Framework within the global indicator framework for SDGs provides the opportunity for many of the aspects to be addressed as part of countries' broader follow-up to the 2015 agreements. An appetite for joint analysis and development of applied information has been observed in many countries.[73] Some Member States have brought in NSOs as one of the key contributors in their monitoring system, demonstrating the need for rigorous evidence to respond systematically and consistently to the requirements of the Sendai Framework.

Capacity development for monitoring: mastering the skills

The new Sendai Framework was developed in a consultative manner following calls by Member States for a more robust, comprehensive quantitative framework. As recommended by OEIWG, steps were taken by UNISDR while developing the monitor:

- The overarching finding of the Sendai Framework Readiness Review (a comprehensive survey among Member States) was that almost no country had the necessary capacities and subsequent functions to report against all the targets. In response, the technical guidance notes were developed to serve as a road map in support of Member State data consolidation efforts.
- Countries have been supported by trained personnel since the launch of the monitoring system, with different approaches in each region. The African Union Commission led the charting of a road map through its Africa Working Group on DRR at a policy level. Regional Economic Communities also committed themselves to supporting their Member States in the monitoring process. In 2018, the Intergovernmental Authority on Development (IGAD) organized an event in June, the Southern African Development Community (SADC) in August and the Economic Community of West African States (ECOWAS) in November. In the Asia–Pacific region, subregional training was complemented at the national level, hosted by the Member States (subregional training involved two to three key officials from focal institutions, including the National Disaster Management Agencies and NSOs, while the national ones brought in representatives from virtually every ministry or department responsible for sharing the required data).
- Development of an online e-training module to support Member States in encouraging self-learning of assigned staff members in their focal ministries and departments. It is designed with the incentive of certification for trained personnel, and will also incorporate refresher courses as required, to ensure that the trainees have cutting-edge knowledge of the periodic improvements envisaged in the Sendai Framework Monitoring system.

Strategic approach to capacity development

The Sendai Framework recognizes a State's primary role in facilitating the achievement of its DRR goal and priorities and highlights the criticality of sharing these responsibilities with other stakeholders and realizing a participatory approach. To support this approach, United Nations Member States have identified a need for implementation support and enhancement of the capacity of institutions and individuals dealing with DRR. Without adequate capacity, it will be challenging to implement the Sendai Framework.

With the aim of guiding sustainable capacity development for Sendai Framework implementation, the UNISDR Global Education and Training Institute began facilitating consultations with Member States, stakeholders and partners towards a Strategic Approach to Capacity Development for Implementation of the Sendai Framework for Disaster Risk Reduction – a Vision of Risk-informed Development by 2030.

Consultations resulted in refinement of language, and Member States and other relevant stakeholders re-emphasizing the driving principles for effective capacity development for DRR, including that efforts are nationally owned and coordinated. Importantly, the strategic approach generalized advice on the capacity-development roles and responsibilities of various DRR stakeholders, provided high-level guidance in six critical areas of need, and validated proposed "anchors" to help strengthen and institutionalize capacity development.

The strategic approach is a guidance document that aims to reflect changes in needs and trends over time, envisaged to capture and share lessons learned, best practices and examples over time. Among the next steps for its implementation are orientation and awareness-raising for all, pilot testing, development of a monitoring, evaluation and learning mechanism for its implementation, and development of capacity development "marketplace" guidance for adaptation at various levels. Capacity development is a long-term process that should be included in the implementation plans of DRR strategies, to effectively support the implementation of the strategy and realize the Sendai Framework.

Engagement of multiple departments and stakeholders: leaving no one behind in monitoring

Sendai Framework monitoring calls for a new way of thinking when it comes to national reporting on DRR. In the HFA era, the national disaster

72 (Peters et al. 2016)
73 (United Nations 2017a)

management organization (NDMO) assumed responsibility for submitting the required information in the HFA monitor. The reporting was a centralized exercise conducted under the authority of NDMOs. Many NDMOs established an offline coordination process, which, in most cases, involved the National Platform for Disaster Risk Reduction as the multisectoral and multi-stakeholder mechanism for coordination in this area of work. However, it was still the primary responsibility of NDMOs to compile the reports and feed into the HFA monitor.[74] SFM provides a different approach to data sharing and information management. It presents the opportunity to assign different roles to various ministries as per the indicators accorded to them for data-collection purposes. For example, while the Ministry of Agriculture could focus on the economic losses of the sector in Target C, the Ministry for Health and the Ministry for Education could contribute data for the related infrastructure in Target D. However, it should be noted that responsibility of data provision must be distributed in a structured manner within established limits to ensure qualitative rigour and timeliness of reporting.

In addition, governments are not the sole producers of data. Private companies, universities and other third-party actors may offer complementary sources of data useful for augmenting or validating the official reporting system.[75] In line with this, several Member States have brought their international and national development partners in as observers or contributors. Building interoperability and comparisons into existing reporting and data-collection systems may also enhance such partnerships for a wide range of purposes supporting global frameworks on sustainable development.[76]

9.2.3

Challenges in establishing national capabilities

This section identifies the challenges that Member States are experiencing in reporting against the indicators of the seven global targets of the Sendai Framework. Challenges relate to data management through sequential phases of collection, validation, storage and analysis, proposed baselines for analysis, as well as overall institutional capacities in monitoring and reporting as they emerge from different country experiences.

Data is at the core of the monitoring process. The United Nations Secretary-General's Independent Expert Advisory Group (IEAG) on the data revolution has suggested nine core principles that should be common to all actors contributing data to the measurement of sustainable development.[77] With regard to the Sendai Framework, the initial years of reporting point to the following challenges:

- **Data availability.** This includes collection practices, organizational culture, data-sharing mechanisms or the lack thereof, cost (e.g. of establishing collection systems, housing data and purchasing data), private sector proprietary concerns and data governance. Critical data gaps exist in specific areas of disaster loss, in all areas of international cooperation, and for many aspects of early warning, risk information and DRR strategies.
- **Data quality.** The implementation, monitoring and reporting of the Sendai Framework and the 2030 Agenda is predicated on the generation and provision of, and access to, high-quality disaster-related data that will allow effective collation, comparison and analysis by Member States and other stakeholders, within a country context, as well as among countries and regions. This will become all the more challenging without the application of commonly agreed methodologies and quality standards. Some NSOs are exploring the integration of open EO data and statistical data in existing decision-making structures. The complementarity of EO with traditional statistical methods means that EO can offer validation options of in situ data measurements (e.g. survey and inventory data), can communicate and visualize the geographic dimensions and context of SDGs and Sendai Framework indicators, and, where appropriate, provide disaggregation of the indicators.
- **Data accessibility.** Data sharing among government institutions is a cause of concern for several countries. A minority of agencies have a set procedure in place for data access. Even if informal exchanges occur, publication or secondary use may be difficult without official authorization. However, as reflected in the above paragraph on the division of labour among relevant ministries, some Member States are beginning to set up mechanisms of data sharing that facilitate comprehensive reporting in SFM.
- **Application of data.** While sustained investments in data creation and management are necessary, the ultimate value of information is not in its production, but in its use. To ensure the appropriate application of data, there is a need for data to be generated with users in mind. Herein lies one of the critical challenges that Member States face with the uptake of data and translation of information into actionable policies. Data providers often underinvest in operational tools supporting the translation of information and oversee the importance of engaging with those in a position to use data and drive action, thus compromising opportunities for uptake.

The need for collective effort in enhancing aspects of data availability, accessibility and quality has been recognized by some key communities such as NSOs, and national mapping and geo-information agencies. Unless gaps in data availability, quality and accessibility are addressed, countries' ability to ensure accurate, timely and high-quality monitoring and reporting of implementation across all targets and priorities of the Sendai Framework will be severely impaired.[78]

Disaster loss accounting: working behind the scenes

Processes and methods involved in the collection of loss data is a complex task, with the involvement of technical and non-technical inputs, as well as partners from a range of different disciplines. Even though having a disaster loss database has not been made compulsory by the Sendai Framework, a loss accounting system without an event-wise recording of events would lack credibility. Some of the key challenges related to the output-oriented indicators are as follows:

- Not all countries systematically collect disaster loss and damage data, and even fewer integrate this data into official national statistics.[79]
- Several disaster loss databases exist, but they face challenges such as standardizing data-collection processes, missing data, and inconsistent economic valuations of physical damage and losses.[80]
- There is a lack of simple loss data reporting procedures and common language to ensure the standardization of loss data collection, comparability, recording and reporting across countries. Even where loss accounting systems exist, they may be in the non-governmental domain and thus not officially endorsed as required for Sendai Framework monitoring purposes.
- Most of the countries responding to the Global Readiness Review collect a critical mass of disaster loss data (Targets A–D, more so for A and B). The practice of disaster loss accounting was said to be well established in many countries; however, data sets are typically more available on physical damage and human impact, and less available on economic losses,

74 (UNISDR 2013a)
75 (Murray 2018)
76 (Migliorini et al. 2019)
77 (Espey 2017)
78 (United Nations 2017a)
79 (Fakhruddin, Murray and Maini 2017)
80 (Fakhruddin, Murray and Maini 2017)

livelihoods, losses of specific assets and infrastructure, cultural heritage and disruptions to basic services.[81]

- Multiple taxonomies for hazards exist, including the Integrated Research on Disaster Risk (IRDR) peril classification[82] and Cambridge taxonomy of threats for complex risk management.[83] Controlled vocabularies are an essential component of technical data standards, as they provide a precise and agreed definition of what is being measured or counted.[84]
- In relation to classification, among hazard types, a system for naming individual tropical cyclones has been widely adopted only at the international level. At the same time, expansion of a system for assigning unique identifiers across multiple hazard types introduces some challenges (e.g. lack of creation of internationally recognized mechanisms for identifier generation, procedures for reconciliation of identifiers for events affecting multiple countries and adoption of standard operating procedures).[85]
- Lastly, 40% to 60% of countries reporting in the Global Readiness Review felt they could develop a baseline for most indicators for the disaster loss-related Targets A–D, though much fewer could do so for critical infrastructure, disruptions to basic services, losses to productive assets and the housing sector.[86]

Disaggregation of data: more is less

Even though disaggregation has not been made compulsory by the Sendai Framework, Member States are encouraged to provide as much disaggregation as possible against the different criteria established in support of each of the global indicators. The key theme "leave no one behind" recognizes that the dignity of the individual is fundamental and that the 2030 Agenda's goals and targets should be met for all nations and people and for all segments of society. Ensuring that these commitments are translated into effective action requires a precise understanding of target populations. Disaggregation of indicators, where relevant, by income, sex, age, race, ethnicity, migratory status, disability, geographic location and other characteristics is essential in measuring vulnerabilities of affected populations. Aggregated data may mask inequalities within vulnerable groups that, unless disaggregated, will remain hidden to policymakers. Paying closer attention to the differentiated vulnerabilities of people requires data and analysis that zooms in on specific groups in finer detail. Different levels of disaggregation are useful depending on the context. Household data is widely used in examining, monitoring and evaluating the impact of disasters at the micro-level and informing policy development accordingly. Policies and nationwide programmes may necessitate data at the national or regional level, while interventions wishing to alter poverty and vulnerability dynamics at the household level (e.g. elderly, women and children) require data collection at the individual level.

Significant efforts in this regard are being made for the indicators of SDG 1 on poverty eradication. The international household survey network, demographic and health surveys, multiple indicator cluster surveys, as well as regional initiatives such as the Africa Household Survey Databank, the Latin American and Caribbean Household Survey Databank, are promising examples. They offer opportunities for cross-sectoral data collection, tackling the interfaces of systemic global challenges.

Baselines: going back in time

Progress and change can be monitored only if there is a baseline. For example, in the Sendai Framework targets, countries are expected to report on human-related loss data for the period 2005–2015 to enable comparison with data from 2015 to 2030, per 100,000 population. However, the collection of historical loss data will require an investment of time and resources and may not be possible for countries lacking the necessary data infrastructure. The GBD study led by the Institute for Health Metrics and Evaluation is a potential resource to understand trends in disaster-related mortality. It is the most comprehensive worldwide epidemiological study in existence, with a description of mortality from a variety of causes at global, national and regional levels. The extraction of baseline health measurements for some SDGs from GBD is already being explored. Capitalizing on and maximizing use of complementary data sets monitoring disaster loss data is critical for: (a) data comparability and (b) a nuanced understanding of more accurate benchmarks as points of departure if commitments under the Sendai Framework and the 2030 Agenda are to be realized.

Adapting to expected institutional mechanisms

Despite robust steps by many Member States, there is still room for improvement in terms of political recognition and active engagement for improved alignment of the different global frameworks in national planning. It will be necessary to demonstrate the synergies among the frameworks and efficiencies that can be realized in ensuring coordination by integrating, for example, Sendai Framework discussions into SDG data when advising at the country level.

In addition to this, political will and sustained funding is also required to enhance investment in the required data infrastructure. Raising awareness with national and subnational governments on how the different frameworks align is also critical. Given the higher international and political profile of SDGs, the SDG community needs to be sensitized to the Sendai Framework and actively consider coherence with the framework as it advocates for SDG data system improvements. This combination will serve to reduce fragmentation and duplication.[87] The criteria for portfolio development in donors and regional development banks should recognize and reward initiatives designed in ways that deliver progress on multiple resilience goals and targets.[88] Some countries have also set up committees comprising national stakeholders to identify data holders and gaps in data needed, which should be coordinating with SDGs as and where available.

SFM provides an opportunity for a shared approach to monitoring and related reporting. However, given the need for interministerial policy decisions and associated administrative steps, it has not been easy for countries to establish this institutional structure within a short period of time. This has led to some countries reverting back to HFA procedures of soliciting offline information and opting for a centralized data management process. As a result, sometimes the dilemma has been that Member States that did not focus on establishing a decentralized institutional mechanism may have progressed faster in their reporting commitments, while those that put extended efforts into developing the new institutional structure as per SFM may have done so at the cost of a delay in their reporting in the system.

Problems encountered in the first year

SFM is expected to have a lifespan of 12 years. At the time of writing this GAR, it has been launched for about a year. It was launched in a phased approach where different modules were released over time. There was a period of learning as the online tool was rolled out and gained more users. However, nomination of the country focal points has also taken time in many cases, and there has been a high turnover in the focal agencies and their staff, requiring retraining orientation of new staff.

81 (United Nations 2017a)
82 (IRDR 2014)
83 (Coburn et al. 2014)
84 (Fakhruddin, Murray and Maini 2017)
85 (Dilley and Grasso 2016)
86 (United Nations 2017a)
87 (Murray 2018)
88 (Peters et al. 2016)

Over 600 users now have access to the system, with different kinds of roles. However, it cannot be assumed that all users become conversant with the system with equal ease. Even when information is available within the government domain, there is still a period of time needed to ensure its smooth transition into the desired formats of the monitoring system. In fact, to assume the assignment of these roles is a mere technical function would be a gross underestimation. Even if within the monitoring system it is a simple matter of filling a form, in the context of the government's procedural requirements, the efforts and commitment behind it cannot be overemphasized. This is another process that requires dedicated time and must be undertaken at the outset.

SFM is an online tool, and is therefore highly dependent on broadband Internet access. Thus, the differential bandwidth among regions and even countries within the same region, was a fundamental issue, as expected in any online reporting mechanism. Though part of this is a broader challenge of connectivity, the substantial reporting from some of the developing countries is a testament to how they have not let such constraints inhibit their commitment to accountability.

Translation of content into the languages of the United Nations has taken time and has sometimes been conducted in a staggered manner. Moreover, translation is not a one-time phenomenon, as the deployment of each new module (including in multiple languages) requires a similar feedback loop. This enriches the software, making it progressively easier for users to record their data.

9.2.4

Reporting by targets: trying to be on target

There are several target-specific challenges that Member States may be facing while reporting against the indicators of each of the global targets. This requires further technical discussion on those issues that have been highlighted in the technical guidance for monitoring and reporting on progress in achieving the global targets of the Sendai Framework. One of the main considerations OEIWG made in its report[89] was that Member States agreed that countries may choose to use a national methodology or other methods of measurement and calculation to measure the key parameters of individual targets, especially for Targets A–D. However, OEIWG also recommended that countries keep the metadata consistent if the methodology is changed.[90] For the purposes of this GAR, some of the key issues are outlined below.

Target A

As described previously, this target is related to reduction of mortality by 100,000 population in the decade 2020–2030 as compared to 2005–2015. Some issues related to the estimation of mortality are as follows:[91]

- Determining which deaths are relevant and comprehensively attributable to disasters is complex; alongside the direct impact of a hazard on health, there are many indirect pathways to mortality.
- The time periods between the exposure to a hazard and death can vary widely. The disruption of care for chronic conditions and onset of persistent stress can lead to a greater disease burden or deaths that may not occur for months or years after a disaster.
- Data availability is not uniform across the world. WHO regularly receives cause-of-death statistics from about 100 Member States, yet two thirds (38 million) of 56 million annual deaths are still not registered.
- Though all countries are vulnerable to disasters and loss of life, there is generally a higher exposure to disasters and the risk of death in low- and middle-income countries, which often coincide with those lacking vital registration data, further magnifying the data gap.
- Populations are mobile across country borders, causing challenges in accounting; it has been suggested that each death should be counted in the country where the death occurred, regardless of the nationality of the dead person.[92]
- Most vulnerable people, including illegal migrants, tend to be unrecognized by authorities; thus, the real number would be higher than that reported.
- As reported by some Member States, data disaggregation is a challenge that requires systematic records of disaster losses per hazardous events. In spite of addressing this in the target, it is difficult to obtain baseline data without disaster loss accounting systems from the respective period.

A disaster loss accounting system that records event-wise losses is a critical requirement to make credible information available for Target A. In fact, despite the above-mentioned challenges, Target A had the highest number of countries reporting comparing to other targets. It is also evident that more countries are making concerted efforts in accumulating disaggregated data, even though this was not a mandatory requirement.

Target B

This target is related to reduction of people affected by disasters by 100,000 population in the period 2020–2030 as compared to 2005–2015. Some issues related to the estimation of affected persons are as follows:[93]

- As with Target A, concerns around attribution apply. Target B encompasses scenarios where cascading effects from hazards can develop into significant impacts. A simple assessment approach is critical, as measurement involves drawing information from a wide range of sectors.
- Like Target A, data on injured and ill people can come from existing health indicators that are adapted to target disaster-specific impacts, but clarification is essential of the periods of time used for measurement and the inclusion of secondary illness and injury. Mental health issues, among the most acute health impacts associated with disasters, are a specific area requiring definition within ill- and injured-person calculations.
- Local authorities and international standards need to also account for degrees of damage to informal settlements through GIS and remote-sensing techniques that can assess impacts to the physical environment such as for dwellings and local infrastructure.
- When data for assessing impacts of disasters on affected persons is not available or sufficient, proxies may serve as useful, alternative sources. Proxy indicators for instance, are widely used by the World Bank Group's GFDRR, which has employed PDNA techniques using sector-specific data for employment, agriculture, health, transport and communication, and by FAO using data on agriculture, food security and nutrition.

Given the different forms in which disasters can affect individual lives and assets, countries need to take a multisectoral approach to monitoring and reporting, to foster a broader set of information and strengthen the resultant analysis. Key organizations working on health such as WHO and Public Health England are trying to address some of the health-related issues through extended guidelines for the ministries and departments of health. Critical studying, careful planning and robust systems to improve data analysis across different sectors in health, agriculture and transport can assist building trust in the data, expanding people's ability to use it, so

89 (United Nations General Assembly 2016a)
90 (UNISDR 2018b)
91 (Saulnier et al. 2019)
92 (UNISDR 2018b)
93 (Clarke et al. 2018)

that their needs are at the heart of data-collection processes.

Target C

This target encompasses the reduction of total direct economic losses as a proportion of global GDP. Some issues related to the estimation of economic losses are outlined below:[94]

- The definition of global annual losses attributed to disasters omits the substantial losses in productivity and well-being, which lead to economic impact. However, the complexity of necessary assessment protocols is avoided to ensure that indicator calculation is practical and feasible.
- Measurements for assessment of indirect economic losses are less developed and not included in the Sendai Framework. But understanding the cascading impacts of disasters on economic welfare and productivity is critical, particular as drivers of hazard risks changes over time.
- As in the case of Target B, when reliable information is absent, proxies may be useful, but come with the caveat that non-private price indices be used as often as possible; an example of this is reconstruction inputs such as building materials. Noted challenges extend to the application of affected ratios (i.e. amount of damage due to a hazard) that may give binary, categorized (segmented) or continuous (percentage) values in damage ratios. At different periods following a hazard impact, reporting practices should also reflect need, thus requiring assessment protocols providing for a rapid one and a subsequent one, a year later.[95] Estimating losses to cultural heritage is a unique and context-specific challenge. While available guidance proposes assignment for non-movable and movable cultural heritage assets, their value is difficult to disentangle from local connection and (if applicable) tourism-related income. Cultural heritage issues associated with the natural environment further add to this challenge.
- In the Global Readiness Review, the responding countries mentioned that data sets were typically more available on physical damage and human impact, and less available on economic losses.[96]

Though indicators related to economic losses seem to be one of the more complicated ones in terms of methodology and computation, this is the target that is covered most comprehensively by the available guidelines. Moreover, since a large part of the economic losses are borne by high-income countries, these are also the same countries where the penetration of formal insurance mechanisms is high, thus providing more structured information on validation of economic losses. Reiterated efforts and sustained funding are needed to better capture the indirect costs and cascading impacts of disasters for the most vulnerable segments of the world's population.

Target D

This target aims at the reduction of losses to critical infrastructure and disruption of basic services. Some issues related to the estimation of losses are outlined below:[97]

- Clear definitions are key to consistency in reporting on Target D. For instance, there are challenges of measuring disruption due to slow-onset and small-scale disasters.[98]
- Disaster loss data is greatly influenced by large-scale catastrophic events, which represent important outliers in terms of damage to critical infrastructure. UNISDR recommends countries report the data by event, so that complementary analysis can be undertaken to obtain trends and patterns in which such catastrophic events (which can represent outliers in terms of damage) can be included or excluded.
- As national disaster loss databases that have been developed do not necessarily include historical data on damage to railways, ports, airports and other infrastructures, establishing baseline data is a challenge.[99]
- Contrary to recommendations, damage and disruption to infrastructural assets and services can be disaggregated according to the institutional level (e.g. primary or secondary health facilities), rather than based upon size. Such classifications are in line with practices in public sector risk assessment and private sector catastrophe modelling used to inform insurance products.[100]

For the purposes of the Sendai Framework monitoring, baselines for Targets C and D are not compulsory because the targets, as articulated, do not include a baseline comparison. However, to the extent possible, it is recommended that countries account for data by event, so that complementary analysis can be undertaken to obtain trends and patterns in which such catastrophic events (which can represent outliers in terms of damage) can be included or excluded. As part of Target D, capturing information on critical infrastructure is key for a government, as reducing losses on this infrastructure and these services could lead to reduced losses in other targets, especially Targets A and B.

Target E

This target relates to the increase in the number of countries having national and local DRR strategies, aligned to the Sendai Framework:

- There is an element of subjectivity in the self-assessment of the national DRR strategies because Member States score themselves against 10 criteria related to the Sendai Framework. However, it is similar to the HFA monitor with which Member States are familiar, where there was also an element of subjective scoring.
- SFM can provide a monitoring platform for DRR strategies with defined indicators and targets.
- A focus should be placed on implementation of DRR strategies. As the statutory and regulatory systems vary among Member States, the decision regarding the adoption and implementation of DRR strategies to be included in the calculation has been left to Member States.
- Compared to national strategies, local DRR strategies are far more heterogeneous, vary across countries and local administrative units, and change over time. It is therefore difficult for the national government to track all local strategies without a substantial scheme (e.g. legislation).

Countries are therefore recommended to conduct detailed self-assessment of national DRR strategies and use them as a benchmark against established global targets and indicators. They can then identify gaps for undertaking DRR actions and for other actions.

Target F

This target aims at enhancing international cooperation on DRR. In the Global Readiness Review, for Target F, only 20% (the lowest among all targets) of the countries reported that they have the available data.[101] The provision or receipt of international cooperation for DRR is conducted with subsequent modalities in each country.[102]

94 (Clarke et al. 2018)
95 (Clarke et al. 2018)
96 (United Nations 2017a)
97 (Clarke et al. 2018)
98 (UNISDR 2018b)
99 (UNIS7DR 2018b)
100 (Clarke et al. 2018)
101 (United Nations 2017a)
102 (UNISDR 2018b)

The challenges raised by Member States for some of the Target F indicators include:[103]

- Separating DRR components from the overall amount of resources.
- Confidentiality concerns about sharing the requested information.
- Common terminology for "disaster risk reduction actions", "disaster risk reduction-related technology" and "disaster risk reduction-related capacity-building".
- While useful to identify DRR actions, the OECD DAC Creditor Reporting System codes do not comprehensively cover DRR-related support to developing countries in terms of sectoral definition within development assistance.
- The methodology for capturing the data for Indicator F-2. This needs to be further developed and clarified, particularly about the option to report as a "provider" and ways in which funding channelled through multilateral agencies should be reported.
- SDG Indicator 17.7.1 does not have an internationally established methodology or standard yet, and a definition of "environmentally sound technologies" is missing from the methodological development for Indicator F-4.
- There is a lack of useful and reliable indicators for science and technology innovation in many developing countries. In addition, there is no internationally established methodology or standard yet for SDG Indicator 17.6.1. on "science and/or technology cooperation agreements and programmes between countries, by type of cooperation".

Target G

This target relates to enhanced capacities for EWSs, risk information and assessment, and pre-disaster evacuation. As with Target E, this target also has an element of subjective scoring based on ranking of hazards and scoring of initiatives undertaken on issues related to EWSs and risk information. Key components of effective MHEWSs include aspects of systematic detection, monitoring and forecasting of hazards, vulnerability and exposure. They also include detailed capacity analysis of the risks involved and appropriate means of communicating risk information from accountable authorities to populations exposed to or at risk at the local level, such that appropriate action to prepare and respond in a timely manner is prompted.

A few issues for consideration are as follows:[104]

- As MHEWSs vary considerably among countries, instead of counting the number of systems, UNISDR suggested a focus on functionality.
- The selection of major hazards to be included in MHEWSs is determined nationally, recognizing that hazardous events differ significantly among countries in terms of frequency, scale and intensity.
- With regard to measuring coverage of early warning information, Member States may wish to examine proxies for the level of "information redundancy", that is, the number and kind of different warning dissemination channels providing the same authoritative warning information.
- In calculating coverage, the number of exposed populations would ideally be used. However, identification and calculation will be challenging, especially for small- and medium-sized hazardous events and for such an event when not everyone exposed is affected. Therefore, UNISDR suggested the use of a proxy, for example, the total population in targeted subnational administrative units.
- As more than one MHEWS could cover the same geography or population, Members States should consider double counting and consistency of information.

Early lessons on MHEWSs highlight that early warning practice can still improve from past experiences and increase its efficiency, at the level of analysis (data collection and risk assessments) and ensuing action (response). National institutions need to exercise strong ownership of the risk assessment and identification steps of the system. There is no single "off-the-shelf" EWS; instead, a variety of practices make the MHEWS design diverse and context specific. International organizations, strengthening local capacities, can have a complementary role by means of promoting national ownership and strengthening national capacities for early warning.

9.3

Support for thematic and sectoral review of progress

Sectoral analysis is required for full reporting under the Sendai Framework. There has already been considerable international cooperation in various sectors. Two examples are given below of such cooperation, relating to agriculture and school safety.

9.3.1

Agriculture sector

Agriculture forms the livelihoods of 2.5 billion people worldwide. Three quarters of the world's poor obtain their food and income from farming, livestock rearing, forestry or fishing. Smallholders manage over 80% of the world's estimated 500 million small farms and provide over 80% of the food consumed across the developing world.[105] With the growing frequency and impact of disasters and extreme events, they regularly face storms, drought, floods, pests and diseases that destroy or damage harvests, livestock, supplies, equipment, seeds and food. Over the past decade, 26% of all damage and loss from climate-related disasters in developing countries was in the agriculture sector.[106] Moreover, the impact of disasters is not limited to the immediate short term. Disasters often undermine decennial development gains, thus making communities increasingly vulnerable and less able to absorb, recover and adapt to future risks.

In partnership with UNISDR, FAO has developed the Methodology to Assess Direct Loss from Disasters in Agriculture, which is used to track progress towards achieving Indicator C-2 on reducing direct agricultural loss attributed to disasters, under Sendai Framework Target C on global economic loss. This new methodology seeks to standardize disaster impact assessment in agriculture. However, it needs to be institutionalized at the country level. FAO has therefore been providing support and building capacity of national institutions for the adoption, operationalization and implementation of this methodology. A growing number of countries across Latin America, the Caribbean, East Africa and Southeast Asia are already adopting this new approach and are becoming ready to report and track their progress towards Sendai Framework commitments to reduce direct loss from disasters in agriculture.

FAO supports countries in reducing risk and strengthening agricultural livelihoods for building resilience to disasters and crises, while remaining context specific and anchored in local livelihoods and food systems. FAO resilience-relevant work is defined around three main groups of shocks: natural hazards, including climate change extreme events; food chain crises and transboundary threats, including pests and diseases and food safety, in alignment with the Sendai Framework broader scope of hazards; and protracted crises, including violent conflicts. Through this holistic

103 (OEIWG 2016)
104 (UNISDR 2018b)
105 (UNEP and International Fund for Agricultural Development 2013)
106 (FAO 2018)

approach, FAO is able to address the compound nature of disasters and the interconnectedness of threats.

Improving crisis and risk governance

Agricultural livelihoods can be protected from multi-hazards only if adequate disaster risk and crisis governance is present at all levels through risk-informed legal, policy and institutional systems, as well as disaster and risk management capacities for the food and agriculture-related sectors.

Early warning – early action

Monitoring risk and disasters helps to prevent, prepare and reduce impact. The FAO Early Warning Early Action (EWEA) system translates warnings into anticipatory actions to reduce the impact of specific disaster events. It focuses on consolidating available forecasting information and putting plans in place to ensure government partners act when a warning is at hand. On a global level, early warning sources to monitor the main risks to agriculture and food security are published in the EWEA quarterly report. At a country level, FAO works closely with country offices to develop EWEA systems tailored to local contexts. Implementation is under way in Kenya, Madagascar, Mongolia, Pacific Islands, Paraguay, Sudan and others.

9.3.2

School safety initiatives

The Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector is a multi-stakeholder mechanism composed of United Nations agencies, international organizations and regional networks. Partners are working to ensure that all schools are safe from disaster risks and all learners live in a culture of safety. The work of the Global Alliance is expected ultimately to contribute to a global culture of safety and resilience through education and knowledge, in support of SDGs and in line with the Sendai Framework. It promotes a comprehensive approach to DRR education through the Comprehensive School Safety Framework.[107] This is based on education policies, plans and programmes that are aligned with disaster management at regional, national, subnational, district and local school site levels, whose goals are to: (a) protect students and educators from death, injury and harm in schools, (b) plan for continuity of education through all expected hazards and threats, (c) safeguard education sector investments and (d) strengthen risk reduction and resilience through education.

The Worldwide Initiative for Safe Schools was launched in 2013 by UNISDR in collaboration with partners from the Global Alliance on Disaster Risk Reduction Education and Resilience in the Education Sector as a response to the High-Level Dialogue Communiqué at the 2013 Global Platform for Disaster Risk Reduction. This initiative aims at securing political commitment and fostering the implementation of safe schools globally. The Worldwide Initiative motivates and supports governments to develop and implement national school safety policies, plans and programmes in combination with the three technical aspects of comprehensive school safety. It offers technical assistance and expertise to support interested governments in implementing comprehensive school safety at the national level and promotes good practices and achievements in safe school implementation for replication in other countries and regions.

Partners of the Global Alliance developed different tools and methodology to enhance school safety. For example, the United Nations Educational, Scientific and Cultural Organization (UNESCO) promotes a multi-hazard school safety assessment methodology, namely visual inspection for defining safety upgrading strategies (VISUS). The VISUS methodology has a strong component on capacity-building for decision makers, technical staff and universities. It allows them to make better informed decisions on how to prioritize funding for improved school safety and has been successfully tested in seven countries (El Salvador, Haiti, Indonesia, Italy, Lao People's Democratic Republic, Mozambique and Peru), where the security of more than 500,000 students and educational staff was assessed. UNESCO is working on the conceptualization of an International Programme for Safe School Assessment, through the implementation of the VISUS methodology worldwide.

9.4

Development of national disaster-related statistics

The adoption of common reporting mechanisms for the Sendai Framework and the 2030 Agenda has prompted the international statistical community to support the development of disaster-related statistics and frameworks. The following section examines this work and its repercussions.

Within the context of a globally agreed policy framework and global indicator monitoring systems, governments have given increased attention to disaster-related statistics. As this area of statistics is a new endeavour in nearly all countries, there is a strong demand for technical guidance and sharing of tools and good practices internationally.

Core concepts and indicators for DRR for international monitoring are defined in the Sendai Framework and SDGs, but there is a need to translate the agreed concepts and definitions into specific instructions and technical recommendations for production and dissemination of statistics. Basic requirements for the international indicator monitoring systems include comparability of concepts and methods for measurement across disaster occurrences. These systems depend heavily on coordination and consistency at the national and local levels.

Countries have different practices for compiling data and preparing statistical tables related to disasters, which makes it difficult to make comparisons or conduct time-series analyses covering multiple disasters. The Sendai Framework focuses on risk assessments, mirroring government demands for improving prevention and preparedness efforts. As risk assessments require information beyond operational disaster data, there is a need for disaster measurements and statistics across disasters, times and geographic locations, and for the integration of disaster information with social, economic and environment statistics.

In many cases, disaster-related data is produced outside the national statistical system and is not included in official statistics. NSOs are often not involved in compiling the data. However, considering the traditional strengths of NSOs and the institutional context for national DRM, different roles can be identified for NSOs. These roles can be grouped into two parts:

- Core roles that should be undertaken by any NSO. These reflect typical strengths of NSOs, such as producing time-series statistics and indicators, providing baseline information fit for purpose for DRM, supporting the assessment of social, environmental and economic impacts, etc.
- Expanded roles with additional tasks that could be incorporated into the functions and responsibilities of NSOs. These can include leading impact assessments, coordinating geographic information services and conducting risk assessments. Some NSOs have already implemented such roles.

107 (Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector 2017)

9.4.1

Conceptual issues

Disaster-related statistics include, but are not limited to, statistics about disaster occurrences and their impacts. Disaster-related statistics also include statistical information used for risk assessment and post-disaster impact assessments, which rely on analysis of a variety of sources of data on the population, society and economy, like censuses, surveys and other instruments used in official statistics for multiple purposes. Georeferenced statistics on population, businesses and infrastructure support the assessment of the number of affected people and other possible impacts of disasters from natural hazards.

Disaster risk is unevenly dispersed within countries, across the world and over time. Each disaster event is different; it is relatively unpredictable, and creates significant changes to the social and economic context for affected regions. To identify authentic trends, rather than random fluctuations or effects of extreme values, much of the analysis of disaster-related statistics requires a coherent time series and depends on clear and well-structured statistical compilations. This context puts an exceptionally high value on harmonizing of measurement for related statistics over time and, as much as feasible, across countries and regions.

Statistics on impacts of disasters are linked to uniquely identifiable disaster occurrences. Collections of these statistics need to be structured and documented in such a way as to maintain the links to relevant characteristics of the underlying disaster occurrence (e.g. timing, location or hazard type), while also remaining accessible to users as inputs for cross-disaster analyses (e.g. monitoring indicators over time or in models for predicting and minimizing disaster risk). Thus, a basic challenge in disaster-related statistics is to make statistics accessible for use in multiple forms and purposes of analyses, while maintaining harmonized and coherent compilations via structured use of metadata.

The challenge is best addressed through the development, agreement and application of a commonly agreed measurement framework.

Based on the above, the fiftieth session of the United Nations Statistical Commission took place from 5–8 March 2019. In this Session (Report of the Commission subject to editing),[108] the Commission requested the United Nations Statistics Division, ESCAP, UNECE, ECLAC and UNISDR, in consultation with members of the existing regional expert groups and task forces to consider options and modalities for the establishment and coordination of: (a) a formal mechanism under the purview of the Commission to progress a common statistical framework on disaster-related statistics; (b) a network across the expert communities to sustain cooperation, coordination and fundraising for enhancing statistics related to hazardous events and disasters; and (c) report back to the Commission at a suitable time.

The Commission also urged the international statistical community to expand its capacity building efforts in statistics relating to hazardous events and disasters to assist countries in strengthening capacities for disaster management agencies, national statistical offices and other related contributors of official data to meet reporting requirements for evidence-based approaches to achieving national development policies, plans and programmes, and the goals and targets in the Sendai Framework and the 2030 Agenda.

9.4.2

International support for development of disaster-related statistics

There are several international initiatives to support development of disaster-related statistics. Key highlights include: the United Nations Statistics Division Framework for the Development of Environment Statistics[109] with the support of the Expert Group on the Revision of the Framework for the Development of Environment Statistics, and the UNECE Task Force on Measuring Extreme Events and Disasters since February 2015.

At a regional level, ESCAP established an expert group on disaster-related statistics in Asia and the Pacific in 2014. This has produced a disaster-related statistics framework and a technical guideline designed for national statistics systems and applicable at multiple scales. ECLAC has long provided technical assistance and training to countries in disaster statistics and indicators and has now established a Working Group on Measuring and Recording Indicators related to DRR for the biennium 2018–2019.

9.4.3

Leveraging disaster-related geospatial and Earth observation data

The 2030 Agenda requires data to understand needs, to study and define solutions, and to monitor progress. The leveraging of disaster-related geospatial and EO data and tools in the pursuit of SDGs and the goals and targets of the Paris Agreement, NUA and other related agreements is essential.

The United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) supports country implementation by focusing on guidance setting directions with regard to the production, availability and use of geospatial information within national, regional and global policy frameworks. This will lead to a better integration of geospatial and other key information in supporting the various post-2015 development agendas as well as their national risk reduction strategies and other national plans. Two reports considered at the eighth annual session of UN-GGIM are particularly important as they bring into context the contribution of geospatial information and services for disasters as well as geospatial information for sustainable development.[110]

The Group on Earth Observations[111] (GEO) is an intergovernmental partnership working to improve the availability, access and use of EOs for the benefit of society. GEO has a work programme of over 70 activities, which cover the global priority areas of the 2030 Agenda, the Paris Agreement and the Sendai Framework. Through this work, GEO has brought together the Global Earth Observation System of Systems,[112] which makes available more than 400 million units of data, information and resources.[113]

9.5

Conclusions

Four years after the adoption of the 2030 Agenda and the Sendai Framework, countries have taken bold steps towards meeting the ambitious aspirations of these transformative plans. In their shared quest to achieve the goals, countries are dealing with daunting global challenges: inequality, a changing climate, instability and fast-paced urbanization. Decision makers across the globe need to critically reflect on how their countries, cities and communities can become more resilient while confronting the interrelated risks. These normative aspirations must be matched with implementation and tangible progress by providing the most up-to-date data and achievements so far. More solid evidence is required, but preliminary findings reiterate previous trends on the highest toll of disasters experienced in the most vulnerable segment of the world's populations.

108 (United Nations Economic and Social Council 2019)
109 (UN DESA 2017)
110 (United Nations Economic and Social Council 2018a)
111 (GEO 2019b)
112 (GEO 2019b)
113 (GEO 2019a)

Part II Conclusions and recommendations

Conclusions

Direct losses are only one piece of the puzzle. The impact of disasters needs to be understood more holistically. When disasters hit, indirect effects are experienced in terms of mortality and morbidity, as well as assets, infrastructure, employment and education opportunities that determine the well-being of affected populations. It is necessary to look at data afresh across goals and targets and establish metrics for those dimensions of disaster impacts that accrue to the most vulnerable by going deeper into distributional analysis, moving away from regional, national and subnational data to the household level.[114] Key indicators such as mortality, morbidity, educational attainment and nutrition outcomes should be disaggregated across all metrics wherever appropriate. If it is endeavoured to reach first those who are furthest behind, it is necessary to understand how socio-economic circumstances affect any given individual's likelihood of being healthy and educated, accessing basic services, leading a dignified life and eventually building back better after a shock.

Open access, validated and interoperable data across the disaster continuum is critical for the development of evidence-based policies. The examples presented above, together with the roll-out of technical guidance notes on Sendai Framework Monitoring, encourage understanding of the cross-sectoral benefits of reporting on progress against SDGs and the Paris Agreement. Increased international attention and targeted funding across different goals is slowly starting to yield results. However, it is critical to maintain momentum and continue to coordinate global and national efforts in terms of taxonomy and comparability across databases moving forward.

This part has demonstrated that while disaster risks are intensifying at a global scale, the collective will to address them has been insufficient. The hope with initial findings is that by assessing the true costs of disasters, prioritization will be placed on the trade-offs inherent in the setting of national planning and budgeting. Given limited capacities and funding on data collection, governments need to decide where they should invest their resources first. By analysing the underlining risks inherent in social, economic and environmental activity and having precise understandings of target populations, policymakers can tailor durable solutions and effective action for their societies.

Recommendations to Member States on improved data collection for Sendai Framework monitoring

- **Connect** data-collection efforts for the Sendai Framework, which should be brought into the realms of official statistics in coordination with NSOs. This can make disaster loss accounting a standard good practice for feeding into Sendai Framework monitoring as it enables event-wise disaggregated data that lends itself to more credible analysis.
- **Invest** efforts on building a strong customized reporting mechanism that focuses on nationally oriented issues and supports the monitoring framework of national DRR strategies in conjunction with NAPs and local-level monitoring of the Sendai Framework.
- **Align** targets and indicators with other countries in the region or with similar geo-political/hazard profile so that spatial comparison can be undertaken if desired.
- **Leverage** the latest research in data science to facilitate the reporting process based on common principles and standards. Meanwhile, it is essential to support the data revolution for sustainable development as recommended by the Secretary-General's IEAG on the data revolution.[115]
- **Invest** in physical infrastructure, especially in the IT sector, to ensure better online reporting and loss accounting at all administrative levels while building capacities in cartography and geospatial data to better record losses through a complementary initiative of in situ and satellite-based monitoring.
- **Build** synergies so that Member States, especially developing and less developed countries, endeavour to engage with resident and non-resident United Nations entities that are custodian agencies for different SDG targets and indicators, to ensure best possible in-country synergies for SDG reporting.
- **Build** partnerships with other stakeholders and expert organizations as a key to enable a strong data-sharing network and comprehensive reporting. To the extent possible, such partnerships should explore multiple uses of the data so that there is a broader demand and intrinsic incentivization for data collection and sharing. Engage with the private sector, for example, the insurance industry, housing sector, chambers of commerce and industry. This is essential for a more comprehensive capture of economic losses.
- **Promote** a data system that is fit for purpose to monitor and achieve SDGs and the other United Nations landmark agreements and help governments to:[116]
    - Manage and govern more effectively, providing policymakers with real-time or near-time information on the quality of services, the welfare of the population and the state of the environment so they can correct their course and change policies to meet changing demands.
    - Monitor historical progress and ensure objectives can be met, track changes over time and help to project where we are headed into the future.

114 (UNISDR 2017e); (Walsh and Hallegatte 2019)
115 (Data Revolution Group 2019)
116 (Sustainable Development Solutions Network 2017)