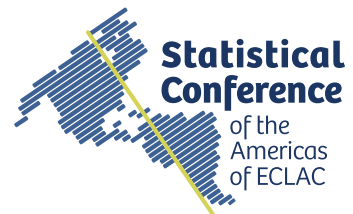# Institutional and methodological recommendations for the measurement of indicators for the disaster-related Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction
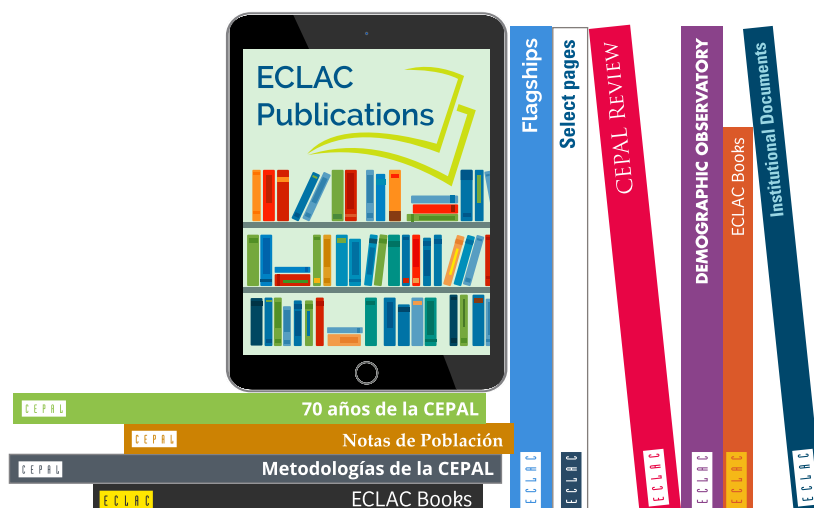
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Institutional and methodological recommendations for the measurement of indicators for the disaster-related Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction

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Acknowledgements

Contents

Executive Summary

While the processes of monitoring and reporting on the 38 indicators of the Sendai Framework for Disaster Risk Reduction are guided by principles of quality, validity and reliability, in practice, these can prove challenging from a regional and global standpoint. The quality of information collected in several Latin American and Caribbean countries cannot always be guaranteed as the vast majority of the data needed for construction of the indicators is drawn from alternative information sources, such as administrative records maintained by various sectors or territorial actors.

This situation results in a broad range of criteria reflecting diverse conceptual approaches to issues relating to disaster risk management, gaps or inconsistencies in the data generated, and limitations in the management, classification and consolidation of the data used to calculate the indicators. Against this backdrop, the national statistical offices, in coordination with national disaster risk reduction and management systems, play a vital role in ensuring adherence to baseline criteria for data quality management.

In response to this challenge, this document outlines institutional and methodological recommendations proposes six methodological steps for measuring indicators for the disaster-related Sustainable Development Goals (SDG) and the Sendai Framework for Disaster Risk Reduction (see diagram 1) and defines a number of global, regional and national criteria and instruments. The document is accompanied by a Matrix of Requirements,[1] a diagnostic mechanism to identify the gaps and needs in statistical processes that require greater clarification and support from the national statistical offices and stakeholders involved.

Diagram 1
Methodological Steps for Measuring Indicators for the Disaster-Related SDGs and the Sendai Framework for Disaster Risk Reduction

Six methodological steps

1. Institutional agreements for statistical data processing
   → Recommendations for the establishment of agreements and the selection of political, legal and inter-agency coordination mechanisms.

2. Standardization of disaster risk concepts and terms
   → Recommendations and criteria for the harmonization and standardization of terms and concepts relating to the indicators and the compilation of relevant conceptual references.

3. Analysis of the data and required information
   → Recommendations and criteria for assessing the data and the data quality using various tools.

4. Classification and standardization of applicable data
   → Recommendations and criteria for data classification, emphasizing the need to define tools and share regional experiences.

5. Management of data collection/utilization
   → Recommendations and criteria for collecting and utilizing data from various sources and centralizing data using databases. Regional tools and experiences are recommended.

6. Processing and generation of statistical indicators
   → Recommendations for the calculation of indicators in accordance with the UNDRR technical guidance notes (2017).
   Criteria for the validation, submission and dissemination of indicators through the Sendai Framework Monitor.

Source: Prepared by the authors.

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[1] The Matrix of Requirements is available in a separate Excel file. See [online] https://repositorio.cepal.org/bitstream/handle/11362/48167/2/matrix_requirements_en.xlsx

The institutional recommendations and suggested methodological steps provide stakeholders and agencies working on the Sendai Framework indicators with a baseline and technical guidance to improve data quality, with the goal of promoting enhanced cooperation between national offices and national statistical and disaster risk reduction (DRR) systems and facilitating greater coordination in monitoring and reporting processes. This, in turn, will result in evidence-based disaster risk governance and improve decision making to ensure disaster risk-informed sustainable development.

The process of developing indicators must adopt a gender-focused approach and promote the empowerment of women, girls and historically marginalized populations. Recommendations to this effect focus on the generation of disaggregated data to produce information that can be applied to these processes and to the formulation of strategies and plans that promote inclusive disaster risk management.

This document is intended to serve as a reference for the management of data, tools and statistical information involved in measuring indicators for the disaster-related SDGs and the Sendai Framework. It is also hoped that implementation of these recommendations will facilitate sustained action and ensure the continuity of measures related to implementation of the Sendai Framework as well as the adoption of decisions that promote disaster risk reduction. This document is intended to complement the *Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction: Collection of Technical Notes on Data and Methodology*, by providing additional institutional guidelines and recommendations.

Introduction

A. Construction of disaster statistics in Latin America and the Caribbean

According to United Nations data, Latin America and the Caribbean is the second most disaster-prone region in the world. Since 2000, about 152 million people in the region have been affected by 1,205 disasters caused by floods, hurricanes, storms, earthquakes, droughts, avalanches, fires, extreme temperatures and climatic phenomena (OCHA, 2020) (see map 1).

Map 1
Latin America and the Caribbean: number of people affected, by type of disaster, 2000–2019
(In millions)

Impact of Natural Disasters

Number of people affected by type of disaster				
53	14	41	34	3
Droughts	Earthquakes	Floods	Storms	Volcanic activity

Droughts
Earthquakes
Floods
Landslide
Storms
Volcanic activity

Source: Office for the Coordination of Humanitarian Affairs (OCHA), *Natural disasters in Latin America and the Caribbean 2000-2019*, March 2020.
Note: The boundaries and names used on this map do not imply official endorsement or acceptance by the United Nations.

The frequency of disasters in the region is continuing its upward trend, spurred primarily by an increase in risk drivers, which leads to greater vulnerability and increasing exposure to simultaneous, complex and interrelated dangerous events.

According to the *Regional Assessment Report on Disaster Risk in Latin America and the Caribbean* (UNDRR, 2021a), improved reporting has enhanced knowledge about disasters and their characteristics. This, in turn, has facilitated risk analysis and assessment in the region (e.g., the number of deaths and people directly or indirectly affected by disasters) and has enabled the collection of information about the frequency of disasters and their location in the region.

Historical records provide information on disasters, their recurrence and spatial distribution. While the data recorded often vary considerably in terms of the quality of the sources or the frequency of their collection, they undoubtedly help explain how events evolve and their impact on different territories and illustrate the associated consequences, many of which are interrelated and multisectoral.[2]

For example, the *Regional Assessment Report on Disaster Risk in Latin America and the Caribbean* (UNDRR, 2021a) notes that most disasters tend to affect urban areas, suggesting a heightened concentration of risk factors due to the dynamics of urban expansion, land use change and higher population density.

In this context, assessment of the role of urban issues in exacerbating risks and disasters begins with the use and interpretation of data and statistics on the environment, population and housing, spatial planning and land use, which, when combined with historical disaster databases and temporal and spatial analyses, illustrate the various manifestations of risk. Data derived from economic, household, environmental and productive sector surveys and censuses are also of vital importance in estimating damage to critical infrastructure when a disaster occurs.[3]

Most of the statistical data on disasters in the region is derived from official sources and is used in decision making in times of crisis and early recovery, with a focus on damage and loss assessment, the identification of immediate needs and the preparation and management of post-disaster response and recovery. However, there is a need to strengthen statistical data focused on prevention and mitigation, especially with a view to identifying statistical variables in vulnerability studies and disaster risk scenarios, based on an understanding of the dynamic, complex and systemic nature of risk, to prevent disasters and boost resilience.

Territorial analysis of disaster risk management statistics is largely focused on urban areas, where the majority of the exposed population is located and where several underlying risk factors are concentrated. However, it is necessary to consider disaster risk statistics in rural areas, where there are more vulnerable and marginalized territories, in order to achieve a sustainable balance in comprehensive disaster risk studies.

B. Limited gender mainstreaming in disaster-related statistics

In addition to the difficulties associated with the quality of information and the variability of statistical data, there is limited gender mainstreaming, inadequate empowerment of women and girls and insufficient inclusion of historically marginalized populations in disaster statistics in the region. According to preliminary data, women, girls and other historically marginalized populations (Indigenous peoples; people of African descent;

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[2]   This conceptual view of the effects and impact of disasters at various scales and in different sectors is known as the "systemic risk approach," which was established by UNDRR as an element of global disaster risk assessments and which has become more relevant in light of the multi-scale, multisectoral effects of the coronavirus pandemic (COVID-19).

[3]   ECLAC established the Damage and Loss Assessment (DaLA) methodology, while UNDP, the European Union and the World Bank developed a post-disaster needs assessment (PDNA) methodology. Both methods have been applied in several countries in the region to obtain information on the impact and damage caused by disasters in different areas.

lesbian, gay, bisexual, transgender and intersex (LGBTI) persons; as well as older persons, children and young people, disabled persons, displaced persons, among others) are more exposed to and disproportionately affected by disasters.

These populations play a critical role in the development of preparedness and early response mechanisms, as well as in strengthening inter-agency connections for effective disaster risk reduction and, when possible, the subsequent recovery of their territories.

However, the process of producing disaster risk statistics does not generate disaggregated data that account for the particularities of the people who make up these populations and their specific needs and distinct capabilities. This not only significantly limits emergency management and disaster recovery, but also hampers disaster risk awareness processes and the formulation of strategies and plans for disaster reduction at the local, national and regional levels.

C.   Objectives, scope and structure

1.   Overall objective

Contribute to strengthening systematic and periodic generation of statistical data and information for developing indicators for the disaster-related SDGs and the Sendai Framework.

2.   Specific objectives

(i)   Develop a guide for the implementation of codes of statistical best practice that recognizes the need for gender mainstreaming and the inclusion and empowerment of women in the production of statistical data on disaster risk management.

(ii) Contribute to the definition and regional adaptation of the most relevant recommendations established in the Sendai Framework and to the development of metadata for disaster risk reduction indicators through data collection and disaggregated analysis.

(iii) Facilitate the integration of countries in Latin America and the Caribbean into global initiatives to define, disseminate and apply methodologies for measuring indicators and processing statistical data pertaining to disaster risk reduction.

3.   Scope and structure

This document proposes a series of recommendations made by the Working Group on Measuring and Recording Indicators related to Disaster Risk Reduction to improve the quality of reporting on the Sendai Framework indicators, without seeking to establish a "regional standard." It should be noted that this document focuses exclusively on the 38 Sendai Framework indicators and the disaster-related SDG indicators.

It is based on the collaborative work of the members of the Working Group on Measuring and Recording Indicators related to Disaster Risk Reduction and incorporates elements of the *Marco teórico para la estimación de indicadores del Marco de Sendái y de los ODS relacionados a los desastres*[4], as well as other regional and global inputs.

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[4]   See [online] https://rtc-cea.cepal.org/sites/default/files/document/files/Marco-te%C3%B3rico-datos-estad%C3%ADsticas-desastres_0.pdf.

The criteria used in data and information management may need to be updated and amended based on contributions from other countries in the region, such as those of the Southern Cone, the Andean region, Central America and the Caribbean, regarding innovations and methodological steps related to managing data quality for the construction of the Sendai Framework indicators.

This document is divided into five chapters. The first chapter presents background information and discusses the efforts of the Working Group on Measuring and Recording Indicators related to Disaster Risk Reduction, the importance to the region of monitoring implementation of the Sendai Framework and the need for gender mainstreaming in the production of disaster risk reduction data and statistics.

The second chapter addresses challenges to implementing the Sendai Framework in Latin America and the Caribbean, emphasizing country commitments and the role of NSOs in developing the Sendai Framework indicators. It also explores the opportunity for coordination offered by the mechanisms developed by the countries to monitor progress on implementation of the SDGs.

The third chapter analyses the institutional aspects of generating data and statistical information for monitoring the Sendai Framework, and the fourth chapter discusses the six-step methodological proposal for developing the Sendai Framework indicators and the respective disaster-related SDG indicators.

Finally, the fifth chapter offers a series of recommendations aimed at strengthening institutional arrangements, improving understanding of risk and managing the data needed for the calculation of these indicators.

This document is supplemented by the Matrix of Requirements, a digital self-assessment tool that countries can use to systematize the information required for implementation of the Sendai Framework and to assess whether actors involved in the generation of the Sendai Framework indicators are applying the methodological steps suggested in chapter IV. The goal is to provide practical support to the implementation of statistical processes using sound data to develop these indicators.

Chapter I

Background

A. Activities of the Working Group on Measuring and Recording Indicators related to Disaster Risk Reduction

In 2017, at the ninth meeting of the Statistical Conference of the Americas of ECLAC, the Working Group on Measuring and Recording Indicators Relating to Disaster Risk Reduction was established to promote the inclusion of disaster risk reduction data in official statistics.

In 2019, the Group published the *Marco teórico sobre la medición y registro de indicadores relativos a la reducción del riesgo de desastres*[5] (Spanish only) as an initial contribution to strengthening the connection between statistics and DRR by measuring disaster risk in the context of the Sendai Framework indicators.

This document is the product of work completed during the period 2020–2021, which included the creation of virtual spaces for sharing experiences, organizing virtual training webinars and workshops and adapting global and other regional reference works to the Latin America and Caribbean context, in particular, the *Recommendations on the Role of Official Statistics in Measuring Hazardous Events and Disasters* (UNECE, 2019) and the *Hazard Definition and Classification Review* (International Science Council/UNDRR, 2020), which expand on the definition and classification of hazards.

For the current biennium of the Statistical Conference of the Americas, the Group comprises the national statistical offices of Chile, Colombia, Cuba, the Dominican Republic, Ecuador, Mexico and the Plurinational State of Bolivia, with Peru and Paraguay as coordinators. The Regional Office for the Americas and the Caribbean of the United Nations Office for Disaster Risk Reduction (UNDRR) and the Statistics Division of ECLAC serve as the technical secretariat. The regional offices of the United Environment Programme (UNEP), the United Nations Development Programme (UNDP) and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) also provided technical support.

B. Member States' commitments after adoption of the Sendai Framework

Following the adoption by United Nations Member States of the Sendai Framework for Disaster Risk Reduction 2015–2030, each country designated a national focal point to manage its implementation. In addition, countries formed an open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction.

Since the launch in March 2018 of the online Sendai Framework Monitor, each country's designated national focal point has been responsible for coordinating the process of submitting national reports using the Sendai Framework Monitor. While each country defines its own institutional arrangements based on its circumstances, they must take into account that disaster risk management and reduction is a State-wide commitment and not just of specific sectors.

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[5] See [online] https://rtc-cea.cepal.org/es/documento/marco-teorico-sobre-la-medicion-y-registro-de-indicadores-relativos-la-reduccion-del.

Chapter II

Monitoring implementation of the Sendai Framework in Latin America and the Caribbean

A. Regional significance of monitoring implementation of the Sendai Framework

Ensuring ongoing measurement of implementation and progress relating to the indicators and targets defined in the Sendai Framework[6] poses a major challenge for Latin America and the Caribbean. One obstacle encountered in preparing the periodic reports lies in the collection and management of the data needed to calculate the indicators. The collection, management, assessment, standardization and review of data quality, among other methodological aspects, are required to ensure the reliability and robustness of the indicators.

The reports submitted through the Sendai Framework Monitor show that countries still face major challenges in the phases of reporting and validating the Sendai Framework indicators. Three major challenges can be identified:

(i) Lack of standardized data that meet the quality criteria as well as information gaps

(ii) Limited intersectoral and local coordination mechanisms for systematized data collection and

(iii) Little or no disaggregation of data for mainstreaming gender and promoting the empowerment of women, girls and historically marginalized populations.

The statistical and institutional capacities of the entities leading disaster risk management in the region should be strengthened, as well as their partnership with NSOs. Baseline data must also be managed to improve data quality and to establish an ongoing mechanism that incorporates statistical processes. This would make it possible to leverage the information collected for measuring the Sendai Framework indicators, improve their consistency and, thus, produce much more robust reporting and analysis.

B. Intersection between monitoring implementation of the Sendai Framework and monitoring progress towards achieving the SDGs

The Sendai Framework for Disaster Risk Reduction 2015–2030 and the Sustainable Development Goals (SDGs) were adopted a few months apart in 2015, within the framework of the 2030 Agenda for Sustainable Development. Both agreements have evolved into a critical road map that guides countries' efforts to meet their disaster risk reduction commitments, end poverty, address the climate crisis and protect the planet.

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[6] In mid-2021, three years after the launch of the online system for monitoring and reporting on these indicators, 77% of the countries in the region were still in the process of monitoring and reporting on them, illustrating that there is still a long way to go.

The 2030 Agenda recognizes and reaffirms the urgent need to reduce disaster risk as an essential element in achieving its goals. Eleven of the SDG indicators are directly related to the Sendai Framework indicators for targets A, B, C, D and E and to the disaster-related SDG targets 1, 11 and 13 (see diagram II.1).[7]

Diagram II.1
Relationship between the Sendai Framework indicators and targets and the SDGs
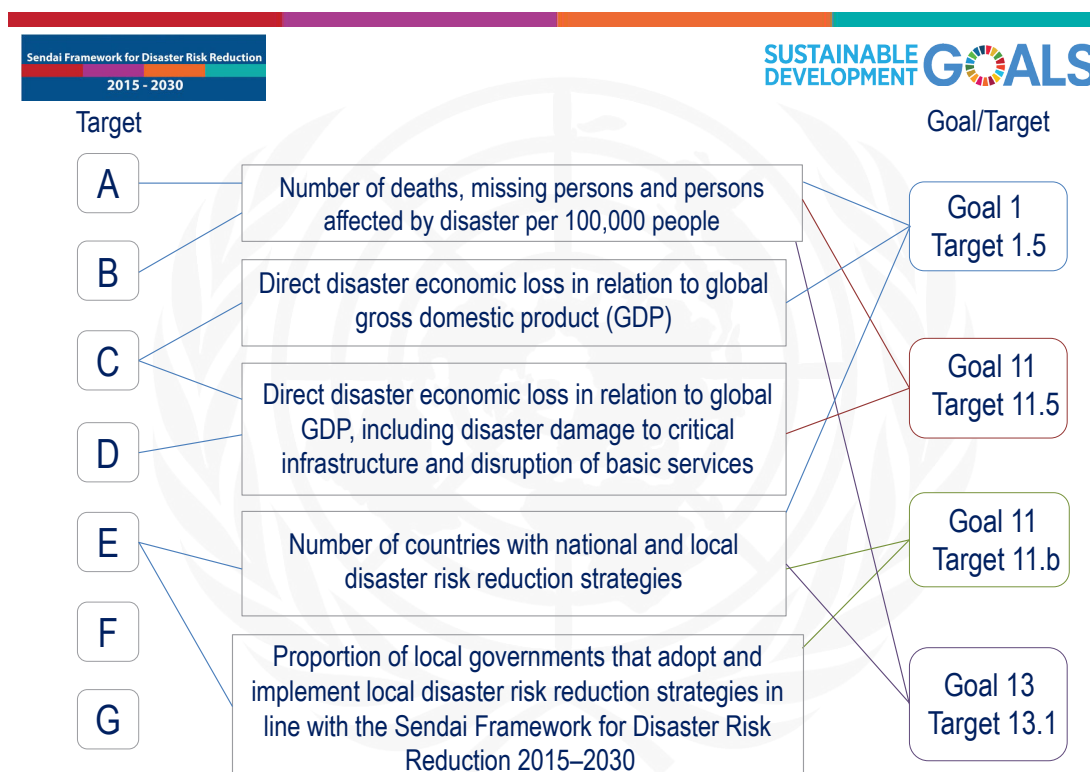
Source: United Nations Office for Disaster Risk Reduction (UNDRR).

While the SDGs and the Sendai Framework are State-level agreements, representing the highest level of political and institutional commitment, there are substantial differences in the mechanisms and institutional arrangements defined for their implementation.

Institutional structures have been implemented in the countries in the region with the aim of ensuring ongoing monitoring and reporting on the implementation of the SDGs, in addition to a voluntary process for periodic progress reporting. Institutional structures and mechanisms, agreements and new institutional forms and legal tools have been established to ensure the active participation of the various economic, social, environmental and planning sectors in meeting the targets and ensuring their proper implementation.

According to ECLAC (n/d), almost half the countries in Latin America and the Caribbean have created specific legal frameworks for the implementation of the 2030 Agenda. These should be taken into account as they constitute the building blocks for institutional organization (see table II.1).

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[7]   With respect to the various objectives and targets, the 2030 Agenda contributes to disaster risk reduction and capacity building to facilitate recovery, in conjunction with the targets relating to gender equality (SDG 5) and reducing inequality (SDG 10).

Table II.1
Latin America (nine countries): institutions created for implementation of the 2030 Agenda
for Sustainable Development

Country	Institution	Policy or legal instrument for implementation of the Sustainable Development Goals (SDGs)
Bolivia (Plurinational State of)	Inter-Agency Committee for the Economic and Social Development Plan and Sustainable Development Goals (CIMPDS)	Multi-ministerial resolution No. 001/2017
Chile	National Council for Implementation of the 2030 Agenda for Sustainable Development	Supreme Decree No. 67 of 2019
Colombia	High-Level Inter-agency Commission for the Preparation and Effective Implementation of the 2030 Agenda	Decree No. 280-2015
Cuba	National Group for Implementation of the 2030 Agenda for Sustainable Development	Resolution No. 233/2018 of the Ministry of Economy and Planning (MEP), recently updated by Resolution No. 111/2020
Dominican Republic	Inter-Agency High-Level Political Commission for Sustainable Development	Decree No. 23-16
Ecuador	National Secretariat of Planning	Executive Decree No. 622
Mexico	National Council for the 2030 Agenda for Sustainable Development	Decree reforming the various entities to create the National Council for the 2030 Agenda for Sustainable Development
Paraguay	2030 SDG Commission Paraguay	Decree No. 3581
Peru	National Centre for Strategic Planning (CEPLAN)	Supreme Decree No. 056-2018-PCM

Source: Prepared by the authors, based on the Economic Commission for Latin America and the Caribbean (ECLAC), "Agenda 2030 institucionalidad," Regional Observatory for Development Planning in Latin America and the Caribbean, n/d [online] https://observatorioplanificacion.cepal.org/es/sdgs-table.

States have also delegated the coordination of actions aimed at achieving the Sendai Framework targets to national risk management offices or managers. However, risk management offices often have a "sectoral" character, which limits coordination and integration with other sectors and key actors to achieve the Sendai Framework targets.

The institutional framework for SDG implementation promotes the issuance of presidential and interministerial decrees, as well as the creation of pacts and alliances under such national policy frameworks. Likewise, councils, committees or commissions have been created, composed of different actors and national, sectoral, subnational and local institutions that support such implementation.

Based on these institutional arrangements, the criteria for improving the official statistics have been examined, and valuable statistics have been produced on issues related to the environment, planning and development, socio-economic aspects or strategic infrastructure. These statistics could be particularly useful in developing disaster risk reduction procedures and building on the institutional and organizational strengths of existing institutional arrangements.

C. Experiences of other regional and global working groups

There is broad, global recognition of the need to develop mechanisms to support the process of reporting on progress made on implementation of the Sendai Framework and to have quality information for risk assessment. Several working groups are developing mechanisms to improve and strengthen the management of statistical information in Latin America and the Caribbean. Some relevant experiences are summarized in table II.2.

Table II.2
Regional and global initiatives pertaining to statistics and their relevance to disaster risk

Regional and global initiatives	Instruments developed and issues addressed	Relevance to disaster risk
Committee of Experts on Global Geospatial Information Management (UNGGIM)	*Integrated Geospatial Information Framework*	Lays the foundation for developing, integrating, strengthening and maximizing the management of geospatial information and related resources for disaster risk reduction and management in all countries, through adaptation of its nine strategic pathways.
	Strategic Framework on Geospatial Information and Services for Disasters, endorsed by UNGGIM	Outlines a number of relevant challenges so that countries may implement governance models for geospatial support in the event of a disaster.
Expert Group on Environment Statistics Expert Group on the Revision of the Framework for the Development of Environment Statistics (United Nations Statistics Division)	"Framework for the Development of Environment Statistics (FDES 2013)"	The fourth component, relating to extraordinary phenomena and disasters, organizes statistics on the occurrence of these phenomena and their impacts on human well-being and the infrastructure of the human subsystem.
	Basic Set of Environment Statistics FDES 2013	Includes Methodological Sheets or metadata for the collection or compilation of all environment statistics, including a Methodological Sheet for disasters.
Expert Group on Disaster-related Statistics in Asia and the Pacific (United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP))	*Disaster-related Statistics Framework*	Provides guidance to the responsible entities for capacity building in the development of internationally harmonized disaster-related statistics.
Task Force for the Measurement of Extreme Events and Disasters (Economic Commission for Europe (ECE))	*Recommendations on the Role of Official Statistics in Measuring Hazardous Events and Disasters*	Makes recommendations to national statistical offices regarding statistics on disasters and hazardous events, provides details on the strengths of official statistics and describes the various institutional conditions in the countries.
Open-ended intergovernmental working group of experts on indicators and terminology relating to disaster risk reduction	*Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction*	Sets forth the terminology and indicators for the preparation of national reports on progress in implementing the Sendai Framework.
Inter-Agency and Expert Group on Sustainable Development Goal Indicators	*Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development*	Sets forth the indicators for the Sustainable Development Goals (Goals 1, 11 and 13 include indicators related to disaster risk reduction, and the United Nations Office for Disaster Risk Reduction (UNDRR) safeguards this information).
Pilot initiative coordinated by UNDRR	"Global Risk Assessment Framework (GRAF)"	Proposes a methodology for assessing disaster risk using an approach that accounts for the systemic nature of risk.

Source: Prepared by the authors.

Additional global and regional initiatives that include statistics in disaster-related discussions are continuously being developed and require better inter-agency and intersectoral coordination and complementary linkages with the instruments currently being implemented. The Working Group on Measuring and Recording Indicators related to Disaster Risk Reduction recognizes and, with this document, adds to the discussion of these challenges.

Chapter III

Institutional aspects of generating data and statistical information for monitoring the Sendai Framework

A. Experiences of the national statistical offices for disaster risk management in the region

National statistical offices are responsible for the management and processing of national statistical data associated with public policies governing the generation and use of State information. The data needed for the estimation of the Sendai Framework indicators is managed based on each country's specificities. It is therefore essential to understand the role of these statistical offices and their involvement in the national context as it relates to information generation.

There are several national statistical offices in the region that exercise functions at the ministerial level, with a high degree of autonomy, and others that depend on ministries or other governmental entities. Institutional differences influence the specific approaches to managing statistical data at the national level and, thus, the data that can be applied to development of the Sendai Framework indicators. Diagram III.1 explains the institutional framework of NSOs in the region.

Diagram III.1
Latin America and the Caribbean: institutional framework of the national statistical offices of the Working Group on Measuring and Recording Indicators related to Disaster Risk Reduction
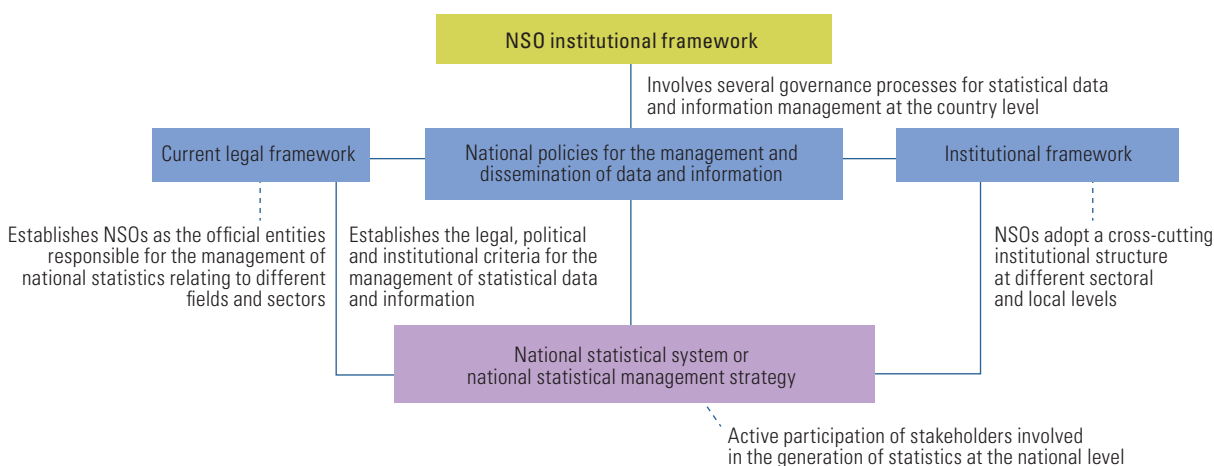
Source: Prepared by the authors.

It is important to define these particularities since the national statistical offices represent the "umbrella" of statistical information management and given their role, can actively and substantively support data generation.

To coordinate the management of statistical data and information, these offices manage the national statistical systems, which are defined as the ensemble of statistical organisations and units within a country that jointly collect, process and disseminate official statistics on behalf of the national government (DANE, 2019).

A closer look at the various institutional structures of national statistical offices in the region reveals a number of important findings regarding their relationship to disaster risk:

- The common national institutional system is based on a legal framework that establishes the national statistical office as the governmental entity responsible for the generation of national statistical data in different fields (economic, social, population, environmental, among others).

- Many offices play a cross-cutting role that is reflected in decentralized functions at the territorial and sectoral levels (intersectoral working arrangements).

- Coordination and regulation mechanisms exist in the form of national statistical systems.
    - The national statistical offices of several countries have undertaken to strengthen technical expertise in the management of disaster risk reduction as is done with social, geographical or environmental issues.
    - The inclusion of statistical units has been encouraged in various disaster risk management offices (such as the National Office of Emergency of the Interior Ministry (ONEMI) in Chile) or planning and monitoring offices (Colombia and Costa Rica, among others), as well as the integration of disaster risk management into national statistical systems (Mexico).
    - Institutional structures, such as commissions or councils, have been created to document experiences with the inclusion and active involvement of national statistical offices in the generation of SDG statistics.

B. Management of statistical information for estimating the Sendai Framework indicators

National statistical offices play a fairly active role in efforts to achieve certain targets and indicators of the Sendai Framework. They are particularly relevant in activities pertaining to targets A and B, and provide additional information relating to the metadata (required by the Sendai Framework Monitor), population, and economic context. NSOs also participate in the definition of pre-established parameters that facilitate the measurement of specific indicators relating to damage and loss in particular sectors, in accordance with methodologies developed by organizations such as ECLAC, the Food and Agriculture Organization of the United Nations (FAO), the World Health Organization (WHO) and the Organisation for Economic Co-operation and Development (OECD), among others, which are available through the Sendai Framework Monitor.

In some countries, statistical offices play a more cross-cutting role in the process of generating or validating indicators through activities such as reviewing or validating statistical operations, providing technical guidance on the generation of data collection sheets, and contributing to improving the quality of information. These roles are linked to each target of the Sendai Framework in table III.1.

Table III.1
Role of the national statistical offices of the Working Group on Measuring and Recording Indicators Relating
to Disaster Risk Reduction in managing the Sendai Framework targets and indicators

National Statistical Office	Connection to Sendai Framework indicators	Role
Bolivia (Plurinational State of) National Institute of Statistics (INE)	Targets A and B	Collection of necessary data Provision of official statistical information
Chile National Institute of Statistics (INE)	Metadata Targets A, B and G Targets E and F	Provision of basic statistical information Review of administrative records and standardization (in progress)
Colombia National Administrative Department of Statistics (DANE)	Metadata Targets A and B Target C (challenge)	Provision of basic statistical information (population and housing) Review of necessary statistical operations that can be applied to disaster risk reduction (DRR)
Cuba National Office of Statistics and Information (ONEI)	Metadata Targets A, B, C and D Indicators C1, C2, C3 and C5	Provision of basic information and infrastructure (target D) Collection of necessary data (data sheets) Provision and review of statistical operations with infrastructure-related information
Dominican Republic National Statistical Office (ONE)	Metadata Targets A, B and C Target D	Provision of basic statistical information Data quality review Collection of necessary data Calculation and revision of the indicator
Ecuador National Institute of Statistics and Census (INEC)	Metadata Targets A, B, E, F and G	Provision of basic statistical information Self-assessment information matrix Provision and review of the required statistical operations
Mexico National Institute of Statistics and Geography (INEGI)	Metadata Targets A, B and C	Provision of basic information Collection of necessary data Provision and review of the required statistical operations
Paraguay National Institute of Statistics (INE)	Metadata Targets A and B Target C (in progress)	Provision of basic population information Agreement with the National Emergency Secretariat (SEN) for validation of indicators
Peru National Institute of Statistics and Informatics (INEI)	Metadata Targets A, B, C and D	Provision of basic information on population and socio-economic aspects Information quality assessment (in progress)

Source: Prepared by the authors.

C. Coordination of national statistical offices and actors involved in the implementation of the Sendai Framework

The different institutions involved in disaster risk management and reduction employ various coordination, participation and operational mechanisms. There are various institutional arrangements for obtaining indicators in the region, associated with two key mechanisms:

(i)   Institutional arrangements established within the framework of national statistical systems. In this case, there are official regulations governing the participation of sectoral and local institutions in the generation of national statistical records and information, with committees and workspaces devoted exclusively to the generation of information relating to the Sendai Framework indicators (as in the case of the thematic committees in the INEGI in Mexico).

(ii) Arrangements based on agreements such as conventions, joint work plans or agendas, road maps or shared tools to improve quality and support the process of obtaining indicators. These mechanisms are established between the national statistical offices and national disaster risk reduction and management offices or other relevant actors involved in specific statistical processes to develop variables and indicators relating to the Sendai Framework. In general, these agreements assign the role of technical adviser to the national statistical office in order to guarantee the quality of the indicators, as in the case of INEC in Ecuador, INEGI in Mexico, INE in Bolivia (Plurinational State of) and DANE in Colombia, among others.

Table III.2 summarizes the various institutional arrangements in the region.

Table III.2
Latin America and the Caribbean (6 countries): main collaboration mechanisms employed by national statistical offices and stakeholders in disaster risk management

National Statistical Office	Agreements established in the context of national statistical systems, strategies or plans	Collaboration mechanisms	Sendai Framework targets
Bolivia (Plurinational State of) National Institute of Statistics (INE)	Not applicable	Agreement concluded with the health and education sectors Agreement to implement an information collection system with the Office of the Deputy Minister of Civil Defence (VIDECI) Plans to define a road map and create working groups with other actors	Targets A and B
Chile National Institute of Statistics (INE)	Workspace for the Sustainable Development Goals (SDGs) (with the participation of the Ministry for Social Development and the Family), which share a number of indicators	Multisectoral emergency working group coordinated by the National Office for Emergencies (ONEMI) and with the participation of INE	Targets A, B and G
Colombia National Administrative Department of Statistics (DANE)	Sectoral Statistical Committee on Geography, Environment and Territorial Planning, which handles extreme events and risks (Resolution No. 1372 of 2020)	Guidelines for the National Statistical System (NSS) on the use of the National Geostatistical Framework in the statistical process Information for consolidation of the National Information System for Disaster Risk Management established by the National Unit for Disaster Risk Management (UNGRD)	Targets A, B and C Challenges D, E and F
Cuba National Office of Statistics and Information (ONEI)	Collection and processing of disaster impact data	Working group with the Civil Defence and other ministries to collect data using forms	Targets A, B, C and D
Ecuador National Institute of Statistics and Census (INEC)	Not applicable	Agreement between the Asociación de Municipalidades Ecuatorianas (AME) and the National Institute of Statistics and Census (INEC) for timely collection of risk information Work plan with the National Risk and Emergency Management Service to guide and validate statistical operations	Targets A and B Targets C and D (partially) Target E Target F
Mexico National Institute of Statistics and Geography (INEGI)	Climate change committee that analyses damage and loss data	Agreements with the National Disaster Prevention Center (CENAPRED) to provide the information required for each indicator Collaborative disaster response site: information and data system managed by INEGI with other stakeholders	Targets A, B, C, D, E, F and G
Paraguay National Institute of Statistics (INE)	SDG work area (including Sendai Framework)	Agreement between the National Emergency Secretariat (SEN) and INE for the validation of indicators SEN working groups in which INE participates	Targets A and B
Peru National Institute of Statistics and Informatics (INEI)	SDG Committee, in which the Presidency of the Council of Ministers (PCM) oversees the monitoring of the Sendai Framework indicators, with INEI participation Household survey with questions on disaster risk	Agreements for the provision of population information INEI participation in PCM working groups	Metadata Targets A, B and C
Dominican Republic National Statistical Office (ONE)	Not applicable	Agreement with the basic services sectors regarding the collection and processing of information on damages and losses	Metadata Targets A, B and D

Source: Prepared by the authors.

Several of these coordination and support mechanisms rely on intersectoral participation (agreements for review or consent to use of information) and focus mainly on targets A, B and C.

Embedding organizational and working arrangements within the institutional structure of the national statistical offices ensures sustainability. This is the case in Mexico, through its National System of Statistical and Geographical Information (SNIEG),[8] as well as with Cuba's National Bureau of Statistics and Information (ONEI). In the case

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[8]   The SNIEG includes different Specialized Thematic Technical Committees composed of various stakeholders and representatives who specialize in the topics that make up the different components of the system, such as the environment, geography, health and economy, among others.

of Cuba, ONEI has been officially designated at the national level as the entity responsible for information in the event of a disaster and is the institution responsible for collecting information on damages and losses in each municipality. In addition, at the request of the Civil Defence System, it completes the online reports for the Sendai Framework Monitor, making Cuba the only country in the region with this arrangement. This allows for direct management of the information needed for these purposes.

Among their statistical processing functions, several national statistical offices are partly or wholly responsible for generating SDG indicators, which include several indicators of the Sendai Framework (as in the cases of Chile, Paraguay and Peru).

Overall, the region has made progress on establishing institutional arrangements to produce the data needed for the development of the Sendai Framework indicators. While in many cases offices still play a limited role in managing these processes, in some countries, such as Mexico or Cuba, the national systems have been used to create enabling conditions for statistical work on disaster risk. In other cases (Ecuador, Chile, Plurinational State of Bolivia), national statistical offices have established agreements with national disaster risk management offices to perform statistical work on the relevant indicators.

It is important to note that all countries have viewers and platforms with spatial information relating to disaster risk. In Mexico, for example, there is a repository for sharing baseline information.

Chapter IV

Methodological proposal for estimation of the indicators

The proposal is based on a series of six steps aimed at facilitating estimation of the 38 Sendai Framework indicators and the 11 disaster-related SDG indicators. This proposal helps inform the global initiatives of the Inter-Agency and Expert Group on Disaster-related Statistics. It is expected to prove useful to disaster risk managers and entities responsible for collecting information for estimation of the Sendai Framework indicators.

The *Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction: Collection of Technical Notes on Data and Methodology* offers a series of technical recommendations for calculating the indicators using statistical concepts and operations. In addition, statistical recommendations are made regarding the quality of the data required for development of the indicators.

Diagram IV.1 details the proposed steps.[9]

Diagram IV.1
Steps for Estimating Indicators for the Sendai Framework for Disaster Risk Reduction
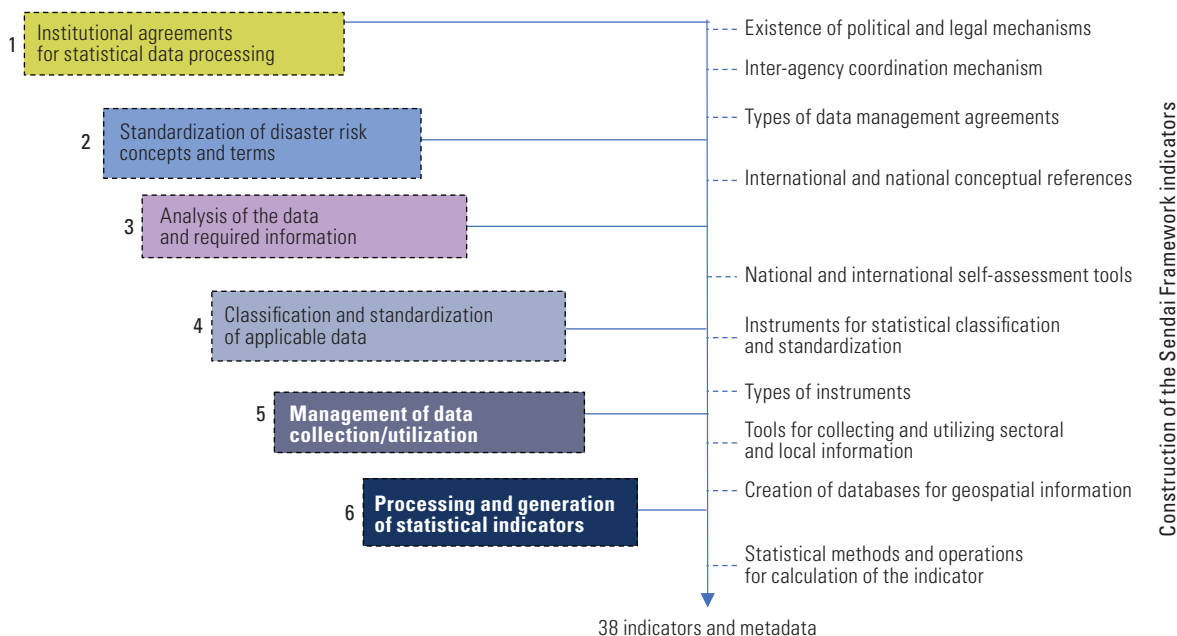
Source: Prepared by the authors.

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[9]   These methodological steps are also presented in the proposed Matrix of Requirements.

The institutional recommendations are based on suggestions made in a number of relevant global and regional documents, as well as statistical criteria that seek to improve data quality and processing. Furthermore, analysis of the information in the Matrix of Requirements helps identify the aspects on which work should be focused to improve the statistical process for obtaining the indicators. Using this tool marks an important step for the region towards incorporating statistics in progress reports on the implementation of the Sendai Framework.

The proposed structure addresses the following aspects:

- Definition of the institutional, political and legal agreements and arrangements needed for implementation of technical work and support for statistical entities.

- Understanding of disaster risk through a conceptual review of the key terms used in estimating risk and suggestions for standardization.

- Assessment and analysis of data and information from various sources to evaluate the quality, recency and availability of metadata, among other criteria, to identify gaps and determine the approach needed to close them.

- Classification and standardization of data to establish a format for comparative analysis. This can be organized by category, similar to the classification of disasters proposed in the ECLAC "Framework for the Development of Environment Statistics (FDES 2013)."

- Data management based on various statistical forms and procedures already in use. This allows data and information from various sources, such as national databases on damages and losses resulting from disasters, to be retrieved and used.

- Generation of indicators via the processing of "Methodological Sheets" from the required statistical operations. The UNDRR *Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction: Collection of Technical Notes on Data and Methodology* describes various globally recommended methods for calculating indicators.

A.   Step 1: institutional agreements for statistical data processing

These refer to coordination mechanisms (inter-agency and intersectoral) in which disaster risk management offices and national statistical offices play a particularly relevant role in creating a collaborative framework for quality assurance processes.

Knowledge and awareness of the different institutional agreements or arrangements are crucial to ensure implementation of the data management processes needed to develop the indicators. It is also important to be familiar with the institutional structures defined by national policies or legal instruments, agreements, conventions or other coordination mechanisms that enable multi-stakeholder and multi-sectoral work. The objective is to make progress on implementation of the Sendai Framework, taking institutional experiences into account, such as those observed in the implementation of the SDGs, or institutional approaches to incorporating statistics into information management processes.

This initial process will enable the definition of baseline agreements to establish a network of key stakeholders in information management and thus ensure the sustainability and reliability of the data. In addition to statistical and disaster risk reduction and management offices, this network should include representatives of key sectors (economics and finance, planning, health, education, housing, among others) and entities or organizations working to promote gender mainstreaming, empower women and girls and include historically marginalized populations.

Diagram IV.2 illustrates the institutional arrangements required for work relating to the indicators.

Diagram IV.2
Institutional arrangements for work relating to indicators for the Sendai Framework for Disaster Risk Reduction

1	Existence of political and legal mechanisms	Identification of policies and action plans at different levels for implementation of the Sendai Framework
2	Inter-agency coordination mechanisms	Existence of institutional structures for successful implementation of the SDGs and the Sendai Framework
		Existence of inter-agency and intersectoral agreements, conventions or instruments
3	Type of management agreement regarding the role of the national statistical office (NSO) and data management	The various roles of statistical offices in the context of inter-agency collaboration for implementation of the Sendai Framework

Step 2 (continued)

Source: Prepared by the authors.

1. Policy-based and legal mechanisms for implementation of the Sendai Framework

The adoption of the Sendai Framework reflects the priority accorded by States to disaster risk reduction and management and the perception of the framework as a sustainable development strategy requiring the full participation of all sectors to achieve integrated management. It is of the utmost importance to promote disaster risk governance within the political, legal and institutional system.

The countries of Latin America and the Caribbean have developed policies, laws and decrees that establish national systems for disaster risk reduction and management. Most also have national disaster risk reduction strategies and plans aligned with the Sendai Framework. Similarly, a growing percentage of local governments have developed local disaster risk reduction plans, which are aligned with national strategies and plans. It is necessary to highlight concrete experiences relating to these mechanisms, their implementation and operation to better understand the governance processes established and suggest ways of incorporating statistical variables in their application.

Various experiences and national reporting processes relating to the SDG indicators and application of the principles of the "Framework for the Development of Environment Statistics (FDES 2013)" have been documented in which this responsibility has been assigned at the institutional level to different entities and sectors. These experiences could serve as a reference for strengthening the institutional processes that support the implementation of the Sendai Framework.

2. Inter-agency coordination mechanisms

These mechanisms refer to the instruments that facilitate the creation of a collaborative framework for discussion and joint work, in which the actors, focal points and individuals involved have been identified, with clearly defined roles and functions at different scales and in various areas of the territory. It is also important to identify a multilevel, multisectoral network of actors involved in the production or use of statistical data for indicator development.

The online Sendai Framework Monitor, which generates reports on the Sendai Framework, outlines a variety of institutional arrangements that can be included among the coordination mechanisms. Four distinct roles have been identified (OSSO Corporation/UNDRR, 2019):

(i) Coordinator: entity or national focal point designated by the State to organize and set up the contributor, validator and observer entities and actors involved in preparing and submitting national reports and responsible for establishing the metadata.

(ii) Contributor: user authorized to enter data based on assigned targets or indicators.

(iii) Validator: user authorized to "approve" the data that has already been entered (a role generally assumed by the NSOs or agencies designated as focal points for the Sendai Framework). This is a necessary step for the information to be considered "shared" or "published." The validation process, as well as data entry itself, are done on an indicator-by-indicator basis. Although this process may be ongoing, it is reflected in annual reports.

(iv) Observer: user authorized to log into the system, but not authorized to enter data or make changes.

It is recommended that the role of observer be assigned to member organizations involved in disaster risk reduction-related issues that can provide comments, views or suggestions on the availability, quality and limitations of data relating to gender mainstreaming and disasters.

In the context of the institutional arrangements required for monitoring the Sendai Framework, the existing coordination mechanisms must be identified to ascertain the role of statistical offices and to understand and assess the sustainability of the processes undertaken. The implementation of coordination mechanisms assumes the existence of an integrated governance approach that facilitates data management for indicator development. A review of the experiences of countries in the region clearly reveals that, given the lack of permanent bodies dedicated to implementation of the Sendai Framework within sectoral institutions, coordination mechanisms could help mitigate existing constraints.

There are several experiences of horizontal coordination in the region through conventions, letters of agreement, work agendas, inter-agency road maps, pacts and alliances, among other forms of collaborative engagement. It is important to identify these mechanisms to affirm the objectives of coordination, the actors involved, the scope, duration and expected outcomes.

More sustained coordination occurs within the framework of national statistical systems when risk management offices are part of these systems or are linked to a specific area. This institutional arrangement provides considerable support for the management of official information relating to disaster risk management.

A review of chapters 5 and 6 of the "United Nations national quality assurance frameworks manual for official statistics: including recommendations, the framework and implementation guidance," published by the Department of Economic and Social Affairs, is recommended as a reference for strengthening processes aimed at integrating actors involved in disaster risk management into the national statistical system (see diagram IV.3). The *Code of Good Practice in Statistics for Latin America and the Caribbean* (ECLAC, 2012), which defines a number of useful principles and rules focused on statistical activity, should also be consulted.

Diagram IV.3
Institutional arrangements for a national quality assurance framework
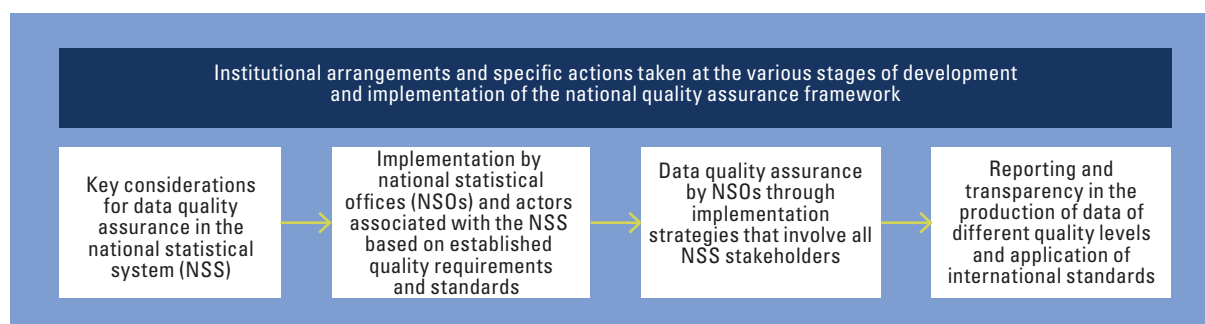
Institutional arrangements and specific actions taken at the various stages of development and implementation of the national quality assurance framework

| Key considerations for data quality assurance in the national statistical system (NSS) | Implementation by national statistical offices (NSOs) and actors associated with the NSS based on established quality requirements and standards | Data quality assurance by NSOs through implementation strategies that involve all NSS stakeholders | Reporting and transparency in the production of data of different quality levels and application of international standards |

In some cases, statistical criteria have been adopted across disaster risk management offices to ensure a higher quality of data processing and guarantee its applicability in the generation of the Sendai Framework indicators. In the absence of such linkages, it is important that the coordinating entities of the national disaster risk management systems create or strengthen multidisciplinary and multisectoral working groups, specialized in statistical work, within their own structures.

3. Management agreements regarding the role of national statistical offices and data management

It is important to identify and consolidate the types of agreements or collaboration mechanisms that national statistical offices establish with disaster risk management offices. The type of agreement makes it possible to specify whether the statistical office plays only the role of "information provider" or has greater involvement (e.g. "technical adviser" or another more technical role in the information generation process). This step is important for the definition of strategies to strengthen the role of national statistical offices in data quality assurance processes related to the Sendai Framework indicators.

B. Step 2: standardization of disaster risk concepts and terms

Knowledge of concepts and terms related to disaster risk reduction enables the optimization of data management processes and the generation of indicators to be used in national reporting on progress made with implementation of the Sendai Framework.

The international terminology agreed between countries and national and regional organizations, as well as the United Nations system and the regional economic commissions, should be revisited. A number of important documents and sources have been produced by various international, regional and United Nations working groups. Diagram IV.4 illustrates some terms and concepts that should be standardized as the basis for the subsequent steps relating to management of statistical information.

Diagram IV.4
Conceptual references associated with the standardization of disaster risk concepts and terms

4	Conceptual references

- Identification of documents outlining the various frameworks
- Formulation of recommendations for the standardization of terms
- Proposal of basic terms to be used in indicator development

(continued) Step 3
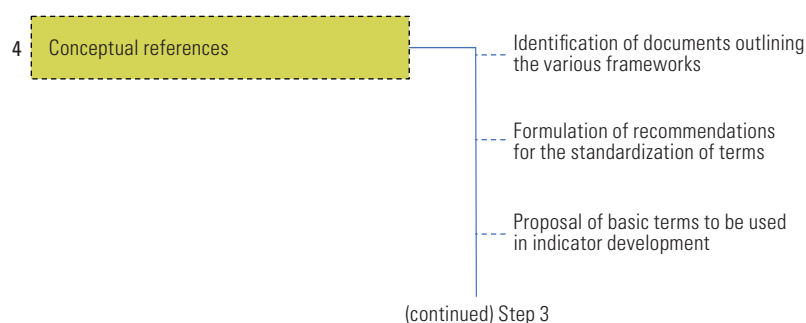
Source: Prepared by the authors.

1. Conceptual references

The review of concepts and terms is an essential step in compiling data on the Sendai Framework indicators. In addition to data related to disaster risk, data on statistical management should be considered. Table IV.1 provides a basic bibliography of terminology tools directly related to disaster risk.

Table IV.1
Basic bibliography of disaster risk management and statistical management terminology tools

Scope	Document	Author and year	Description
Worldwide	*Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction*	United Nations, 2016	Definition of the Sendai Framework indicators and the concepts associated with the disaster risk reduction process, adopted by the United Nations General Assembly in resolution 71/276 in February 2017
Worldwide	*Developing Gender Statistics: A Practical Tool*	ECE, 2010	Criteria and definitions for the generation of gender statistics and the importance of their application in decision-making
Worldwide	*Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction: Collection of Technical Notes on Data and Methodology*	UNDRR, 2017a	Essential concepts and terminology applied to understanding the targets and indicators of the Sendai Framework
Worldwide	"United Nations national quality assurance frameworks manual for official statistics: including recommendations, the framework and implementation guidance"	United Nations, 2019	Terms associated with assessment of statistical data quality —includes recommendations, the framework, and implementation guidance
Worldwide	"Strategic Framework on Geospatial Information and Services for Disasters"	UNGGIM, 2020, unpublished	Concepts and definitions associated with access to information, geospatial services, emergency management and disaster risk management.
Worldwide	"Shifting the Paradigm: Introducing the Global Risk Assessment Framework"	UNDRR, 2020	Revised terms and new conceptual inputs related to disaster risk
Worldwide	"Framework for the Development of Environment Statistics (FDES 2013)"	United Nations, 2021	Statistical concepts applied to extraordinary events, disasters and other categories of phenomena that affect human well-being and infrastructure —addresses disaster preparedness and management
Worldwide	*Theoretical framework*	Working Group on Measuring and Recording Indicators related to Disaster Risk Reduction, 2019	Concepts drawn from various sources —presents statistical management concepts applied to disaster risk measurement
Worldwide	*Generic Statistical Information Model (GSIM): Statistical Classifications Model*	United Nations, 2015a	Definition, objective and structure of internationally agreed official statistics
Worldwide	*Generic Statistical Business Process Model (GSBPM)*	ECE, 2016	Description and definition of the processes required to produce official statistics —provides a standard framework and harmonized terminology to help statistical organizations modernize their statistical production processes and share methods and components
Worldwide	*WHO Technical Guidance Notes on Sendai Framework Reporting for Ministries of Health*	PAHO, 2021	Provides guidance to the health sector, particularly to the relevant ministries, on its role in collecting and presenting data relevant to the Sendai Framework targets and the Sustainable Development Goals (SDGs)
Worldwide	*Hazard Definition and Classification Review*	International Science Council/ UNDRR, 2020	Globally standardized concepts relating to natural, technological, spatial, geological, chemical, biological and social hazards, by thematic group or cluster
Worldwide	*Disaster Risk Reduction Terminology*	UNISDR, 2009	Internationally standardized concepts resulting from consultation with a wide range of experts and professionals at international meetings, regional discussions and national forums
Regional	*Recommendations on the Role of Official Statistics in Measuring Hazardous Events and Disasters*	ECE, 2019	List of terms and definitions related to disasters, their effects and the attendant losses
Regional	*Disaster-related Statistics Framework*	ESCAP, 2018	Globally harmonized definitions associated with preparing disaster-related statistics —addresses the promotion and development of a core body of disaster-related statistics, standardized at the national level and aligned with other countries
Regional, Latin America and the Caribbean	*Regional Code of Good Practice in Statistics for Latin America and the Caribbean*	ECLAC, 2012	Concepts associated with the statistical processes involved in the standardization and improvement of data quality
Regional, Latin America and the Caribbean	*Handbook for Disaster Assessment*	ECLAC, 2014	Concepts associated with approaches to disaster impact assessment in different parts of the region
Andean Subregion	*Glosario de términos y conceptos de la gestión del riesgo de desastres para los países miembros de la Comunidad Andina: Decisión 825*	General Secretariat of the Andean Community, 2018	A standardized tool for the Andean Community (CAN) countries (Colombia, Ecuador, Peru and Plurinational State of Bolivia) that defines relevant disaster risk and disaster management concepts —complementary document to the Andean Strategy for Disaster Prevention and Response

Table IV.1 (concluded)

Scope	Document	Author and year	Description
The Caribbean	*Regional Comprehensive Disaster Management (CDM): Strategy and Results Framework 2014–2024*	CDEMA, 2014	Annex of proposed terms for the Caribbean region (Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname and Trinidad and Tobago)
Central America	*Updated glossary of terms pertaining to disaster risk reduction*	CEPREDENAC, 2010	Standardized terms for the Central American region (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama) and the Dominican Republic
South America	*Glosario básico de gestión integral de riesgos de desastres del MERCOSUR*	MERCOSUR, 2015	List of useful terms compiled from various academic sources and international documents that can serve as a reference for the Southern Common Market (MERCOSUR) countries (States Parties: Argentina, Bolivarian Republic of Venezuela, Brazil, Paraguay and Uruguay)

Source: Prepared by the authors.

Other national publications and sources (e.g. platform-based, observatories or information databases), from non-governmental organizations, international organizations, the United Nations and academic institutions may be added to this list to create a complementary, basic bibliography that can be adapted to the conditions in each country.[10] This complementary basic bibliography will be useful for deepening the understanding of risk and the statistical processes required to develop the Sendai Framework indicators when applied regionally and nationally.

Identification of the types of documents and other possible sources will facilitate analysis of the concepts used and help determine whether they are consistent with international definitions or are of national origin, which will enable the design of methodologies for future standardization.

2. Selection and standardization of useful concepts relevant to the statistical management of disaster risk information

Table IV.2 provides a general list of basic terms suggested for estimating the Sendai Framework indicators[11] and that can be supplemented based on the purpose of the analysis or the expected outcomes.

The terms and concepts should be reviewed and compared to determine whether they are aligned with the 2030 Agenda, the SDGs, the Paris Agreement on climate change, and other regional and global documents defining conceptual guidelines and terminology.[12] They must demonstrate semantic similarity, provide specific definitions and illustrate clear relevance to the phenomenon being explained. This exercise will facilitate the initial standardization of terms from the proposed basic bibliographic database and any supporting bibliographic databases.

This standardization exercise would facilitate adding or complementing various concepts with other national sources to ensure alignment with conditions in each country, avoid conceptual redundancy and ensure complementarity or advancement of thought on the subject.

In harmonizing the terms, it is important to consider general criteria such as universal application, complementarity, inclusion and comprehensiveness. Some of these criteria are mentioned in the Generic Statistical Information Model (GSIM) of the Department of Economic and Social Affairs as part of the process of defining the concepts.

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[10]   The following are worth noting: DesInventar Sendai, INFORM, Center for Research on the Epidemiology of Disasters (CRED) or the International Disaster Database (EM-DAT), CEPALSTAT, Regional Knowledge Platform on the 2030 Agenda in Latin America and the Caribbean (SDG Gateway) and the Plataforma de Información y Cooperación Regional from the Coordination Centre for Disaster Prevention in Central America and the Dominican Republic (CEPREDENAC).

[11]   The above-mentioned *Marco teórico* of the Working Group on Measuring and Recording Indicators related to Disaster Risk Reduction should also be consulted.

[12]   Other resources of interest and relevance include The *United Nations Plan of Action on Disaster Risk Reduction for Resilience*, the system-wide strategy on gender parity, the ECLAC Knowledge Transfer Network (KTN), The Regional Action Plan for the Implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030 in the Americas and statements from regional and global platforms for disaster risk reduction.

Table IV.2
Suggested terms for disaster risk management

Risk management area	Suggested terminology	Source or explanatory note
Variables to be analysed	Natural hazards, anthropogenic or human-induced hazards, technological hazards, environmental hazards, biological hazards, hazardous events, extreme events, hydrometeorological events, hazards	Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction establishing the Sendai Framework indicators and the concepts associated with the disaster risk reduction process (United Nations, 2016); *Hazard Definition and Classification Review* (International Science Council/UNDRR, 2020)
	Vulnerability, exposure, capacity and resilience or adaptation, climate risk, systemic risk	*Hazard Definition and Classification Review* (International Science Council/UNDRR, 2020); Global Risk Assessment Framework (UNDRR, n/d and 2020); *Disaster-related Statistics Framework* (ESCAP, 2018); "Strategic Framework on Geospatial Information and Services for Disasters in the Americas" (UNGGIM, 2020, unpublished)
Governance	Risk management or risk reduction strategies or plans	Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction establishing the Sendai Framework indicators and the concepts associated with disaster risk reduction (United Nations, 2016); *Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction: Collection of Technical Notes on Data and Methodology* (UNDRR, 2017a)
	Risk management policies; institutional framework for disaster risk management	*Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction: Collection of Technical Notes on Data and Methodology* (UNDRR, 2017a); *Disaster-related Statistics Framework* (ESCAP, 2018)
	Risk management and governance; inclusive risk management	Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction establishing the Sendai Framework indicators and the concepts associated with disaster risk reduction (United Nations, 2016); Global Risk Assessment Framework (UNDRR, n/d and 2020)
Preventive and corrective management	Prevention, mitigation, preventive planning, prevention or mitigation plans	*Disaster-related Statistics Framework* (ESCAP, 2018)
	Critical infrastructure, basic services, critical sectors and infrastructure	Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction establishing the Sendai Framework indicators and the concepts associated with the disaster risk reduction process (United Nations, 2016); "Strategic Framework for Geospatial Information and Services for Disasters" (UNGGIM, 2020, unpublished)
Reactive management	Emergency, disaster, emergency plans, early warning systems, disaster management, disaster response, humanitarian assistance, economic impact, damage and loss, deceased/missing/affected/injured persons and persons sheltered in camps	*Hazard Definition and Classification Review* (International Council of Science/UNDRR, 2020); Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction establishing the Sendai Framework indicators and the concepts associated with disaster risk reduction (United Nations, 2016)
Prospective management	Research, prospective scenarios, future risk	*Terminology on Disaster Risk Reduction* (UNISDR, 2009); *Glosario de términos y conceptos de la gestión del riesgo de desastres para los países miembros de la Comunidad Andina: Decisión 825* (General Secretariat of the Andean Community, 2018)
Time-series analysis	Hazardous events, historical underpinnings of disasters, recurring events	Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction establishing the Sendai Framework indicators and the concepts associated with disaster risk reduction (United Nations, 2016); *Hazard Definition and Classification Review* (International Science Council/UNDRR, 2020)
Information analysis	Self-assessment of data, good practice codes, data standardization	*Disaster-related Statistics Framework* (ESCAP, 2018); "National Quality Assurance Framework Manual in Official Statistics: Includes Recommendations, Framework and Implementation Guide" (United Nations, 2019); *Generic Statistical Business Process Model GSBPM* (UNECE, 2016)
Data standardization and validation	Statistical risk classification system, data standardization instruments, databases, administrative and statistical records, standardization of records, statistical processing instruments, geospatial analysis, data protocols	"National Quality Assurance Framework Manual in Official Statistics: Includes Recommendations, Framework and Implementation Guide" (United Nations, 2019); *Generic Statistical Business Process Model GSBPM* (UNECE, 2016); *Generic Statistical Information Model (GSIM): Statistical Classifications Model* (United Nations, 2015a)
Statistical management for Sendai Framework indicators	Statistical operations, validation of indicators, data quality, risk indicators, metadata, validator, coordinator, observer, administrator	Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction establishing the Sendai Framework indicators and the concepts associated with disaster risk reduction (United Nations, 2016); *Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction: Collection of Technical Notes on Data and Methodology* (UNDRR, 2017a); *Generic Statistical Information Model (GSIM): Statistical Classifications Model* (United Nations, 2015a)
Sustainability of information and reports	Assessment, statistical report, assessment and verification tools	*Disaster-related Statistics Framework* (ESCAP, 2018); "National Quality Assurance Framework Manual in Official Statistics: Includes Recommendations, Framework and Implementation Guide" (United Nations, 2019); *Generic Statistical Business Process Model GSBPM* (UNECE, 2016); *Generic Statistical Information Model (GSIM): Statistical Classifications Model* (United Nations, 2015a)

Source: Prepared by the authors.

The terms must be aligned with global and regional agreements and with terminology that has already been globally harmonized. They should be tailored to conditions in the territories and societies and include different perspectives on inclusive and comprehensive disaster risk management. They should also offer new perspectives on social, environmental, economic, political and cultural aspects in accordance with the Sendai Framework.

The *Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction Collection of Technical Notes on Data and Methodology* (UNDRR, 2017a) should be consulted as the official authority for the standardization of terms relating to development of the Sendai Framework indicators. This document breaks down the basic terms used to explain these indicators.

Additional terms related to national or other conceptual approaches to risk management can be added to the list of suggested basic terms. General standardization criteria and the complementary bibliographic databases should be considered during this process.

Regarding statistical concepts and definitions, the Expert Group on National Quality Assurance Frameworks of the United Nations Statistical Commission (United Nations, 2019) recommends that NSOs and NSS members carry out statistical activities and use international concepts, classifications and methods to ensure the consistency of official statistics and the efficiency of statistical systems at all levels. The *Generic Statistical Business Process Model (GSBPM) and Generic Statistical Information Model (GSIM): Statistical Classifications Model* listed in table 6 should also be consulted.

Concepts of biological risk associated with the pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) are incorporated in the notion of systemic risk. These concepts can cut across several conceptual domains, and their effects can be direct and indirect and affect different sectors of society at different scales.[13] From this perspective, the notion of systemic risk triggered by the pandemic helps reinforce and clarify the indicators associated with the number of deaths and persons affected, the scope of damages and losses and the data on the disruption of essential health, economic and educational services, among other factors.

3. List of terms and concepts selected and standardized for statistical estimation of indicators pertaining to the disaster-related SDGs and the Sendai Framework

A definitive list of terms and concepts associated with the statistical measurement of disaster risk should be finalized through a simple standardization process to ensure complementarity. Table IV.3 proposes a list of basic terms associated with the Sendai Framework targets and indicators, in view of the methodological process described in this document.

Since the proposed list is general, a more detailed standardization and complementarity exercise may result in the addition of terms in both the risk and statistical areas. The goal is for each NSO and the different risk management agencies to agree on the list based on their national needs and contexts to manage coordination with the corresponding Sendai Framework indicators and reports.

The terms "missing person", "disaster deaths" or "killed by disasters" are often vulnerable to various subjective interpretations based on an understanding of what a disaster entails and its consequences. Standardization is essential and aims align the term, as far as possible, with the definition provided in internationally validated documents included in the basic bibliographic databases.

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[13] UNDRR and WHO recommend that the data on deaths from COVID-19 reported through the Sendai Framework Monitor match the official data the Ministry of Health has reported to WHO for publication.

Table IV.3
Terms applied to the Sendai Framework targets and indicators

Sendai Framework targets and indicators	Terms related to risk management	Terms related to statistical information	Terms related to the statistical process for the development of indicators
Metadata	Hazards Critical infrastructure Population Road networks	Open data Household statistics Population statistics Disaggregation Primary and secondary sources Gross domestic product (GDP)	Information analysis Good practice codes Standardization Statistical process Standardized concepts Validation
Target A Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020–2030 compared with 2005–2015	Deaths Missing persons[a] Disasters Hazards	Mortality rate	Self-assessment of data, good practice codes, data standardization Statistical risk classification system, data standardization instruments, databases, administrative and statistical records, standardization of records, statistical processing instruments, geospatial analysis, data protocols Statistical operations, data validation, data quality, risk indicators, metadata, validator, coordinator , observer, administrator Assessment, statistical report, assessment and verification tools
Target B Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020–2030 compared with 2005–2015	Injured or sick people Directly and indirectly affected persons[a] Disasters Damaged and destroyed dwellings Livelihoods	Annual average Household statistics: number of households or average number of persons per household Livelihoods	
Target C Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030	Direct and indirect economic losses Disasters Agricultural losses Loss of productive assets Damage to and loss of critical infrastructure Replacement cost	Productive assets GDP Cultural heritage Data on critical infrastructure Agricultural crops	
Target D Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030	Damage to and loss of critical infrastructure Security infrastructure Disruption of basic services	Statistics on health and educational establishments Types of basic services Data on critical infrastructure	
Target E Substantially increase the number of countries with national and local disaster risk reduction strategies by 2030	National disaster risk reduction (DRR) strategies Local or municipal DRR strategies Local governments	Municipalities and local governments (can be administrative units) Population statistics	
Target F Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of this framework by 2030	Official international support International cooperation Official development assistance (ODA) Other official flows Capacity building Developing countries Donors Knowledge transfer and exchange on science, technology and innovation (STI)	Investment for development	
Target G Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030	Early warning system Multiple hazards Disaster risk	Number of persons	

Source: Prepared by the authors.
[a] It is important to include disaggregated data on sex and age, as proposed in the Sendai Framework Monitor, as they enable more specific analyses, for example: (i) "missing persons" -> "missing men and boys" and "missing women and girls;" (ii) age, either by age range or dichotomous values (childhood, yes or no; older person, yes or no).

The social and economic crisis triggered by the coronavirus disease (COVID-19) pandemic is another example of the importance of establishing criteria and parameters for direct and indirect effects. These parameters should be considered in the definition of concepts for measuring indicators developed from information available through UNDRR and WHO and their regional offices. COVID-19 is included in the disaggregated hazard data provided in the national reports submitted through the Sendai Framework Monitor.

C. Step 3: analysis of the data and required information

This step refers to the process of assessing data availability and consistency and falls within the broad scope of the specification of requirements (UNECE, 2016), for which tools are used to derive data from different strategic sources and relevant actors.

The assessment of available data is carried out with techniques and tools often used in statistical processes and covers aspects such as availability, quality, recency, sources, format types and verified metadata. In this context, it is important to understand the type of data and its applicability, as adequate knowledge of the indicator and its underlying concepts guides the search for information (see diagram IV.5).

Diagram IV.5
Content used for analysis of the data and required information
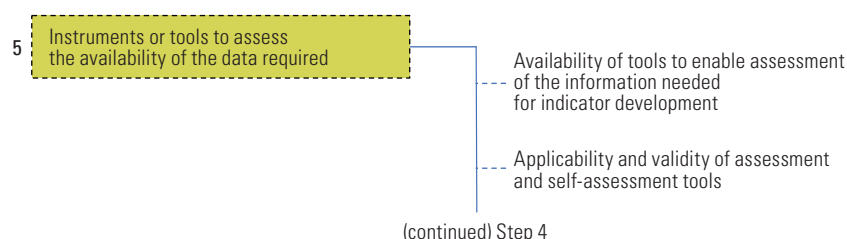
Source: Prepared by the authors.

1. Instruments or tools for assessing the availability of the data required

The adoption of a standardized approach to managing disaster risk concepts guides the process of identifying specific disaster risk issues and areas, which facilitates specification of the requirements. This process must be supported by tools for assessing data availability and quality. The assessment is conducted using four criteria: completeness, coherence, consistency and validity (see table IV.4).

Table IV.4
Criteria for assessing data quality

Criterion	Description
Completeness	The degree to which data associated with an entity has values for all expected attributes and related entities for a specific use.
Coherence	The degree to which concepts, methodology, and outcomes are logically connected.
Consistency	Data stability over time (classifications) and a process that analyses the logical and numerical relationship between two or more variables.
Validity	Corroboration of the data using criteria established by the source, applying source-specific validation rules (for example, ID numbers and allowable ranges).

Source: Prepared by the author, based on the National Administrative Department of Statistics (DANE), "Actualización Norma Técnica de Calidad del Proceso Estadístico (NTC PE 1000:2020)," 2020 [online] https://www.dane.gov.co/index.php/actualidad-dane/5264-actualizacion-norma-tecnica-de-calidad-del-proceso-estadistico-ntc-pe-1000-2020 and the National Institute of Statistics and Census (INEC), *Revista de Estadística y Metodología*, No. 5, Quito, 2019 [online] https://www.ecuadorencifras.gob.ec/documentos/web-inec/Bibliotecas/Revista_Estadistica/Revista_Estadistica_Metodologia-Vol-5.pdf.

Important tools have been developed at the global level to be used in assessing data availability and consistency. Some are used to identify the data that can be applied in the development of the Sendai Framework indicators and others are used to assess the quality of the data in other sectors, such as the environment (see table IV.5).

Table IV.5
Key regional and global data analysis tools

Tool	Description	Type of data and relevant target
UNDRR questionnaire to assess information for Sendai Framework reports (UNDRR, 2017a)	A tool that requires the countries of the region to make the necessary data available for calculation of the Sendai Framework indicators	All targets
ECLAC Environment Statistics Self-Assessment Tool (ESSAT) Assessment of information for Sendai Framework reports (in progress)	The FDES 2013 tool (Self-Assessment Tool for Environment Statistics) is being adapted to the environment-related requirements of the Sendai Framework. An inter-agency team will be created to compile information on the (relevant) demand and supply of basic disaster-related statistics and data	All targets
Data collection and verification sheets from the different national statistical offices (NSOs) (information that may be included on national questionnaires or surveys)	Instruments for observation, analysis and verification of the data available as well as follow-up with the corresponding entities. Individual cases by country (for example, in the case of the INE in Chile, conducting a survey of underlying risk factors)	All targets
Disaster-related Data for Sustainable Development. Sendai Framework Data Readiness Review 2017. Global Summary Report, 2017 (UNDRR, 2017b) and individual country reports available through PreventionWeb	Global summary report with contributions from 87 countries, including the following countries in Latin America and the Caribbean: Argentina, Barbados, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Plurinational State of Bolivia, Saint Kitts and Nevis, Saint Vincent and the Grenadines and Trinidad and Tobago	All targets
"United Nations national quality assurance frameworks manual for official statistics: including recommendations, the framework and implementation guidance," (United Nations, 2019)	A template providing recommendations for assessing the quality of official statistics from institutions and the national statistical systems	All targets
Generic Statistical Information Model (GSIM): Statistical Classifications Model, (United Nations, 2015a)	Reference framework with objective information to enable the management and use of data and metadata throughout the statistical production process	All targets
Generic Statistical Business Process Model (GSBPM), (UNECE, 2016)	A model that describes the processes involved in producing statistics. Indicates the specification of requirements and the assessment of data to ensure its applicability	All targets
"Data Collection and Analysis Methods in Impact Evaluation" (Peersman, 2014)	Description of an evaluation matrix to identify significant data gaps	All indicators, with a focus on the results of implementation of the indicators

Source: Prepared by the authors.

2.   Other observations

- In some countries, data quality has been assessed using the *Generic Statistical Business Process Model* (GSBPM). These evaluations identified quality-related aspects relevant to the development, production and dissemination of the SDG indicators. Applying this experience to the Sendai Framework indicators could be useful.

- It is also worth noting FAO experience in agricultural data diagnostics for the implementation of national disaster damage and loss assessment systems in the agricultural sector. The work done by countries of the Southern Agricultural Council (CAS)[14] and the Central American Agricultural Council (CAC)[15] should be reviewed to support the data used to obtain the agriculture-related indicators of the Sendai Framework.

- The role played by UNDP should also be considered in its capacity as the technical lead of the United Nations system, within the framework of the tripartite agreement among the European Union, the World Bank and the United Nations for damage, loss and post-disaster recovery needs assessment. The post-disaster needs assessment (PDNA) methodology is an important source of data and information with respect to targets A, B, C and D. For example, seven post-crisis assessments have been conducted in the past two years alone, including the crisis precipitated by the COVID-19 pandemic.

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[14]   CAS member countries: Argentina, Brazil, Chile, Paraguay, Plurinational State of Bolivia and Uruguay.
[15]   CAC member countries: Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua and Panama.

- To establish more detailed categories for analysis, it is important to consider the availability of disaggregated data, which enables more specific observations of a particular phenomenon. In the case of disaster risk and the Sendai Framework indicators, this significantly improves the quality of information on damages and losses caused by a disaster. The availability of disaggregated data in other categories (e.g. women, girls, non-binary gender identities, persons with disabilities, ethnic minorities, and other historically marginalized populations, among other categories) would facilitate more inclusive risk management through differentiated policies.

- The process of assessing data availability and consistency should be accompanied by a strategy to fill the gaps in the data and information required for the indicators. It is important to define the mechanisms for augmenting the data and, where applicable, improving its consistency (e.g. metadata, scale, attributes, among others).

D. Step 4: classification and standardization of applicable data

This step covers the set of categories assigned to one or more of the variables recorded in surveys, statistics and administrative records. It is used in the production and dissemination of statistics (United Nations, 2015a) and contributes to the design of statistical data management processes (UNECE, 2016).

This process requires catalogues, risk classifiers, or statistical data formats to enable organization of the data input and output structure according to pre-established categories and codes. The classification and standardization of disaster risk data is an important stage that reduces the likelihood of differences in the interpretation, treatment and outcomes of risk analysis. This process will allow for more efficient, standardized and consensus-based management and more accurate measurement of disaster risk (see diagram IV.6).

Diagram IV.6
Instruments and information for data classification and standardization

6 | Instruments for classifying and standardizing statistical data

Existence of a risk classifier or risk coder currently in use or in the process of being developed

Existence of a statistical tool to standardize and ensure data quality, including technical standards for data collection on other issues that may be applicable to disaster risk

Step 5 (continued)
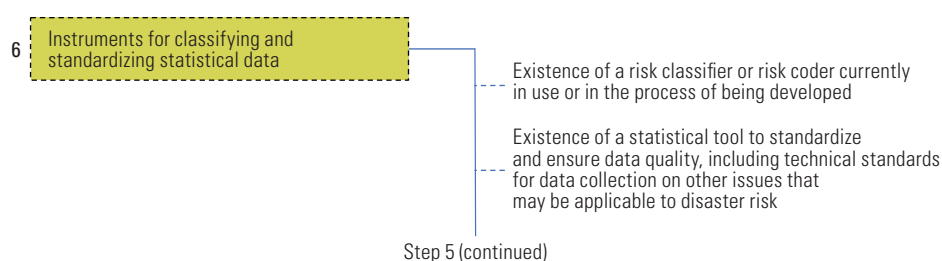
Source: Prepared by the authors.

While this process still poses a significant challenge in the region from a statistical perspective, a number of valuable experiences in classifying risk information can be identified (for example, the statistical classification of emergencies, disasters and catastrophes, which is currently being developed by the INE in Chile, should be reviewed).

1.   Instruments for the classification and standardization of statistical data

In Latin America and the Caribbean, there are several ways of classifying information used to measure disaster risk, demonstrating that, at a statistical level, a single "encoder or classifier" does not yet exist as a mechanism for validating disaster risk data, resulting in unnecessary repetition, inconsistencies, and different interpretations and types of analysis. Therefore, it is important to identify the various tools used to establish the limitations and strengths of the process for ensuring the quality of statistical data.

Implementation of the second and third steps outlined in this document (respectively, standardization of concepts and terms applied to disaster risk and analysis of the data and required information) enables the design of more suitable mechanisms for data classification and standardization; hence the importance of defining baseline tools in such processes.

The *Generic Statistical Information Model (GSIM)* merits consideration to further develop disaster risk classification. This global instrument includes agreed definitions and mechanisms for statistical management, defines the concept of "statistical classification" and describes the structures needed for its implementation.

The classifier for emergencies, disasters and catastrophic events, developed by INE of Chile, is a standardization instrument that will enable the grouping and organization of data into thematic categories, based on similarity criteria.[16] This instrument is the first of its kind in the region and could be adapted to processes associated with the classification of disaster risk statistics by national statistical offices (see diagram IV.7).

Diagram IV.7
Proposed structure of the classifier for emergencies, disasters and catastrophic events

01 IDENTIFICATION Disaster classification and coding	02 LOCATION Description of the special event	03 TIME Description of the event based on the day and time	04 **CATEGORIZATION** **Basic technical description of each type of event**
05 WARNING Definition of the type of alert, coverage and activating agency	06 INDIVIDUAL IMPACT Disaggregation of information based on type of impact on individuals	07 STRUCTURAL IMPACT Building registry based on destination, services and basic supplies affected	08 RESPONSE Agencies involved and government measures based on level of response

Source: P. Casanova Vidal, "Desarrollo Sistema Estadístico Nacional de Desastres. Trabajo colaborativo entre INE–ONEMI", Instituto Nacional de Estadísticas (INE), presentación realizada en la Tercera Reunión del Foro de los Países de América Latina y el Caribe sobre el Desarrollo Sostenible, abril de 2019 [en línea] https://foroalc2030.cepal.org/2019/sites/foro2019/files/presentations/patricia_casanova_ine_chile.pdf.

The United Nations Expert Group on International Statistical Classifications and the Inter-Agency and Expert Group on Disaster-related Statistics should analyse the classification proposed by the Chilean INE to supplement it and align it with international standards, thus making it a useful tool for harmonizing emergency and disaster-related data on a regional and global scale.

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[16]   INE of Chile uses this model, which enables the generation of statistical series for continuous analyses of disaster impacts that can be compared over time, thus contributing to the national statistical heritage and satisfying national requirements and international commitments pertaining to the development of DRR indicators.

2.   Other classification instruments

There are other important tools that provide statistical classification criteria related to disaster risk, as shown in table IV.6.

Table IV.6
Key statistical classification instruments

Classification instruments	Description
International Classification Family, United Nations Statistics Division, Department of Economic and Social Affairs.	Various classifications by domain, activity and sector. Although it does not include specific classification of disaster risks, some classifications may serve as an example (security and environment) or reference for the development of statistical risk classifiers. In addition, the United Nations Expert Group on International Statistical Classifications could offer perspectives for consideration regarding approaches to classification.
Handbook for Disaster Assessment (ECLAC, 2014).	General disaster risk and impact classification tables, including global sources, such as EM-DAT.
"Framework for the Development of Environment Statistics (FDES 2013)" (United Nations, 2021).	Classification and categories of extreme natural events, *natural disasters* and technological disasters (component 4).
Hazard Information Profiles. Supplement to: UNNDRR-ISC Hazard Definition & Classification Review—Technical Report (Consejo Internacional de Ciencias/UNDRR, 2021).	Collection of definitions of more than 300 threats relevant to the Sendai Framework, the Paris Agreement and the Sustainable Development Goals (SDGs).
Principios básicos de las clasificaciones estadísticas en el ámbito sociodemográfico - Histórica (INEGI, 2005).	Criteria and considerations for statistical classifications that could be applicable to risk.

Source: Prepared by the authors.

In addition to these global and regional tools, there are other instruments dedicated to the classification and standardization of data and to ensuring that they are "statistically sound." All the national statistical offices in the region employ different tools that allow for assessment of the quality of data derived from various sources, such as administrative records (for example, INEC of Ecuador, which classifies data from administrative records after quality assessment).

E.   Step 5: management of data collection/utilization

This step refers to the definition of instruments to retrieve and leverage material from various sources in order to create databases that will be subsequently processed to generate indicators related to the Sendai Framework.

This process involves the preparation, collection and partial processing of the reports received (UNECE, 2016). It includes the stages associated with determination of the periodicity of collection and the applicability of the information gathered.

This step is an important pillar of statistical management as it helps identify ways to leverage reports derived from administrative records or alternative sources (for example, non-tabular data, mobile phone records, remote or direct sensors, transactions, social media, among others). Disaggregated records can also be generated by sectoral entities and thematic organizations and partnerships, such as those relating to women, persons with disabilities, indigenous people, people of African descent, migrants, civil society groups, non-governmental organizations, academia, the private and business sectors as well as other entities that generate data on historically marginalized populations (see diagram IV.8).

Diagram IV.8
Collection and use of information
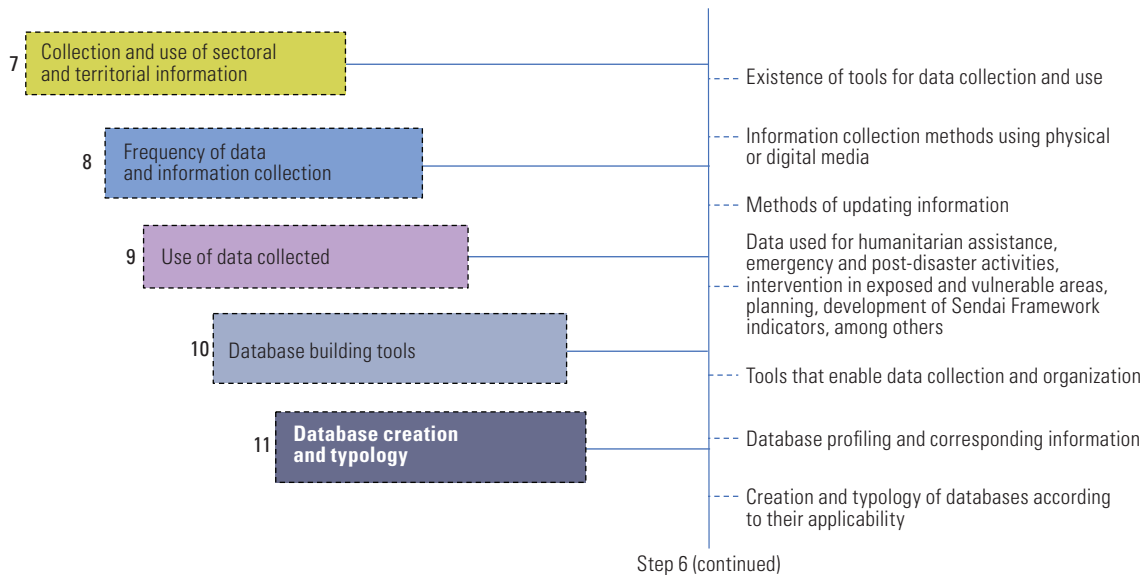
Source: Prepared by the authors.

1.   Collection and use of sectoral and territorial information

It is important to define the reference data and variables required to assess the data sources using statistical tools. Information can be drawn from a variety of sources, including, for example, official statistics and administrative records, geospatial information, monitoring systems (hazard or risk observatories, early warning systems), estimates and models, as well as scientific and technical research (studies of risk scenarios, vulnerability and preventive planning studies, to name a few), as shown in table IV.7.

Knowledge of different experiences with managing administrative records is vital to data collection efforts. There are good practices being employed in the region that can be used to share experiences and leverage these records in disaster risk reduction efforts.

It is important to collect and use data from alternative sources associated with gender mainstreaming or social inclusion. This information will facilitate the inclusion of variables that are not generally considered in risk reduction efforts and will strengthen future vulnerability and risk analyses by including historically marginalized populations.

The data, information sources and statistical output of administrative records must meet minimum quality requirements. Solutions proposed by each NSO should be reviewed to improve the records associated with the Sendai Framework indicators.

In addition, the work by the Working Group on Administrative Records of the Statistical Conference of the Americas 2020–2021, which focuses on sharing experiences in the use and standardization of statistical records and their connection to disaster risk reduction, should be reviewed. Use of the *Cuestionario para Evaluar la Calidad de los Registros Administrativos* (CECRA) (Spanish only) is also recommended as it provides quality criteria on the use of records relevant to the SDGs and the 2030 Agenda that could be adapted to the Sendai Framework indicators.

Other ways of gathering information involve the use of questionnaires, interviews, or other data collection techniques. In the region, there are multiple data collection experiences at different levels that could be replicated in other contexts. Some examples are provided in table IV.8.

Table IV.7
Sources of the data needed for the development of indicators for the Sendai Framework
for Disaster Risk Reduction

Data required	Applicability	Key national sources
Currency and exchange rate Gross domestic product (GDP) (nominal) Percentage of paved roads Population by age group and sex Geographical scope (territorial administrations) Housing	Metadata in the Sendai Framework Monitor and for calculating all indicators	Official statistics from censuses, economic and household surveys, among others, central banks Other alternative sources: List of national currencies Official World Bank exchange rate United Nations Department of Economic and Social Affairs Database on Household Size and Composition United Nations Department of Economic and Social Affairs World Population Prospects
Educational facilities Health facilities Critical infrastructure (providing essential services[a])	Metadata—applicable to targets C and D	Official health and education surveys Administrative records and geospatial databases of ministries and sectoral actors in the areas of education, health, transportation and roads, basic service providers, municipalities, offices of planning and territorial development
Types of hazards	Metadata—applicable to all targets	Administrative records from risk management offices and various types of threat-monitoring entities
Agricultural crops Agricultural activities Productive assets	Metadata—applicable to target C	Official agricultural surveys Administrative records from risk management offices, agricultural ministries, municipalities and insurance companies
Persons who have died or gone missing, were injured or ill, had homes damaged or livelihoods affected by disasters	Indicators for targets A and B	Administrative records and geospatial databases from offices responsible for risk management, emergency management, legal and medical management and from civil registration offices
Agricultural losses attributed to disasters Direct economic losses due to damage to productive assets, housing, critical infrastructure (providing services) and cultural heritage attributed to disasters	Indicators for target C	Administrative records from risk management offices, ministries of agriculture, housing and service providers, cultural heritage registration and territorial planning offices Records from ministries or offices of economy and planning, municipalities and insurance companies
Damage to health, educational and other critical infrastructure attributed to disasters Disruption of basic health and educational services attributed to disasters	Indicators for target D	Administrative records from risk management offices, ministries of health and education and service providers, territorial planning offices Records from planning ministries or offices, municipalities and insurers
National and local disaster risk reduction (DRR) strategies	Indicators for target E	Administrative records or data collection from disaster risk management offices, municipalities and the ministries of various strategic sectors
International support for DRR by multilateral entities or through bilateral mechanisms International support for the transfer and exchange of DRR-related technologies and capacity building in DRR International, regional or bilateral capacity-building programs or initiatives pertaining to DRR Developing countries supported by international, regional or bilateral initiatives	Indicators for target F	Records from ministries and offices of finance, economy and planning, national public investment systems, municipalities, insurance companies, private companies and chambers of commerce and production Disaster risk management offices Ministries of foreign affairs National statistical offices
Multi-Threat Early Warning System Monitoring and forecasting systems Early warning dissemination Action plans in case of warnings in the territories Risk information and assessments accessible at all levels Protection of the exposed population using evacuation mechanisms in the event of a warning	Indicators for target G	Administrative records from risk management offices and diverse types of threat-monitoring entities Records from ministries with disaster risk management offices or similar bodies

Source: Prepared by the authors.

[a] Refers to critical infrastructure in the social (health, education and housing), basic services (transport, water and sanitation, energy, household gas) and productive (agriculture, tourism, trade and industry) sectors. The Sendai Framework Monitor enables other types of critical infrastructure to be added for the development of disaggregated indicators. For this, it is important to have access to the data generated by each sector responsible for such critical infrastructure.

Table IV.8
Latin America and the Caribbean (four countries): experiences in data collection and application

Country and institution	Experience	Description
Chile National Statistics Institute (INE) and Regional Offices of the National Office for Emergencies (ONEMI)	Survey of underlying risk factors at the local level	Data required to understand information management in disaster risk reduction (DRR) and support decision making in the municipalities Also useful in information analysis
Colombia National Planning Department (DNP)	Municipal index of disaster risk adjusted for capacity	Tool that defines risk conditions in relation to floods, mass movements and torrential rains, and the capacity of each territorial entity to manage them. Facilitates a differentiated approach to public policy priorities relating to disaster risk management to focus investments in the national and territorial budget and to prioritize technical assistance processes, among others
Ecuador Asociación de Profesionales de Gestión del Riesgo, National Institute of Statistics and Censuses (INEC), National Risk and Emergency Management Service	Disaster risk index adjusted for capacity, excluding municipalities	Municipal administrative records for analysis of local disaster risk management capacities May be applicable to target E
Ecuador Asociación de Municipalidades Ecuatorianas (AME), INEC, National Risk and Emergency Management Service	Collection of municipal risk data from municipal administrative records at the national level	Inclusion of risk variables in the AME administrative records of solid waste and water to obtain municipal risk data INEC submits annual cantonal information and describes the entire process of generating statistical information
Dominican Republic National Statistical Office (ONE), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and service providers	Collection of data on the impact of disasters on the disruption of basic services	Five standardized and integrated questionnaires using a data collection tool managed by the national statistical office These data apply to the indicators for target D, particularly indicator D5

Source: Prepared by the authors.

Other data are also available from social information systems and records of the beneficiaries of social protection programs in several countries in the region.[17] These data sources are used to strengthen social protection and welfare policies. These systems incorporate data networks from different administrative records and other alternative sources managed by the State, thus providing a wide range of data on the population's socio-economic and housing conditions.

Information produced from the consolidation of data from remote sensors, satellite information, photographs or shots taken of the earth's surface by drones and the use of the Global Positioning System (GPS) can be obtained from geospatial databases.

Several national statistical offices in the region incorporate geospatial techniques in the production and dissemination of statistical information, some of which are applicable to estimating disaster risk. One common approach is the development of a "risk atlas," which includes the analysis of geospatial and statistical information. This tool could serve as a model for the collection of geospatial information through multisectoral teams (the national statistical office and disaster risk management office) and the use of geographic information tools.

INFORM, a platform that gives access to risk profiles adapted by region, can also be used.[18] Analysis of these profiles, in addition to geospatial information from national disaster risk management systems, provides knowledge that can be used to examine geospatial statistics that are applicable to disaster risk management.

Georeferenced data are collected through the retrieval of geospatial data and information that help characterize human settlements and territories exposed to threats. The quality of geospatial information, data and the associated metadata should be assessed to maximize their use for statistical purposes.[19]

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[17]   For more information, see the document "Social information systems and registries of recipients of non-contributory social protection in Latin America in response to COVID-19," (Berner and Van Hemelryck, 2020).

[18]   A collaborative partnership between the Inter-Agency Standing Committee (IASC) Task Team on Preparedness and Resilience and the European Commission.

[19]   For example, in Colombia and Mexico, statistical and geospatial information retrieval techniques applied to DRR are used, reflecting the importance of the use of georeferenced information, from collection with quality attributes, analysis and assessment of risk through hazard and exposure models, to dissemination through publicly available platforms (for example, the Collaborative Site for Disaster Response (SICADE) of Mexico, managed by INEGI).

Population and housing censuses and national geostatistical frameworks are key resources for generating spatial risk analyses as they can provide geographic reference levels or geographic and statistical units. The information is, thus, comparable and useful for the construction of the Sendai Framework indicators, and for leveraging geospatial information, and is generally aligned with established standards. Some tools for improving the quality of these geospatial data references and techniques are described in table IV.9.

Table IV.9
Regional and global reference tools for the development of geospatial data, information and services

Global instruments	Description
Lines of work and Sustainable Development Goals (SDGs) Geospatial Roadmap from the Working Group on Geospatial Information of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators and the United Nations.	Develops lines of work to provide geospatial support for the production and dissemination of SDG indicators, which could be reproduced or adapted to the Sendai Framework indicators.
Statistical and Geospatial Framework for the Americas (MEGA). Implementation within the framework of the Committee of Experts on Global Geospatial Information Management for the Americas (UNGGIM: Americas).	Aimed at integrating regionally harmonized and unified statistical and geospatial information with common principles and standards. Endorsed by the Expert Group on the Integration of Statistical and Geospatial Information of UNGGIM: Americas.[a]
Integrated Geospatial Information Framework (IGIF) of the Committee of Experts on Global Geospatial Information Management (UNGGIM) and the World Bank.	A guide for the development and management of global geospatial information resources.
Strategic Framework on Geospatial Information and Services for Disasters, supported by UNGGIM.	Outlines a number of relevant challenges so that countries may adopt governance models for geospatial support in the event of disasters (in progress).

Source: Prepared by the authors.
[a] The Expert Group on the Integration of Statistical and Geospatial Information is coordinated by the National Administrative Department of Statistics (DANE) and the Instituto Geográfico Agustín Codazzi (IGAC) of Colombia.

One way to strengthen institutional capacities in DRR is to improve the quality of the administrative records held by risk management offices so that they can be used in statistical processes. The advisory role of the national statistical office and the integration and strengthening of statistical areas and staff are key to achieving this objective.

2.   Periodicity of data and information collection

Establishing the frequency of data collection is a crucial element in understanding the reliability, relevance and consistency of data. A data update programme should be implemented that reflects the different mechanisms for obtaining up-to-date, continuous and relevant data, based on existing conditions and information needs.

In the case of disaster risk reduction, data updates should be linked to territorial conditions and reflect the constant changes in the territory: demography, human settlements, changes in land use, environmental impact, among other factors. Moreover, the periodicity of data collection should be considered when recording hazardous events to avoid inconsistencies and gaps in the data.

While the data required for the Sendai Framework indicators may be generated continuously, they are typically reflected in annual reports. Table IV.10 provides indicative dates for the Sendai Framework reports.

Table IV.10
Indicative dates for Sendai Framework reports

	31 March	30 September
Data for 2005–2014 (baseline)	Targets A and B (C and D optional, but recommended)	Targets A and B (C and D optional, but recommended)
Data for 2015 onwards (Sendai Framework implementation period)	Targets A, B, C, D, E, F and G from 2015 up to two years prior Targets A, B, C, D and E for the previous year	Along with targets F and G for the previous year

Source: United Nations Office for Disaster Risk Reduction (UNDRR), *Disaster-related Data for Sustainable Development. Sendai Framework Data Readiness Review 2017. Global Summary Report*, 2017 [online] https://www.preventionweb.net/files/53080_entrybgpaperglobalsummaryreportdisa.pdf.

The data are current up to the previous year (data generated up to 2020 was submitted in 2021). Data can be entered or modified in the Sendai Framework Monitor at any time, including after the dates indicated and after validation.

3. Use of data collected

The data collected can be used in different ways based on the intended objectives and the quality of data processing. The requirements specification phase (defined by the GSBPM) should determine the relevance of the data for statistical purposes, verify whether existing data sources meet user requirements, and indicate their availability (for example, if there are usage restrictions).

In Latin America and the Caribbean, disaster risk data are used for different purposes according to the States' priorities. Most of this information is managed by risk management offices. Some of the most important uses of the data include the following:

- Creation of an historical record of hazardous events
- Monitoring of hazards in early warning systems
- Decision making in humanitarian and post-disaster assistance
- Land use and planning, including in vulnerable and exposed areas
- Emergency management and response
- Climate risk governance and management
- Risk management pertaining to geomorphological and hydrometeorological phenomena
- Rehabilitation and reconstruction
- Management of Sendai Framework indicators

Many of the above-mentioned uses of data are not directly linked to the Sendai Framework indicators as specific variables and attributes are not necessarily considered in their development. However, historical information on the impact of damages and losses may be useful for targets A, B, C or D. Data from early warning systems could help with monitoring target G, while data on the management of vulnerable and exposed areas, emergencies and reconstruction could assist with monitoring targets C or D. Therefore, from the beginning of the process, it is important to consider the requirements in terms of the variables and attributes that are needed to ensure that the data are applicable to the Sendai Framework indicators.

4. Database building tools

Building databases and managing them using a variety of technological resources is an important element of organizing the variables and attributes that make up the indicators. Several experiences in the region have been documented and can be replicated from a conceptual and methodological standpoint.

Database creation requires tools for storing, organizing and structuring data with the variables and attributes needed to conduct statistical analyses. Table IV.11 summarizes some tools used.

Table IV.11
Tools used in database creation

Tool	Description	Source
Tools for storing, consulting and processing risk information	DesInventar is a conceptual and methodological software tool for building databases on damages and losses caused by disasters. It helps with understanding disasters across a range of scales. It gives access to data that can then be reflected in thematic mapping, including at the local level. With the updated version (DesInventar Sendai), the data obtained can feed into the Sendai Framework reports.	Network for Social Studies on Disaster Prevention in Latin America (LA RED) and the OSSO Corporation for the original version (desinventar.org), and the updated version, DesInventar Sendai (desinventar.net), endorsed by UNDRR. DesInventar Sendai. DesInventar Sendai training site.
Comprehensive data management tools	Among other tools capable of integrating data management functions (collection, processing and results), KoBoToolbox is used in Latin America and the Caribbean. It is among the group of applications used in the collection of information in the field through surveys and censuses and can be linked to other analytical software. Similar software programs include: JotForm, Kizeo Forms, Formplus, Survey Solutions, among others.	https://www.kobotoolbox.org/. KoBoToolbox was developed by the Harvard Humanitarian Initiative. For use in humanitarian contexts, the server is sponsored by the United Nations Office for the Coordination of Humanitarian Affairs (OCHA). The National Statistical Office (ONE) for the Dominican Republic used KoBoToolbox for target D of the Sendai Framework. Survey Solutions enables the development of digital forms and digital data capture, work management and information analysis through its application programming interface (API). It is provided free of charge.
Software for the storage, processing, analysis and dissemination of geospatial data	Tools that facilitate the creation of georeferenced databases from diverse sources for spatial analysis Widely used for disaster risk.	There are several producers of geographic information systems (GIS). National statistical offices and risk management entities employ many of them.
Data editing software	Various software tools that enable data collection and editing for data structures. Among the most common are the SCPRO developed by the United States Census Bureau, SPSS, SBF, ASCCII and, of course, Excel.	There are several developers, many of which are employed by national statistical offices to create statistical databases.
Hierarchical data restructuring software	REDATAM is an accessible, interactive computer system that facilitates the processing, analysis and dissemination of information from censuses, surveys, administrative records, national/regional indicators and other data sources. The most recent version is from early 2015.	REDATAM is sponsored by the Economic Commission for Latin America and the Caribbean (ECLAC) and is commonly used by NSOs and official online data platforms.

Source: Prepared by the authors.

The data collected, structured and organized are drawn from various sources and are merged and consolidated to produce integrated statistics that, depending on their purpose and use, could generate various risk analyses or other similar outputs. In this section, it is important to explore data classification and standardization (described in section D, point 2 of this chapter). For example, the existence of a risk classifier can help standardize data based on a number of categories and unique codes.

Databases require administrators to ensure their functionality and maintenance. Disaster risk databases are generally overseen by national risk management offices, but it is important that NSOs jointly assess their condition and the technical needs associated with their use, dissemination or expansion.

Profiling is a key step in the database creation process and facilitates assessment of the quality of the information entered. While data quality and consistency are assessed in the previous step of data analysis and management, it is advisable at this stage to re-assess and cleanse the data to identify possible redundancies, flaws or inconsistencies, as well as other quality-related problems.[20]

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[20] These operations include, among others, removing file errors, determining whether errors influence the results, ensuring consistency, and examining classification and coding issues.
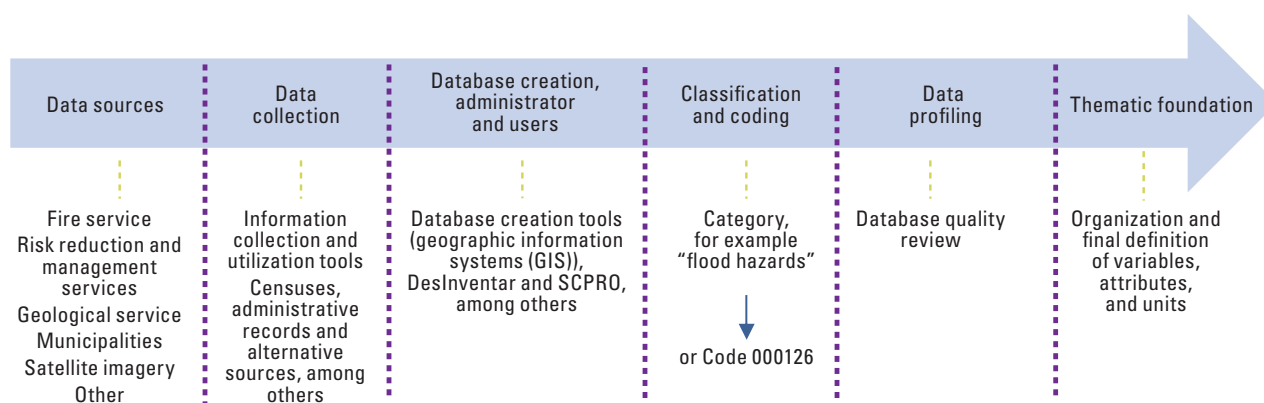
Many disaster risk databases use diverse sources, which must be corroborated, cleansed and updated to ensure their validity and reliability. The references to be used to develop the Sendai Framework indicators should be revised in line with the most recent statistical data quality and assessment standards.

The development of variables, attributes and units should be defined according to the intended use of the database and future analyses. A thematic database for developing the Sendai Framework indicators should be created so that the variables and attributes may be considered against the 38 indicators and to ensure that the data are accurate and appropriately designed for the relevant statistical operations.

Once database profiling has been completed, it is necessary to systematize and document the variables and attributes along with their units to facilitate their use in obtaining the Sendai Framework indicators. Diagram IV.9 summarizes this process.

Diagram IV.9
General process for creating statistical databases

Data sources	Data collection	Database creation, administrator and users	Classification and coding	Data profiling	Thematic foundation
Fire service Risk reduction and management services Geological service Municipalities Satellite imagery Other	Information collection and utilization tools Censuses, administrative records and alternative sources, among others	Database creation tools (geographic information systems (GIS)), DesInventar and SCPRO, among others	Category, for example "flood hazards" ↓ or Code 000126	Database quality review	Organization and final definition of variables, attributes, and units

Source: Prepared by the authors.

5.   Database creation and typology

The database is a tool that groups information in an organized and consolidated manner, with the aim of facilitating analysis and processing. Users should be able to gain access to the databases by various means (applications, remote or local access, permissions, among other elements) to update and re-enter the data and verify their quality.

There are several types of databases according to the objectives of data collection (as mentioned in subsection 3 above). At the regional level, there are several databases for disaster risk-related purposes, many of which aim to organize information for decision-making in the different phases of risk management. Although there do not appear to be any databases dedicated solely to the Sendai Framework indicators, with the exception of DesInventar Sendai, table IV.12 highlights some databases that can assist with development of some of the indicators.

Table IV.12
Useful reference databases for the Sendai Framework indicators

Databases	Description
Exposure and hazards in different territories according to different risk scenarios	These databases are managed in geographic information systems (GIS) using geospatial data. The INFORM platform can provide databases associated with risk profiles. Most of the hazard data comes from the academic community and from institutions in the field of earth sciences (such as IRIS or WOVOdat) hydrometeorology and climate management (such as NOAA), while territorial data are based on socio-demographic and economic data from national statistical offices (NSOs) and administrative records from various sectors and municipalities
Indicators of progress towards achieving the Sustainable Development Goals (SDGs)	Global database of over 210 indicators presented by indicator, country, region or time period —established by the United Nations Department of Economic and Social Affairs
Socio-economic, financial and environmental information (linked to GDP production)	Created by the NSOs from official surveys and records
Emergency management, first response and humanitarian aid	Databases have been created from the post-disaster needs assessment (PDNA),[a] the Damage Assessment and Needs Analysis (DANA) carried out by the Office of Foreign Disaster Assistance (OFDA) or the damage and loss assessment (DaLA) methodology developed by ECLAC and the portal on global humanitarian operational presence: who, what, where (OCHA). Many of these data are processed in the countries and adapted for thematic databases
Monitoring and early warning systems	These data are drawn from early threat warning systems. These data systems generally cover various stages of disaster risk management, such as preparedness, response and, in some cases, recovery using geospatial information
Population and housing	Created by the NSOs based on population and housing censuses
Risk reduction and improvement of human and institutional capacities	Databases on mitigation efforts, risk perception by institutions, presence of trained personnel for disaster risk reduction (DRR) and institutional mechanisms, among other data. In general, these databases are not commonly used in the region as these topics are often covered in other databases, such as those mentioned in this table
Register of events and damage	Databases have been created using DesInventar Sendai and international databases such as EM-DAT, Sigma, NatCat[b] and other global platforms In addition, many countries have their own damage and loss databases created from various administrative records

Source: Prepared by the authors.
[a] The PDNA databases are sponsored through the tripartite agreement among the European Union, the World Bank and the United Nations, with technical leadership provided by the United Nations Development Programme (UNDP).
[b] NatCat and Sigma have their own methodology for calculating the economic losses caused by the main types of disasters. They are managed by Munich RE and Swiss Re respectively, the world's leading reinsurance companies.

Databases used in calculating the Sendai Framework indicators should categorize the reference information in table IV.13 in terms of primary variables and attributes.[21]

Table IV.13
Suggested content for databases dedicated to developing the Sendai Framework indicators

Databases for estimation of the Sendai Framework indicators	Variables	Key attributes
Metadata	Currency Gross domestic product (GDP) National roads Population Geographic scope Housing Educational facilities Health facilities Critical infrastructure Hazards	Currency and exchange rate GDP (nominal) Percentage of paved roads Percentage of population by age group, sex and disability Type of territorial administration or geo-statistical unit Number of dwellings Number of educational facilities Number of health facilities Types of critical infrastructure Types of basic services Number of critical infrastructures Types of hazards Affected areas
Targets A and B (by disaster)	Deaths Missing persons Sick persons Damaged homes Affected livelihoods	Number of deaths (disaggregation by age group, sex and disability is recommended)

[21] For more detail and specific information on the data, see the *Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction: Collection of Technical Notes on Data and Methodology* (UNDRR, 2017a).

Table IV.13 (concluded)

Databases for estimation of the Sendai Framework indicators	Variables	Key attributes
Target C (by disaster)	Agricultural crops Agricultural activities Productive assets Agricultural losses Direct economic losses due to damaged productive assets Losses due to damaged or destroyed homes Loss of critical infrastructure Loss of cultural heritage	Types of agricultural activities Types of crops Types of productive assets Surface area of cultivated agricultural and livestock areas and productive assets Types of crops lost Annual monetary cost of agricultural losses Annual monetary cost of loss of productive assets, housing, critical infrastructure (providing services) and cultural heritage Number of dwellings, critical infrastructure (providing services) and cultural heritage lost or damaged (disaggregation of attributes by threat and geographic scope is recommended) Types of goods destroyed
Target D (by disaster)	Damage to health infrastructure Damage to educational infrastructure Damage to other critical infrastructure Disruption of basic services Disruption of health services Disruption of educational services	Types of damage to health, educational and critical infrastructure (partially or completely destroyed), ideally by type of hazard Number of damaged facilities Annual monetary cost of damage to health, educational and critical infrastructure (ideally by type of hazard and geographic scope) Instances of annual physical disruption of basic services (preferably by hazard and geographic scope) Number of people and area (estimated) affected by the disruption
Target E	Disaster risk reduction (DRR) strategies in line with the Sendai Framework	Number of DRR strategies implemented by local governments Geographic scope (national, local) Types of strategies Percentage of local governments implementing strategies
Target F	International support for DRR International support for the transfer and exchange of DRR-related technology International support for capacity building in DRR Programs or initiatives to build capacity in DRR Developing countries supported by initiatives	Types of international support for DRR (multilateral, bilateral) Types of donors and recipients of DRR funding Types and estimated amount of financing for DRR (annual) Types of support through DRR-related technology transfer and exchange (international, regional or bilateral) Types of donors and recipients of DRR-related technology exchange Types of entities providing support for DRR-related technology transfer and exchange Types of support for capacity building in DRR (international, regional or bilateral) Number of programs or initiatives for capacity building in DRR Number of territorial administrations with capacity-building programs or initiatives (international, regional or bilateral)
Target G	Monitoring and forecasting systems Dissemination of information from early warning system (EWS) Action plans for warnings in the territories Risk information and assessments accessible at all levels Protection of the exposed population using evacuation mechanisms in the event of a warning	Number of monitoring and forecasting systems in the country Types of threats identified in monitoring and forecasting systems Characteristics of the systems (monitoring, forecasting, messages to the population —in progress) Number of persons receiving information from early warning systems (by geographic scope and country) Types of broadcast media Percentage of local governments with an EWS action plan Quality of the plans (preparation, awareness-raising, assessment) Existence of national-level information and risk assessments Quality of risk assessments (by threat and local government) Percentage of population exposed, by threat type Percentage of population exposed, by local government Number of evacuees per year

Source: Prepared by the authors.

It is important to differentiate among the metadata, which can be (i) metadata or necessary basic information required by the online system for monitoring and reporting on the global indicators of the Sendai Framework targets to perform the calculations and (ii) statistical metadata required by databases such as the one suggested for calculating the Sendai Framework indicators, in which case it should provide information about their properties, characteristics and use.

The database should include the information necessary for accurate interpretation: variables, attributes generated, sources, collection and processing procedures, administrators, among other aspects that ensure the transparency and quality of the data. The national statistical offices have developed formats that meet international standards.

Disclosure control mechanisms should be employed to ensure that dissemination of the data and metadata through databases is carried out in a manner that does not violate the rules of statistical confidentiality and discretion. Various computer, web or conventional media, such as compact discs or USB memory sticks (DANE, 2020b), can then be used to disseminate the information.

# F. Step 6: processing and generation of statistical indicators

According to UNECE (2016), there are two key phases in the generation of indicators: processing and analysis. In the processing phase, calculations are performed, and the indicators are obtained. The analysis phase assesses the consistency of the data used and the results.

To facilitate the processing phase, UNDRR published the *Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction: Collection of Technical Notes on Data and Methodology* (UNDRR, 2017a), which sets out the statistical requirements and operations for obtaining the 38 indicators of the Sendai Framework. In the analysis phase, in addition to assessing the consistency of the data and results, the interpretation and explanation of data to be used in the preparation of the Sendai Framework report are reviewed.

The indicator generation mechanism provides for a validation process upon entry into the online Sendai Framework Monitor. In this regard, the work done by the NSO and the actors involved in risk-related issues, as well as use of the online system, are crucial. This process is illustrated in diagram IV.10.

Diagram IV.10
Calculation and validation of the Sendai Framework indicators
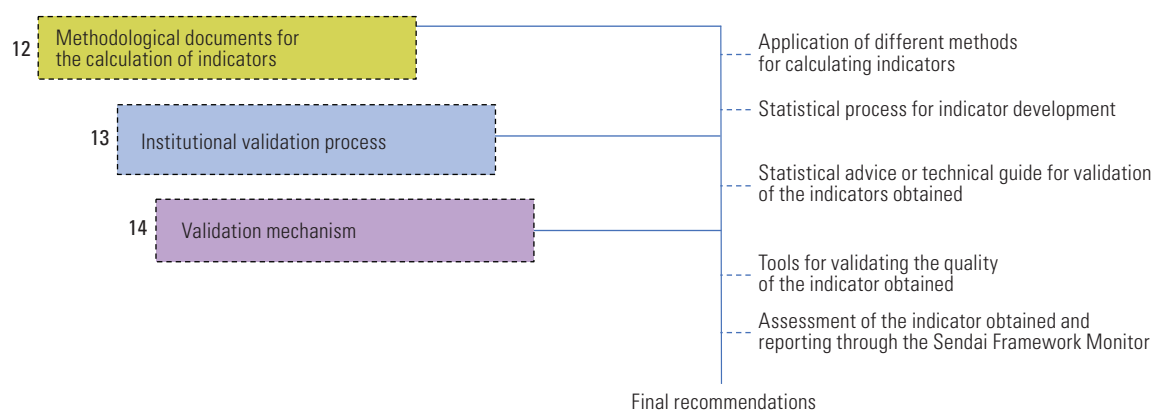
Source: Prepared by the authors.

1.   Methodological references for calculating the indicators

The calculation of indicators requires statistical operations based on traditional statistical standards and norms.[22] All procedures established for obtaining the indicator should be described in the form of metadata to facilitate the comparability, sustainability and transparency of processes in accordance with international recommendations and standards.

To validate and regulate a statistical operation, three important guidelines must be followed: (i) the code of good statistical practice (ECLAC, 2012), (ii) the statistical process model and (iii) the statistical certification system. The code and model are basic technical tools that regulate statistical production in line with principles of good practice and processes. The certification system is a set of procedures and actions aimed at ensuring the quality of statistical operations (INEC, 2013c).

There are specific reference documents that can be used in the generation of the Sendai Framework indicators (see table IV.14).

Table IV.14
Supporting reference documents for calculation of the Sendai Framework indicators

Methodological references	Description	Comments
Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction: Collection of Technical Notes on Data and Methodology (UNDRR, 2017a).	Includes concepts and calculations based on the minimum data required for each indicator of the seven global targets.	This document is used in most countries of the region and serves as a reference document for technical monitoring by national statistical offices.
DesInventar Sendai 10.1.2 User Manual. Administration and Data Management (UNDRR, 2019).	Describes the steps for using the DesInventar Sendai system and focuses on the data and ways to consolidate the Sendai Framework targets and indicators.	DesInventar is a tool used in several countries in the region. It provides key information for construction of the indicators for targets A, B, C and D and is linked to the online Sendai Framework Monitor.
"Methodological Guide for Developing Environmental and Sustainable Development Indicators in Latin American and Caribbean Countries" (Quiroga Martínez, 2009).	Outlines the underpinnings of the work involved in construction of the indicators and indicates a methodological path for the development and monitoring of environmental indicators. The methodological sheets for each indicator are provided.	A guide that can be adapted to the Sendai Framework indicators. It contains statistical principles and steps for construction of the indicators used by the national statistical offices in their work on statistical indicators.
Sistema de Monitoreo de Sendái: Compilación de los datos y otros requerimientos mínimos para la presentación de informes sobre los avances para alcanzar las metas globales del Marco de Sendái (available in Spanish only) (OSSO Corporation/UNDRR, 2019).	Derived from the UNDRR *Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction: Collection of Technical Notes on Data and Methodology*. Presents general methodological recommendations and the minimum data to be considered in the calculation of the Sendai Framework indicators.	A specific document used for Sendai Framework reports by many regional stakeholders.
WHO Technical Guidance Notes on Sendai Framework Reporting for Ministries of Health (WHO, 2020).	Guides the health sector, in particular the ministries of health, in the collection, submission and calculation of indicators pertaining to the Sendai Framework targets and other related frameworks, such as the Sustainable Development Goals (SDGs).	A document that complements the UNDRR technical guidance, but with common language and methods for health sector stakeholders, reflecting its multisectoral nature.
Plan de Desarrollo Estadístico para el reporte de los indicadores de los Objetivos de Desarrollo Sostenible. Tomo I: Diagnóstico de la capacidad estadística del Ecuador y estrategias de fortalecimiento (INEC, 2017) *Plan de Desarrollo Estadístico para los Objetivos de Desarrollo Sostenible. Tomo II: Producción de indicadores de la Agenda 2030 y fortalecimiento del Sistema Estadístico Nacional* (INEC, 2018a).	Includes guidelines and recommendations for the development of SDG indicators (e.g., implementation of statistical quality certification and standards for the transfer, storage and dissemination of statistical information).	Criteria that can be adapted to the development of the Sendai Framework indicators and that producers and users of this information should consider.

Source: Prepared by the authors.

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[22] Statistical operations refer to the set of processes and activities comprising the identification of needs and the design, construction, collection, processing, analysis, dissemination and evaluation of data for the production of statistical information on a topic of national and/or territorial interest (Decree No. 2404 of 2019 regulating Article 155 of Act No. 1955 of 2019 and amending Title 3 of Part 2 of Book 2 of Decree No. 1170 of 2015, Single Regulatory Decree of the Administrative Sector for Statistical Information).

The *Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction: Collection of Technical Notes on Data and Methodology* published by UNDRR (2017) should be used as a reference in the statistical operations required for the calculation of indicators. Other documents (such as those mentioned above or other national documents) may reinforce certain criteria and recommendations currently applied in several countries to adapt the calculation of indicators to national conditions.

Table IV.15 outlines the indicators considered in the Sendai Framework report.

Table IV.15
Indicators for the Sendai Framework report

Sendai Framework Targets	Indicators
Target A Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020–2030 compared with 2005–2015	A1 Number of deaths and missing persons attributed to disasters, per 100,000 population (compound A2, A3)
	A2 Number of deaths attributed to disasters, per 100,000 population
	A3 Number of missing persons attributed to disasters per 100,000 inhabitants
Target B Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020–2030 compared with 2005–2015	B1 Number of directly affected people attributed to disasters, per 100,000 population (composite indicator B2, B3, B4, B5)
	B2 Number of injured or ill people attributed to disasters, per 100,000 population
	B3 Number of people whose damaged dwellings were attributed to disasters
	B4 Number of people whose destroyed dwellings were attributed to disasters
	B5 Number of people whose livelihoods were disrupted or destroyed, attributed to disasters
Target C Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030	C1 Direct economic loss attributed to disasters in relation to global gross domestic product (compound C2, C3, C4, C5, C6)
	C2 Direct agricultural loss attributed to disasters
	C3 Direct economic loss to all other damaged or destroyed productive assets attributed to disasters
	C4 Direct economic loss in the housing sector attributed to disasters
	C5 Direct economic loss resulting from damaged or destroyed critical infrastructure attributed to disasters
	C6 Direct economic loss to cultural heritage damaged or destroyed attributed to disasters
Target D Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030	D1 Damage to critical infrastructure attributed to disasters (compound D2 to D4)
	D2 Number of destroyed or damaged health facilities attributed to disasters
	D3 Number of destroyed or damaged educational facilities attributed to disasters.
	D4 Number of other destroyed or damaged critical infrastructure units and facilities attributed to disasters
	D5 Number of disruptions to basic services attributed to disasters (compound)
	D6 Number of disruptions to educational services attributed to disasters
	D7 Number of disruptions to health services attributed to disasters
	D8 Number of disruptions to other basic services attributed to disasters
Target E Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020	E1 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030
	E2 Percentage of local governments that adopt and implement local disaster risk reduction strategies in line with national strategies
Target F Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of this framework by 2030	F1 Total official international support, (official development assistance (ODA) plus other official flows), for national disaster risk reduction actions
	F2 Total official international support (ODA plus other official flows) for national disaster risk reduction actions provided by multilateral agencies
	F3 Total official international support (ODA plus other official flows) for national disaster risk reduction actions provided bilaterally
	F4 Total official international support (ODA plus other official flows) for the transfer and exchange of disaster risk reduction-related technology
	F5 Number of international, regional and bilateral programmes and initiatives for the transfer and exchange of science, technology and innovation in disaster risk reduction for developing countries
	F6 Total official international support (ODA plus other official flows) for disaster risk reduction capacity-building
	F7 Number of international, regional and bilateral programmes and initiatives for disaster risk reduction-related capacity-building in developing countries
	F8 Number of developing countries supported by international, regional and bilateral initiatives to strengthen their disaster risk reduction-related statistical capacity

Table IV.15 (concluded)

Sendai Framework Targets	Indicators
Target G Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030	G1 Number of countries that have multi-hazard early warning systems (compound G2, G3, G4, G5)
	G2 Number of countries that have multi-hazard monitoring and forecasting systems
	G3 Number of people per 100,000 that are covered by early warning information through local governments or through national dissemination mechanisms
	G4 Percentage of local governments having a plan to act on early warnings
	G5 Number of countries that have accessible, understandable, usable and relevant disaster risk information and assessment available to the people at the national and local levels
	G6 Percentage of population exposed to or at risk from disasters protected through pre-emptive evacuation following early warning

Source: Prepared by the authors based on the United Nations *Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction* (A/71/644), 2016 [online] https://documents-dds-ny.un.org/doc/UNDOC/GEN/N16/410/23/PDF/N1641023.pdf?OpenElement.

Some indicators are compound indicators, meaning that their production depends on other indicators within the same targets. Other complementary documents should be consulted, such as the *Guía metodológica: Diseño de indicadores compuestos de desarrollo sostenible* from ECLAC and Deutsche Gesellschaft für Internationale Zusammerbeit (GIZ) (Schuschny and Soto, 2009), which provides definitions and outlines the limitations and advantages, as well as the technical requirements for the development of compound indicators.

The online Sendai Framework Monitor is a platform that facilitates the integration of metadata, variables, and attributes relating to the Sendai Framework indicators. Once this information is entered, calculations can be performed manually or automatically.

This platform for monitoring and reporting on the Sendai Framework targets allows for the global harmonization of information to develop indicators using standardized metadata, internationally recognized and validated calculation methods, and common, minimum information requirements for all member countries. Thus, it is possible to obtain national reports that are comparable with those of other countries in the region and in other regions.

The reports generated in the Sendai Framework Monitor can be particularly useful in developing strategies for disaster risk management issues as they address different aspects of risk such as governance, threats, identification of various inter-sectoral elements, economic and social impact, damage and loss, as well as other institutional and political factors pertaining to risk.

The process of developing the Sendai Framework indicators should be multisectoral, multidisciplinary and applicable at different territorial scales. The role of the "coordinator" of national focal points under the Sendai Framework (usually assigned to national risk management offices) is critical. Its functions include organizing the working group for the generation of the Sendai Framework indicators and defining the role of stakeholders in the Sendai Framework Monitor (see section A, subsection 2 of this chapter). For this reason, the importance of the "institutional arrangements" needed to organize information from various sectors and territorial areas should be emphasized, as well as the cross-cutting role of the national statistical offices in ensuring data quality.

To learn more about the use of the online Sendai Framework Monitor, the following activities are recommended:

- Offer the virtual course "An Orientation to Using the Online Sendai Framework Monitor" by UNDRR and the Asian Disaster Preparedness Centre.

- Use the Sendai Framework Monitor training system. Once signed in, enter ([abc]@sendai.com, where (abc) is the three-letter code from the International Organization for the Standardization of Country Names ISO 3166. Some codes for the region are BOL, COL, CHL, ECU, among others. Then type the password: 123456.

Image IV.1
Online system for the preparation of Sendai Framework reports (Sendai Framework Monitor)
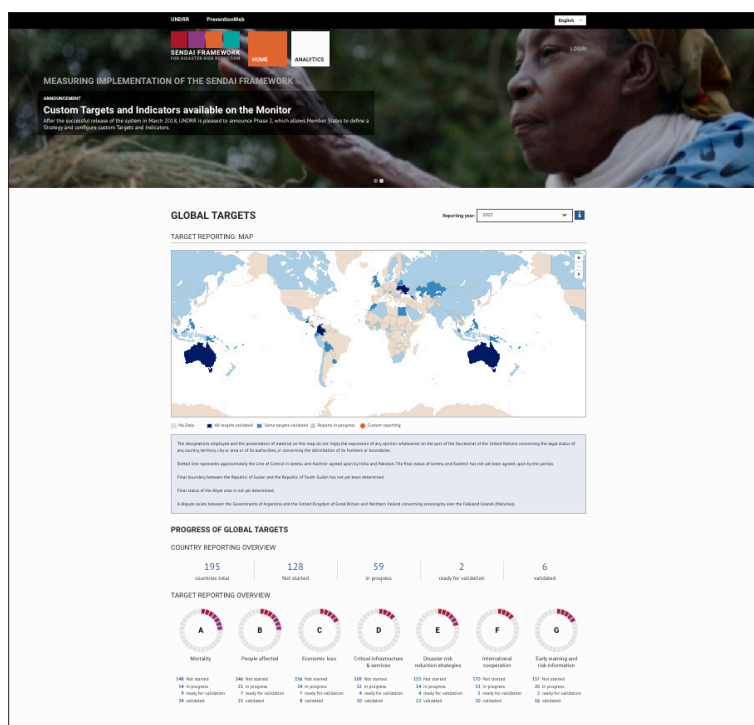
Source: United Nations Office for Disaster Risk Reduction (UNDRR), "Measuring Implementation of the Sendai Framework," 2020 [online] https://sendaimonitor.undrr.org/.

2.   Institutional process and validation mechanisms

The process of validating the indicators is a cross-cutting task. As we have seen throughout this document, each step requires an assessment of the quality of the data to be used in the statistical process, which determines the eligibility of the indicators.[23] One tool used to ensure eligibility is the Methodological Sheet, a statistical tool that provides summarized, concrete information on analysis and interpretation of the indicator and variables, for example, the sheet that is currently being developed by INEC in Ecuador (see table IV.16).

The UNDRR *Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction: Collection of Technical Notes on Data and Methodology* (2017) includes several criteria and recommendations related to the information provided on the Methodological Sheets that should be considered by data-processing officials.

Statistical operations that validate the Sendai Framework indicators should be part of the Inventory of Statistical Operations (ISO) used in the various national statistical systems. These inventories are a set of statistical data provided in the form of a database with various access modalities, which essentially provide a catalogue of metadata and a description of statistical operations.

For validation processes it is important to have technical support from the NSOs or guides or instruments that support the entities responsible for generating the data to complete the validation of the statistical operations and of the indicators obtained.

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[23]   Eligibility refers to the quality of the statistical information used for calculations, the existence of statistical metadata describing the process of collecting the indicator and the internal consistency of a statistical methodology sheet that sets out the steps and evaluates the procedures for obtaining the indicator.

Table IV.16
Methodological Sheet for the definition of metadata for indicator A2 of target A of the Sendai Framework

Methodological Sheet			
Indicator	Number of deaths attributed to disasters per 100,000 population		
Definition	Ratio of the total number of people killed by disasters per 100,000 population to the total population during the same period		
Calculation formula			
Where:	$$ND = \frac{D_{(t)}}{P_{(t)}} * 100,000 \; population$$ $$ND = \; Number \; of \; deaths \; attributed \; to \; disasters, per \; 100,000 \; population$$ $$D_{(t)} = Total \; number \; of \; people \; killed \; by \; disasters \; during \; the \; time \; period \; (t)$$ $$P_{(t)} = Population \; during \; the \; time \; period \; (t)$$		
Definition of related variables			
Variables Deceased Levels of hazardous events identified by the Secretariat of Risk Management Catastrophe: A disaster in which the country's resources and response mechanisms are inadequate, and international assistance is therefore necessary and indispensable			
Calculation methodology			
Technical limitations			
Unit of measurement for the indicator		Number of people killed per 100,000 inhabitants	
Interpretation of the indicator		This calculation provides the number of people killed by disasters in a given period, per 100,000 inhabitants	
Data source		*Consolidado de Eventos Peligrosos, Guía de orientación técnica*—Secretariat of Risk Management	
Periodicity of the indicator		Annual	
Availability of data		2010–2017	
Level of disaggregation	Geographic	Province and canton	
	General	By type of disaster	
	Other areas	Not applicable	
Geo-referenced information		Not applicable	
Connection to national planning instruments or international agreements and initiatives			
Bibliographic references on the development of the statistical indicator			
Date Methodological Sheet prepared		13/03/2018	
Date of most recent update of the Methodological Sheet			
Statistical thematic classifier		Domain 3: Multiple domains	3.3.6 Sustainable development
Prepared by		Secretariat of Risk Management National Institute of Statistics and Census (INEC)	

Source: Prepared by the authors.

Statistical validation of indicators is an important activity and differs from the validation of indicators in the Sendai Framework Monitor. The latter offers the possibility of validating indicators in reports generated by institutions designated by the national focal point under the Sendai Framework (sectoral, national and local institutions). This validation process consists of approving the input data according to parameters set by the Sendai Framework Monitor, as shown in the following example (see image IV.2).

Once the indicators have been generated, their impact and consistency must be assessed. An assessment process should be conducted for internal use in the country to detect specific quality-related problems that occur during the process of generating the indicator.

Image IV.2
Validation of indicators in the Sendai Framework Monitor

Contributors enter data for each indicator, year by year, under the oversight of the coordinator.
The coordinator can provide access to observers.

The validator ensures that the input required by contributors is correct, according to the system requirements.

Once validated, the data are disseminated and can be used by the United Nations Office for Disaster Risk Reduction (UNDRR) for reporting purposes.
Although the validated data for the global targets are disclosed, the data for the customized targets may remain private if the country so wishes.

Source: Prepared by the authors.

After the indicators have been assessed and reported, they can be disseminated at the national and sectoral levels via the different dissemination mechanisms used by NSOs or national risk management entities (web platforms, books, brochures or other media). Disclosure including other national statistics is also important to complement decision-making on environmental, economic and other related issues.

There are several formats (used by the different NSOs based on each country's information requirements) for dissemination of the indicators. In general, it is recommended that they briefly describe the indicators, their importance, the methodology used for their development, the content and the respective attribution (Quiroga Martinez, 2009).

Table IV.17, taken from the "Methodological Guide to Developing Environmental and Sustainable Development Indicators in Latin American and Caribbean Countries," highlights various aspects considered for the publication of environmental indicators, which can serve as a reference for the Sendai Framework indicators. In the same vein, the Sendai Framework Monitor provides validated data in the form of tabular, statistical and mapping reports based on the reference year, by target and indicator and by region or country.

Table IV.17
Example of publication of environmental indicators

Element	Definition
1. Foreword	(formal introduction by the authority)
2. Table of Contents	
3. Introduction	This section can explain the process, the intended audience, the importance of having a National System of Environmental Indicators, and so on.
4. Methodology for construction of the indicators	The intra- and inter-institutional agreements and the process for building and maintaining the indicators over time should be presented very succinctly.
5. Content	This section should present the indicators. 5.1 The structure of the indicators by subject area 5.2 The thematically organized indicators, with specific introductions In general, each of the indicators should be presented in a user-friendly format, using as much space as necessary (two to six pages for a complete double-page display). For each indicator, depending on the design of the fact sheet made up of selected fields from the Methodological Sheet, the following minimum information is suggested: – Number of the indicator in the series – Name of the indicator – Short description – Graph and/or map – Description of the graph and map, trend line – Relevance – Relationship to policy challenges or existing standards or goals Graphic design should employ the following: – Photographs – Supplementary charts – Maps, where appropriate – Wide array of colours
6. Acknowledgement	It is very important to give the appropriate credit to each of the teams and institutions participating in the process, in order to encourage them to continue contributing to the maintenance and development of the System of Environmental Indicators that will be managed by the institution that develops environmental or sustainable development indicators.

Source: R. Quiroga Martínez, "Methodological Guide for developing Environmental and Sustainable Development Indicators in Latin American and Caribbean countries", *Manual Series*, No. 61 (LC/L.3021-P), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2009 [online] https://repositorio.cepal.org/bitstream/handle/11362/37890/1/SLCL3021_en.pdf.

Chapter V

Final recommendations

The recommendations in this section have been drafted as final conclusions and aim to strengthen institutional arrangements, improve understanding of disaster risk, manage the data used in calculating the Sendai Framework indicators and strengthen a number of important aspects of this work.

The Sendai Framework explicitly calls on national statistical offices to:

Enhance [globally and regionally] the development and dissemination of science-based methodologies and tools for recording and reporting disaster losses and relevant disaggregated statistics and data, as well as to enhance modelling, assessment, mapping and monitoring of disaster risks and multi-hazard early warning systems (United Nations, 2015b, para. 25a).

The following recommendations aim to respond to that call.

A. Institutional recommendations

(i)   Improve national statistical offices' strategies for collaborating with stakeholders in disaster risk management and encourage them to play a more active role in the statistical processes related to reporting on the Sendai Framework indicators (recommendation based on paragraph 6 of resolution 71/313 adopted by the United Nations General Assembly on 6 July 2017).

(ii) Analyse the process for creating stronger, possibly higher-level, institutional structures to organize task forces and define the specific roles of all sectors and areas involved in construction of the indicators (e.g. the institutional structures created for the SDGs).

(iii) Promote synergies and close collaboration between national disaster risk management offices and systems and national statistical offices by executing institutional agreements.

(iv) Strengthen sectoral mandates and internal and inter-agency procedures and protocols related to reporting on Sendai Framework targets and indicators and promote regulation at different levels and the development of technical guides and tools.

(v) Where possible, promote the creation of specialized units or the designation of focal points with budget support and monitoring and reporting responsibilities.

B. Technical recommendations

(i)   Prioritize the concept of "systemic risk" in the various sectors to illustrate the importance of intersectoral and multi-stakeholder collaboration and in so doing, improve resource allocation to disaster risk reduction activities.

(ii)   Strengthen the statistics associated with all aspects of disaster risk management, rather than those pertaining only to disasters, in a manner that enables linkages with national statistical systems and national statistics. This includes creating and optimizing technical guidelines and data architecture to leverage the geospatial information produced after the implementation of geographic information policies and standards.

(iii) Resume the learning process that began with the generation of SDG indicators and environmental indicators with respect to the FDES. These processes highlight important experiences regarding the institutional arrangements, the data analysis tools, approaches to measuring data quality used in indicator development and other tools mentioned in this document.

(iv)   Create a dedicated database for the management of data relating to the Sendai Framework indicators, with inputs and advice from the national statistical offices, to ensure data quality.

(v)   Expand the specific definitions of key geographic data involved in disaster risk management and establish a common nomenclature through coordination with the relevant entities in member countries to develop a geospatial information governance model for disaster risk management.

(vi)   Recognize that gender-sensitive statistics contribute to the elimination of stereotypes, the formulation of inclusive policies and the implementation of agreements, particularly in relation to gender equality.

(vii) Use inclusive language in the development of disaster risk reduction indicators. Gather data disaggregated by sex, age and disability to generate gender-sensitive indicators that recognize historically marginalized populations. The collection of disaggregated data facilitates recognition of the diverse needs and capacities of these populations, as well as the differentiated impact of disasters, which helps decision makers formulate inclusive risk management strategies.

(viii) Strengthen the development and dissemination of methodological sheets or statistical operations for indicator development.

(ix)   Strengthen the strategic alliance between national disaster risk management systems, national statistical offices and entities associated with national statistical systems to build the statistical capacities of countries in the region with regard to reporting on the Sendai Framework targets and indicators.

(x)   Establish a methodological step to ensure effective gender mainstreaming, as well as mechanisms focused on the empowerment of women and girls and the inclusion of historically marginalized populations in data generation and indicator development for disaster risk reduction.

(xi)   Promote the development of regionally standardized spatial data infrastructure that complies with the applicable geospatial information standards.

C. Recommendations to ensure sustainable capacity building in monitoring implementation of the Sendai Framework

(i)   Promote capacity-building for stakeholders in the national statistical system on the use of the tools, methodology or statistical tools needed to compile the information to be used in disaster risk management in connection with implementation of the Sendai Framework.

(ii) Develop a digital library of publications to strengthen reporting on the Sendai Framework targets and indicators in the countries in the region. Ideally, with this functionality added, the library would be accessible from the Sendai Framework Monitor website. The library could start with the methodological document proposed by the Working Group on Measuring and Recording Indicators related to Disaster Risk Reduction, the series of sectoral booklets and other information available on good practices or national experiences.

(iii) Maintain regional spaces for sharing experiences and practical work to harness the full potential of the Sendai Framework Monitor and improve data disaggregation.

(iv) Use the Matrix of Requirements proposed by the Working Group on Measuring and Recording Indicators related to Disaster Risk Reduction to report on the status of statistical processes aimed at improving the quality of data pertaining to the Sendai Framework indicators and, thus, focus attention on areas and steps that require further strengthening and technical support.

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