BNPB

INDONESIA
ONE DISASTER
DATA

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EXECUTIVE SUMMARY

Indonesia faces high risks of disasters that are exacerbated by climate change which have the potential to disrupt development momentum and achievements. Necessarily, the National Medium Term Development Plan (RPJMN) 2020 - 2024 sets disaster resilience among national priorities, which among its strategies is through strengthening data and information related to disasters.

At a global level, Sendai Framework is a road map for disaster risk reduction that comes with targets and detailed indicators. Disaster risks are also listed in 25 targets in 10 of the 17 Sustainable Development Goals (SDGs), which thus includes the global targets stipulated in the Sendai Framework. At the regional level, the 2016 Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR) stated a commitment to carry out periodic and cyclical monitoring starting in 2020, especially related to the goal of the significant reduction in mortality, number of people affected, damage and losses to the economy and critical infrastructure.

All of these commitments render the disaster database a prerequisite for calculating, monitoring, and reporting on national development achievements. Additionally, it must also be comparable internationally in order to be used globally in relation to the Sendai Framework and SDGs.

At present, Indonesia has been meeting the need for disaster-related data on an ad-hoc basis, especially in the form of emergency response data. Notwithstanding, there are already a number of data compilation formats such as the InaRisk, a georeferenced map which is quite complex and has the potential to become a single disaster data platform. However, data on risks, occurrences, impacts, and financing related to disasters and disaster management is yet to be managed using standardised concepts and definitions. Therefore, the National Disaster Management Agency (BNPB) and the National Statistics Indonesia (BPS-Statistics Indonesia) jointly develop the Satu Data Bencana Indonesia (Indonesia One Disaster Data) as

an official sectoral statistical domain under the national statistical system. This has been developed in reference to the Disaster-Related Statistical Framework (DRFS) designed by UN ESCAP, and is guided by the Presidential Regulation Number 39 of 2019 on Indonesia One Data policy.

Indonesia One Disaster Data is a synthesis of the existing international guidelines on disaster-related statistics to improve the coverage and consistency in compilation data based on primary data related to disasters and basic statistics for all types of disasters. Statistics provide a broad context and vision for comparison and for a deeper understanding of risks across both single and multiple hazards.

Indonesia One Disaster Data covers data management and statistics on disaster risk, occurrence, impacts and recovery, and financing of disaster management activities at all stages of disaster management in accordance with Law Number 24 of 2007 concerning Disaster Management, namely pre-disaster both in situations where no disaster threat, and in a situation of potential disaster; during emergency response; and post-disaster. For this reason, concepts, definitions, and variables are aligned based on the concurrence among Ministries / Agencies, and refer to the main reference and methodology guidelines, as well as detailed mapping of existing data sources.

Indonesia One Disaster Data is guided by the principle of coherence, which follows a pattern in accordance with the basic reasoning contained in the policies and regulations; comparability in the sense that data from one locality or particular time period are ought to be matched with data from another locality or time period based on the actual value of the relevant data; and consistency in which various forms of data from various stakeholders are collected and analysed using a standard methodology, metadata and master references and a single portal to enable data interoperability.

One of the most important benefits of a Disaster Data is its usefulness as a basis for cross-trend analysis for the purpose of improving the quality of risk assessment towards improving disaster management. Therefore, Indonesia One Disaster Data has a scope that includes, first, data related to disaster risk, namely data on hazard, vulnerabilities, exposures, as well as the ability - or capacity gap - related to the resilience to facing potential disaster events. Second, data related to disaster events that include the characteristics of the event, the type of event, the place and time of the beginning and end of the disaster event, then

the disaster status. Third, data on impacts on humans, damage including crucial infrastructure, material and economic losses, disruptions to basic services, and impacts on the environment and cultural heritage. Indirect impacts, for example, displacement, loss of work or reduced income and ultimately poverty. Fourth, disaster management financing, ideally, a satellite account within the national account, which contains data on expenditures and/or investment in the implementation of development programme activities, as well as research and development on prevention, risk reduction, mitigation, preparedness, emergency response, and recovery. This includes data on transfers in terms of international cooperation.

In its implementation, Indonesia One Disaster Data adheres to the norms stipulated by the President's policy regarding Indonesia One Data. With regard to institutional arrangements, BNPB acts as Walidata Bencana (Disaster Data Custodian), which through a mechanism, and its Disaster Data Portal, facilitates the data coordination among various ministries and agencies that act as Walidata Sektoral (Sectoral Data Custodians) as well as disaster data producers. They all converged in a Disaster Data Forum. The system obtains support from BPS-Statistics Indonesia in its capacity as the basic data advisor, and from Indonesia Geospatial Agency (BIG) as the geospatial data advisor. These arrangements and mechanisms are replicated in the localities in a form that is consistent and in accordance with the provisions of the prevailing laws and regulations. For consistency sake, the local and national governments are linked through a tiered technical mechanism to ascertain that, together, they carry out the planning, data collection; verification and validation, presentation and dissemination of disaster-related data.

Through a nationally centralized system, coherent documentation will be obtained as official government data to strengthen the evidence base for policy formulation, decision making and guidelines for implementation, enhance transparency and meets people's rights to access information, and promote community participation, as well as fulfil the commitments for monitoring and reporting on disaster management at national, regional, and global level. Ultimately, Indonesia One Disaster Data is a contribution to the fulfilment of the Indonesian State's obligations to protect Indonesian people from the risks, occurrence and impacts of disasters.

FOREWORD & AWARDS

Our praise and gratitude to God Almighty for it is through His grace and generosity that the Indonesia One Disaster Data (Indonesia One Disaster Data) can be completed. Indonesia One Disaster Data, an initiative of BNPB in collaboration with BPS-Statistics Indonesia and supported by UNFPA, is established to support government programs through the Indonesia One Data (SDI) in accordance with Presidential Regulation No. 39 of 2019. It is our hope that Indonesia One Disaster Data will be the sole source of data reference and information on disasters in Indonesia

Data is a new type of wealth of the Indonesian people, that is the direction of the President of Indonesia in relation to Indonesia One Data. In conjunction with the goals set in the Indonesia One Data Policy, BNPB moves quickly to initiate the Indonesia One Disaster Data, which is a major aspiration of BNPB to produce quality Disaster Data. Certainly, establishing such quality data would require the participation of all stakeholders.

With the Indonesia One Disaster Data in existence, it is expected that problems arising due to data mismatch could be better addressed. Data differences and asynchronous data can be minimized by referring to the standardised "who does what", and thus there will be no overlapping data. Through the Indonesia One Data policy, disaster data management will improve along with the standardised concepts, definitions and methodologies.

We are grateful to all parties involved in the preparation of this book, namely the Ministry of Health, Ministry of Social Affairs, Ministry of Public Works and Public Housing, Ministry of Energy and Mineral Resources, Ministry of Home Affairs, Ministry of Agriculture, Ministry of Environment and Forestry, TNI, Polri, BASARNAS, PMI, BPPT as well as all other parties involved whom we could not mention one by one.

It is our hope that this book will be useful for every Disaster Management actor and the general public to attain a better future disaster management in Indonesia.

Ir. Bernardus Wisnu Widjaja, M.Sc.
Deputy for Systems and Strategy

FOREWORD & AWARDS

We praise the presence of God Almighty, for it is with His blessings and grace that we are able to publish a disaster statistical framework entitled "Indonesia One Disaster Data ". This book is compiled to encourage all Ministries and Agencies to realize the importance of an integrated disaster data.

Up to the present, disaster data is still scattered in various Ministries and Agencies. Therefore, BPS-Statistics Indonesia, BNPB and Pujiono Centre have developed a national statistical framework that could unify the data. This was undertaken with assistance from UNFPA.

Finally, it is my hope that this book could be used by many groups, such as government agencies, academicians, and other stakeholders who are concerned with disaster data. Our gratitude goes to all those who have helped the development of the "the National Statistical Framework for Indonesia One Disaster Data".

Dr. Margo Yuwono, S. Si, M. Si
Deputy for Social Statistics

FOREWORD & AWARDS

The availability of accurate, reliable, and timely data is very important for all stages of disaster management, namely preparedness, pre-disaster, and for emergency response. In the event of a disaster, accurate and reliable data can help policymakers formulate steps that are fast, accurate, and allow them to have more precise analysis in determining the disaster impact to the affected populations, vulnerable groups, and infrastructure exposed to hazards in the affected area .

Having a clear and complete picture of the characteristics of the population in disaster-prone areas and the services available in these communities, including emergency preparedness and response capacity, will help them to develop effective disaster risk reduction plans and relevant responses.

To produce accurate and reliable data, it is necessary to have a National Framework that regulates the mechanism of data flow in the disaster management cycle. This will provide guidance to meet the standards, concepts, and definitions needed and apply nationally in the event of a disaster so as to produce statistics and indicators. This framework will also include institutional arrangements for data collection.

UNFPA is proud to be able to join the national effort by providing technical support in the development of the National Statistical Framework for Indonesia One Disaster Data. This framework is available as a result of good cooperation between BNPB, BPS-Statistics Indonesia, and UNFPA. It is important for UNFPA to support and facilitate this collaboration.

This national framework is not only in line with the vision of the President of the Republic of Indonesia, namely the Indonesia One Data policy, which is used as a reference for program planning, development, implementation and monitoring of development programs, but will also be the main reference for aligning data management needs during disaster situations in this country. Having a National Framework for Indonesia One Disaster Data, Indonesia will be one of the first countries to develop and implement this

framework. This experience will be well documented because it is worth sharing with other countries at the regional and global level.

This document was developed under the coordination of BNPB, BPS-Statistics Indonesia, with contributions from all relevant stakeholders in Central Sulawesi, and funding support from Australian AID (DFAT). UNFPA will remain committed to supporting the continuation of this process through implementation at the national and sub-national levels. UNFPA is also committed to supporting BNPB and the Indonesian Statistics Agency in the preparation of a higher legal basis in supporting a disaster data policy, so that accurate and reliable data on disaster management is available when needed.

Anjali Sen
UNFPA Representative

CONTENTS

INTRODUCTION

Disaster events, whether caused by natural, technological, and biological factors, claimed many victims, damage, and losses that disrupt the safety, security, and welfare of the community. Such impacts closely correlated with the development and achievement of economic, social, and environmental well-being in the short, medium, and long term.

The availability of systematic data related to disaster management is the concern of the government. So far, the need for disaster data has been met on an *ad hoc basis*, especially in the form of data collection during emergencies. Some data compilation patterns such as InaRisk have been developed for a long time and become a geo-referenced map that is quite complex and has the potential to become a disaster data *platform*.

Data and statistics have important roles in the administration of disaster management. This begins from preventing the emergence of risk, risk reduction and mitigation, preparedness, response, to recovery. The need for timely and accurate data becomes even more urgent given the increasing frequency and severity of disaster events that are exacerbated by the effects of climate change. The challenge is that the data needed for effective disaster management is not always available when needed. Even if available, the data is often scattered in various official sources, they differ from one another or even conflicting, both methodologically and substantially. It is therefore deemed necessary to strengthen the role of official statistics to provide key data relevant to all stages of disaster management. Good disaster data also helps identify and address disaster risks for the achievement of short-term and long-term development goals.

INDONESIA ONE DISASTER DATA INITIATIVE

Satu Data Bencana Indonesia (Indonesia One Disaster Data) is an initiative to improve the utilization of disaster-related data in an official national statistical system. This is important to provide context towards a better understanding across disaster hazards, enhancing the effectiveness of disaster management, and meeting the needs for monitoring and reporting within the framework of the implementation of disaster

management. Better disaster data is also expected to help mobilize the participation of stakeholders in the effort to live with disaster risks.

Indonesia One Disaster Data includes elements of the measurement of risk factors, namely probabilities associated with hazards, exposure to hazards, according to where the population and infrastructure, vulnerability and resilience capacity are located. Disaster risk can be analyzed at different scales – for example at the level of individuals or households, communities, districts, or a country. Therefore, Indonesia One Disaster Data needs to be applicable to the different levels and can be applied flexibly, suiting the needs of each user of the statistics.

INDONESIA ONE DISASTER DATA AND GLOBAL COMMITMENTS

World leaders adopted the Sendai Framework as a global road map of concepts and targets for disaster risk reduction. Accordingly, Indonesia needs a statistical framework for monitoring and reporting on the seven core targets, including through the Sendai Framework Monitor[1].

Furthermore, the inclusion of disaster risk reduction targets in the Sustainable Development Goals (SDGs) also requires the development of internationally comparable disaster databases. Disaster risk crosses various aspects and development sectors in the SDGs. There are 25 targets related to disaster risk reduction in 10 out of 17 sustainable development goals. This clearly establishes the role of disaster risk reduction as a part of the core development strategy. Therefore, Indonesia One Disaster Data becomes a statistical prerequisite for calculating international indicators, which as a whole, is being compiled by BAPPENAS for the SDGs global monitoring system.

Given the global context of these two commitments, Indonesia One Disaster Data also ensures that Indonesian disaster data must meet the requirements for comprehensiveness, consistency, and comparability with disaster data of other countries.

Indonesia One Disaster Data is a synthesis of the current international guidelines, which is expected to increase the coverage and consistency in gathering statistics that are consistent throughout and for all types of disasters.

[1] https://sendaimonitor.unisdr.org/

Indonesia One Disaster Data connects the data sources, contributes to forming the coherence and consistency of data across sources related to all types of disasters regardless of their level, and converts them into a series of disaster-related sectoral statistics that are centralized nationally.

Indonesia One Disaster Data is conceived to be part of the Indonesia One Data program, a government initiative to improve and enhance the quality of the management of government data, both as a basis for policy making and as a form of meeting data needs of the public.

> *"Indonesia One Data is a management policy on government data to produce data that is accurate, current, integrated and accountable, and is easily accessible and shared between Ministries / Agencies and Local Governments through the compliance to Data Standards, Metadata, Data Interoperability, and using Reference Codes and Master Data*[2]*"*

The improvement of the Indonesian government data includes the provision of data in an open and easy-to-use format, so as to increase government transparency and accountability as well as to promote society participation in overseeing the development.

The criteria applied are:

- Easy to obtain: Data that is easily obtained, utilized and can be reprocessed, and can be accessed through the internet.
- Quality: Data that is coherent, in a form that is easy to use and can be reprocessed, according to specified requirements, and accountable.
- Public access: Data can be obtained free of charge and can be accessed via the internet by all without discrimination based on either line of business, person, or group[3].

The disorganisation of disaster data is an issue that is often the subject of debates that underlines policies, programs and disaster management activities. Difference, discrepancy, mismatch, and conflicting data resulting in a reduced efficiency in the implementation of disaster management programmes.

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[2] Article 1 paragraph (1) of Presidential Regulation No. 39 of 2019 concerning Indonesia One Data

[3] Law Number 14 of 2008 concerning Open Access to Public Information

Indonesia One Disaster Data is thus a government data management policy to produce disaster-related data that is accurate, current, integrated, accountable, and easily accessed and shared between Ministries / Agencies and Local Governments through the compliance to data standards, metadata, data interoperability, and using the master code and reference.

As an inseparable part of the Indonesia One Data, the Indonesia One Disaster Data combines a variety of data sources from various government agencies. Such data, taken together, provide a broader and more in-depth evidence basis and information in the formulation of disaster management policies and plans, enhancing preparedness and emergency response at the national, local and sectoral levels. Therefore, Indonesia One Disaster Data is also a standardization of concept and method of measuring across disaster events and the implementation of a consistent and mutually agreed measurement framework in the policies, agreements and coordination at the national and local levels.

In addition to increasing the production of statistics from existing databases, Indonesia One Disaster Data also connects the representation of disaster management statistics with other socio-economic statistics within the realm of national development. In the end, Indonesia One Disaster Data makes disaster data an inseparable part of Indonesia One Data, which is one of the pillars of achieving national development goals.

Indicators related to disaster management, both in the context of national development and monitoring and reporting of global commitments, is an important investment. For this reason, strong coordination between BNPB, BPS-Statistics Indonesia, Ministries / Agencies and Local Governments is needed leveraging the spirit of mutual understanding of the core concepts and the concurrence of the methodologies needed to apply these concepts in the practice of cogent statistics.

REGULATORY FRAMEWORK

As a statistical framework that is an inseparable part of the national statistical system, Indonesia One Disaster Data bases itself on the provisions of laws and regulations governing the fields of disaster management, statistics, local government, and data management, as follows:

1. Law Number 24 of 2007 concerning Disaster Management (State Gazette of the Republic of Indonesia Year 2007 Number 66, Supplement to the State Gazette of the Republic of Indonesia Number 4723);
2. Law Number 16 of 1997 concerning Statistics (State Gazette of the Republic of Indonesia of 1997 Number 39, Supplement to the State Gazette of the Republic of Indonesia Number 3683);

3. Law Number 32 of 2004 concerning Local Government (State Gazette of the Republic of Indonesia of 2014 Number 244, Supplement to the State Gazette of the Republic of Indonesia Number 5587);
4. Law Number 14 of 2008 concerning Openness of Public Information (State Gazette of the Republic of Indonesia Number 61 of 2008, Supplement to State Gazette Number 4846);
5. Law Number 25 of 2009 concerning Public Services (State Gazette of the Republic of Indonesia of 2009 Number 112, Supplement to State Gazette Number 5038);
6. Government Regulation Number 8 of 2008 concerning the National Disaster Management Agency;
7. Government Regulation Number 21 of 2008 concerning the Implementation of Disaster Management;
8. Government Regulation Number 61 of 2010 concerning the Implementation of Law No. 14 of 2008 concerning Public Information Openness
9. Government Regulation Number 2 of 2018 concerning Minimum Service Standards
10. Presidential Regulation Number 39 of 2019 concerning Indonesia One Data

The tasks and functions of government agencies to produce and collect official data related to disasters are reflected in a policy framework governing Indonesia One Disaster Data management. The framework is required to enable the facilitation of, and access to, the resources needed to build and develop capabilities in managing national disaster databases.

PRINCIPLES

In accordance with the provisions of the Indonesia One Data, the utilization of disaster data and statistics, on one hand is the utilization of data internally and between government agencies, on the other hand it is a matter of fulfilling the society's rights and needs for data in order to reduce the risk and impact of disasters.

Indonesia One Disaster Data utilizes existing data to produce information relevant to all phases of disaster management, including risk assessment, prevention and mitigation, disaster preparedness, emergency response and recovery, as well as the funding related to the implementation of disaster management.
In relation to the above considerations, Indonesia One Disaster Data adheres to the following principles:

Coherence: disaster data follows a pattern of coherence in accordance with the basic reasoning contained in the policies and legislations. One data relates to others to represent a concept, which then together with other concepts becomes an element that ultimately forms the representation of a phenomenon.

Comparability: disaster data from one locality or one time period can be matched with data from another locality or time period based on the actual value of the particular data. Data comparative capacity is achieved based on the agreement on standardised concepts, classifications, and master references. The Indonesia One Disaster Data is structured in accordance with the rules set by the expert working group formed by the UN General Assembly to develop the terminology and indicators of the Sendai Framework[4].

Consistence: in various forms of data originating from various stakeholders, is compiled and analyzed using a methodology containing data standards, metadata, and master references. Thus the data can be consistent to serve the regional, national or international interests. Related to this, Indonesia One Disaster Data is based on the principle of one data standard, one metadata, and one data portal to enable the data that is *interoperable*.

In regard, data being produced by Disaster Data Producers, must meet the following requirements:

a. Data Standards: Statistics Data Standards are established by BPS-Statistics Indonesia as statistics advisor, Geospatial Data are determined by BIG (Indonesia Geospatial Agency) as geospatial data advisor, and other data by other Central Level Data Advisors, which are one of the Ministries / Agencies that are given the authority to provide the guidance related to the Data.
b. Metadata: information about data, which is developed according to the standardised structure and format, refers to information about Data. This contains the specifications or technical standards set by the Central Level Data Advisors or the Minister or heads of relevant Ministries / Agencies. The Metadata is intended to meet the needs of the relevant agencies in accordance to their duties and functions.
c. Data Interoperability: consistent data presentation in syntax / form, structure / scheme / composition of presentation, and semantic / articulation of readability; and stored in an open format that can be read by an electronic system.
d. Master Reference: Reference Code agreed by the Ministry / Agency whose work unit is the data custodian (Walidata) of the Reference Code, and / or the Master Data, and the Indonesia One Disaster Data Forum.

[4] A / 71/664 Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction

PURPOSE

In conjunction with the Indonesia One Disaster Data, BNPB together with BPS-Statistics Indonesia in collaboration with the Geographic Information Agency, the Ministry of National Development Planning (PPN) / Bappenas and related Ministries / Agencies, establish the disaster management-related statistics in order to produce statistical compilations to provide the basis for decision making, to design and implementation of disaster risk reduction measures, and at the same time, to assist in the preparation of national and international indicator reporting.

General purposes

1. Providing the basic policies and rules of implementation as well as guidelines for central and local agencies in the management of data and statistics related to disaster management, that can be easily downloaded and shared among government agencies, as the basis for planning, implementing, evaluating, and controlling disaster management;
2. Strengthening the evidence basis for policy formulation, planning, implementation, monitoring and evaluation and control of disaster management and in conjunction with the sustainable development goals (SDGs) through a modern statistical system in accordance with rules and regulations;
3. Encouraging openness and the right to information in order to promote society's role and responsibility in reducing disaster risks and preparedness, and enhancing the ability to respond and recover from the impacts from disaster occurrences;
4. Compiling data and statistics that are accurate, current, integrated and accountable for calculating the international indicators for reporting on the development, achievement and results of disaster management in accordance with the monitoring and reporting system of the Sendai Framework and SDGs.

Special purposes

Specifically, Indonesia One Disaster Data aims to:

1. Harmonising the views on disaster data management and statistics among BNPB, BPBD, Related Ministries / Agencies and other stakeholders.
2. Enhancing the utilization of disaster data, including through harmonizing disaster data management methodologies in order to strengthen the accountability to the public.

3. Facilitating the collection, processing, analysis and reporting of disaster data, during pre-disaster, emergency response as well as rehabilitation and reconstruction.

THE SCOPE

Indonesia One Disaster Data contains internally coherent and internationally consistent guidelines for utilizing the existing data to produce information that is relevant to all stages of disaster management, including for the recognition and understanding of risk, prevention, and mitigation and for disaster preparedness, response, and recovery.

1. Indonesia One Disaster Data covers the management of data and statistics on disaster risk, events, impacts and recovery, and disaster management activities.
2. Indonesia One Disaster Data includes data and statistics at all stages of disaster management, i.e. pre-disaster both in situations where no disaster occurs and in situations where there is potential for disaster to occur; during emergency response; and post-disaster.

Indonesia One Disaster Data as a statistical coordination system

Disaster data are mostly part of basic, thematic or sectoral statistics that are already collected and stored scatteredly in various agencies, being managed in various formats, and following different frameworks. Therefore statistical coordination is critical in Indonesia One Disaster Data because most statistical compilations involve collaboration between central and local government agencies and other official data producers.

Indonesia One Disaster Data development as a national centralized system in the preparation of statistics related to disasters is intended to obtain documented and coherent data and manage the flow of information to be compiled into standard tables.

The functions of Indonesia One Disaster Data as a national disaster statistics system are:

- Producing disaster-related primary data
- Generating baseline statistics
- Presenting data in the geospatial information format
- Coordinating the flow of information
- Providing a data-sharing platform
- Maintaining a disaster database; and
- Generating official statistics and indicators about disasters

Indonesia One Disaster Data Ministries/Agencies are those who produce official data on a national or regional scale and, to the extent possible, involve non-governmental organizations that have the stake in the implementation of disaster management.

Indonesia One Disaster Data involves conceptual alignment whereby all relevant Ministries/Agencies use variables that are based on the same definition, are known, shared and coded in the same way, with reference to the master reference and methodological guidance during the statistical compilation phase as well as after the management of the final data. Indonesia One Disaster Data includes detailed mapping of available data sources and can be accessed in sectors and localities to calculate variables in the scope of disaster-related statistics tables. All of this is to ensure that official statistics on disaster can be accessed for use in policies, planning, programs and implementation of disaster risk reduction and other needs including disaster-related research.

PARTNERSHIP

Engaging with and including stakeholders since the early stages of database development plays an important role to foster a common and clear understanding of the scope of data collection and the importance of statistics for understanding, assessing, and reducing disaster risk.

Partnership aims to compile a database related to capacity building activities, ensuring ownership and management of sectoral and regional disaster data. It is also critical to ensure that disaster data collection and validation is carried out in line with the framework and standards for data sources and methodologies that are set nationally.

Regarding partnerships, the Disaster Data Forum is a technical coordination platform and mechanism involving all Ministries/Agencies providing disaster data to make decisions about terminology, methodology, and technical guidance. This forum is established with the aim of ensuring coherence and consistency throughout the phases from data collection, data processing, compilation, aggregation, dissemination and analysis of the disaster-related statistics.

INDONESIA ONE DISASTER DATA

Ministries / Agencies and local governments that have the task and function of disaster management and monitoring are required to collect statistical and geospatial data to assess risk, disaster events, impacts and funding for disaster management. Statistics can be derived from censuses, relevant surveys, and other official data sources in accordance with the standard model for the application of established data.

Although the national disaster database is compiled by BNPB, the physical data location does not have to be at BNPB. The data may be stored in the Indonesia One Disaster Data Portal and, though a database query system, it may be accessed and utilized for various disaster-related statistics. It can be used to calculate indicators, conduct risk and post-disaster assessments, and other statistical needs that arise related to the implementation of disaster management.

With guidance from BIG, the database will use codes and formats that are compatible with the national geographic information systems. Various existing disaster data platforms such as InaRISK, InaSAFE, DIBI, IRBI and so on, will be integrated to ensure that the disaster database remains flexible in terms of geographical scale and level of analysis details so that the same basic data input can be reused to conduct analysis in various geographical scales.

INSTITUTIONAL ARRANGEMENTS

Management at The Central Level

The National Disaster Management Agency (BNPB) carries out the functions of formulating and setting the policies for managing and coordinating the implementation of disaster management. Furthermore, BNPB provides guidance and direction on disaster management; sets the standards and implementation requirements; and reports to the President and conveys information to the public regarding the implementation of disaster management. In the context of the Indonesia One Disaster Data, BNPB formulates policies, compiles guidelines and provides substantive technical guidance.

BNPB with methodological and technical input from BPS-Statistics Indonesia-Statistics Indonesia and BIG establishes a standardised structure and format for disaster data. Thus it can be assured that BNPB is able to collect disaster data from data producers and to ensure compliance with the standards, and to ascertain that the metadata is included as an inseparable part therein. BNPB also publishes disaster data master references as guidance for data producers.

MECHANISMS

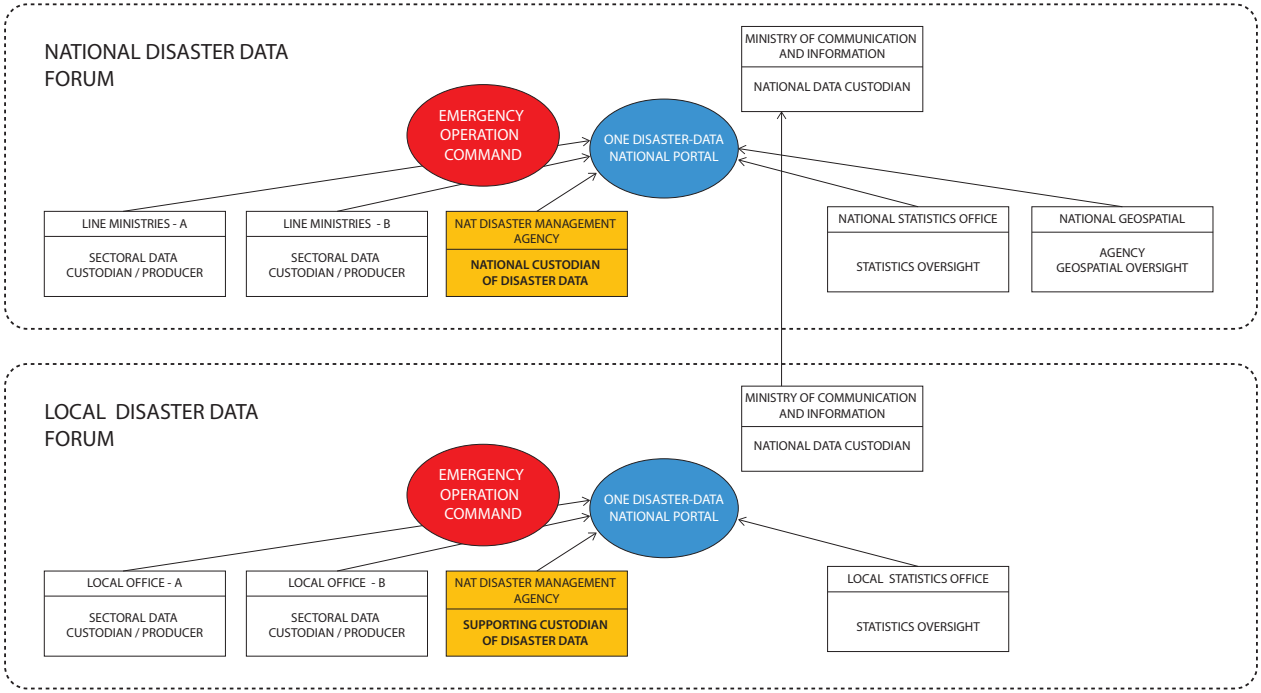

Figure 2.1 Data Flow Mechanism

With regard to the disaster response, BNPB ensures that every time an emergency response operation is completed, the data generated by the Emergency Response Command Post is collected according to the data standards and master references.

The implementation of this task is carried out along with the preparation and dissemination of Indonesia One Disaster Data technical guidelines and as part capacity building for officials of disaster management agencies as well as of Ministries / Agencies and local agencies and other stakeholders.

BNPB establishes and manages a single disaster data portal as the only platform in the collection and dissemination of disaster data. In this regard, BNPB also ensures that all existing disaster data portals are integrated, and mechanisms are provided to synchronize the data integration.

BNPB as the Walidata Bencana (Disaster Data Custodian) submits the data along with the metadata and master references to the Walidata Nasional (National Data Custodian) for a later use in the planning process of monitoring and reporting development planning at the national and global level.

In its capacity as the secretariat of the Indonesia One Disaster Data Forum, BNPB provides secretarial services including, but not limited to, proposing to forum members to organize periodic meetings, providing human resources, and supporting the tasks of the Indonesia One Disaster Data forum.

The BPS Statistics Indonesia (BPS) has a role and function as a statistics advisor in its capacity as the authorised agency managing the national statistical system. The BPS-Statistics Indonesia functions include reviewing, compiling and formulating statistical policies related to disasters, coordinating statistical activities related to disasters; development and application of statistical engineering standards and methodologies, and provision of technical guidance on statistics. BPS-Statistics Indonesia also functions as a "bank" of population databases in a national statistical system to assist statistical activities of Ministries / Agencies and other bodies.

In the implementation, BPS-Statistics Indonesia provides basic population statistics related to Indonesia One Disaster Data. When necessary, BPS-Statistics Indonesia may incorporate elements of disaster data that still need to be collected into the various statistical activities. These include national socioeconomic surveys, village potential statistics surveys, and other surveys that may be specifically designed to meet the above-mentioned disaster data requirements.

In addition to the Central BPS-Statistics Indonesia, guidance and technical guidance related to managing Indonesia One Disaster Data statistics may also be provided by the Provincial BPS-Statistics Indonesia and the Regency / Municipality BPS-Statistics Indonesia.

BPS-Statistics Indonesia as the statistics advisor to the Indonesia One Disaster Data will ensure that the employed methodologies are adequate, uniformed, and consistent. Thus, it ensures that disaster data can be shared by stakeholders and be utilized properly for monitoring and reporting both for the purposes related to the monitoring of the national development goals and reporting of global commitment indicators.

Geospatial Information Agency (BIG) has the functions of, among others, formulating and controlling technical policies, preparation of plans and programs, as well as the organization of basic geospatial information. In addition, BIG also carries out the integration and operation of infrastructure, as well as the organization and development of geospatial information networks related to disasters that are organized by Ministries / Agencies and/or local governments.

In carrying out its function as a geospatial advisor, BIG ensures that disaster data has the ability to interface with national geospatial information systems so that its utilization can be connected with data from other sectors. This includes the provision of data under the principle of Indonesia One Map to complement both the reference and the basic range of disaster data.

The Ministry of Communication and Information (Kemenkominfo) has the function of, including, formulating and setting of policies, application management, and management of information and public communication; providing technical guidance and supervision and substantive support for the entire Indonesia One Disaster Data to all Ministries / Agencies and / or local governments.

In its implementation, the Ministry of communication and information combines disaster data with other data from various sectors to be presented as a unit under Indonesia One Disaster Data.

Ministries/Agencies can be sources and providers as well as users of disaster data in accordance with their respective roles, tasks and functions.

Each Ministry/Agency clearly states its duties and functions related to disaster management at all stages along with the types of data used to carry out these tasks and functions. Each Ministry / Agency is responsible for compiling and submitting metadata from their respective sectors and adjusting their presentation in a predetermined format related to disaster standards and disaster data master reference.

Local governance

Local Disaster Management Agency (BPBDs) or local government disaster management offices, in their capacity as supporting custodian of disaster data, must ensure that disaster data submitted by the Data Producers meets the requirements specified in the disaster standard. The submitted data should be accompanied by metadata and be compiled according to the format specified in the disaster data master reference.

Supporting Disaster Data Custodian in the localities carry out the collection, analysis, presentation, and dissemination of disaster data. It is to generate substantive input in the implementation of disaster management, monitoring development in their respective areas and contributing to the monitoring and reporting of indicators related to disaster management as part of the global commitment.

In carrying out their duties as the secretariat of the Regional Disaster Data Forum, the Supporting Custodian of Disaster Data must provide secretarial support to facilitate the Forum's activities, including periodic meetings.

Provincial and District/City BPS-Statistics Indonesia in their capacity as Statistics Advisors, provide guidance and technical guidance to the Supporting Custodian of Disaster Data and the One Disaster Data Forum in the locality.

Local Sectoral Offices have the roles as Supporting Data Custodian in their respective agencies. In that capacity, they also act as producers of disaster data and can become members of the One Disaster Data Forum in their area.

Indonesia One Disaster Data Forum: At the national and local levels, the One Disaster Data Forum will be established as communication avenues that consist of BNPB or BPBD, or local disaster management offices as Supporting Custodian of Disaster Data, sectoral agencies as Sectoral Data Custodian and Disaster Data Producers, and BPS-Statistics Indonesia and BIG as disaster data advisors, as appropriate. Coordinated by the senior leadership of the Disaster Data Custodian Agency, the Indonesia One Disaster Data Forum carries out its functions and duties in accordance with rules and regulations.

In the One Disaster Data Forum, BNPB together with forum members can determine the instruments including the followings:

- Types of hazards that serve as a reference for determining types of disaster events
- Glossary of terms as a form of conceptual agreement to be applied in the management of a disaster data
- Technical guidance on data definitions and technical specifications on calculations and compilation
- Technical guidelines for the calculation and conversion of the impact of disaster events on human, economic, material, environmental, crucial infrastructure, and basic services
- All types of data needed in disaster data management. This data list becomes a reference for compiling summary table data collection tables and in the analysis process.
- Basic statistics related to disasters, i.e. the list of data that already exists in the basic population statistics can be used to fill the disaster data table.
- Satellite disaster management account, an account established specifically for the purpose of disaster management and follows the structure of the national account.

Implementation of Indonesia One Disaster Data

The implementation of Indonesia One Disaster Data consists of data planning; data collection; and dissemination of data which will be described as follows:

Disaster Data Planning

BNPB with methodological and technical input from BPS-Statistics Indonesia implements Disaster Data Planning that consists of:

List of Disaster Data, disaster data targeted to be collected in the year and the subsequent years. BNPB submits the list of disaster data to the Indonesia One Disaster Data Forum to be endorsed as a shared target in the Indonesia One Disaster Data system. In general, the list of data is in accordance with the pillars of the disaster-related statistical framework namely:

- Disaster Risk Data consists of data on various categories of disaster hazards in reference to the catalogue of disaster events. Meanwhile data on vulnerability, exposure and coping capability / resilience are stated in terms of population characteristics, location according to geographical specifications and/or administrative boundaries, and other specifications in accordance with BNPB rules.

- Disaster Event Data consists of types of events in accordance with the catalogue of disaster hazards, and broken down by event data which includes where it happens, when it starts and when it ends, and with reference to the unique identifier for each disaster event.
- Impact Data consists of impacts on humans; material impact; economic impact; and impact on basic services. BNPB converts Impact data into the required data formats using the predefined conversion tables.
- Disaster Management Financing Data consists of all costs incurred for the purpose of disaster risk prevention; disaster risk reduction, emergency preparedness and response, disaster recovery; and general government, research and development, and education / training.

Each type of data has the targets for collection and to be furnished with information regarding the type of data, the type of metadata, and the master reference, as well as which Data Producer will produce them, and when it is planned to be published and updated. The items listed in the Data List constitute a priority list what is targeted for collection in the year based on the considerations that the data would contribute to the development priorities and the President's priorities in the National Medium-Term Development Plan and / or the Government Work Plan; and would support the achievement of disaster management objectives; and / or meeting urgent needs.

The Supporting Disaster Data Custodians in the local level make use of the list of targeted data that is compiled at the central level as guidance for their own local data priorities. This takes into account the inputs from the Disaster Data Custodian in their respective localities, and the result is to be submitted for the endorsement of the Local One Disaster Data Forum.

The list of disaster data agreed upon by the Indonesia One Disaster Data Forum serves as the basis for the preparation of the Indonesia One Disaster Data Action Plan that consists of the objectives, targets, activities and expected outputs of the activities of each member of the Indonesia One Disaster Data Forum.

The Indonesia One Disaster Data action plan can cover a number of activities to be implemented to ensure the attainment of the common goals. The plan includes the needs for human resource development, preparation of technical implementation guidelines, and other activities to support the achievement of the Indonesia One Disaster Data objectives in accordance with the statistical principles related to disasters. The action plan also sets forth the coordination among the Indonesia One Disaster Data Forum members

insofar as the disaster data management which includes the collection, analysis, and dissemination of disaster data.

Disaster Data Collection

Based on the agreed Indonesia One Disaster Data Action Plan, BNPB and related Ministries / Agencies carry out disaster data collection in accordance with the catalogue of disaster hazards and in adherence to the data standards, by always including the Metadata and in reference to the disaster data master reference.

BNPB coordinates with BPS-Statistics Indonesia in utilizing the basic statistics as well as results of the National Economic and Social Census and the Village Potentials Statistics, or results of surveys and other data collection that may be specifically being conducted in order to meet the needs of disaster data collection. From time to time, BNPB also coordinates the possibility of integrating disaster-related data collection in the formal activities in the National statistical system. This includes providing input in the design of Population Censuses, Economic Censuses, Agricultural Censuses, National Economic and Social Census and the Village Potentials Statistics, etc.

At the conclusion of an emergency response phase, BNPB and/or BPBD as Operation Command Centre ensure that emergency response data is properly stored; namely to be classified according to data standards, to be accompanied by metadata, and to be categorised according to the disaster data master reference.

BNPB, as the Disaster Data Custodian, submits the data that has been collected to the Ministry of Communication and Information with a copy to Bappenas, while BPBD or local disaster management agency submit it to the Local Office of Communication, Information, and Statistics and/or Local Development Planning Agency.

Data Checking

The Disaster Data Custodian also has the duty to ensure that the data produced by the Disaster Data Producer is in compliance with the priorities that have been jointly determined, meets the disaster standard requirements, is furnished with the metadata, and is delivered in the specified format. During the data checking process, Data Producers may be subjects to validation and verification as necessary. Thus the Data Producer could improve the data in accordance with the results of the data checking with the guidance of the Disaster Data Advisors.

Data Dissemination

BNPB maintains the Indonesia One Disaster Data Portal to be the only disaster statistics platform that provides access to master references, master data; data; metadata; priority data; and schedules of data publication and/or update.

BNPB is responsible for disseminating the data through the Indonesia One Disaster Data Portal and other media in accordance with rules and regulations, and leveraging the advancement of science and technology. In its capacity as the manager of the Indonesia One Disaster Data portal, BNPB provides access to data users both through special password protected access mechanisms and through the open access for the public.

Based on the agreement of the Indonesia One Disaster Forum, BNPB may periodically publish disaster data. This is to ensure public accountability while providing input for improving disaster management, for national development monitoring and reporting planning, as well as monitoring and reporting on global commitments related to disaster management including Sendai Framework and SDGs.

INTERNATIONAL COOPERATION

The preparation and implementation of the Indonesia One Disaster Data is considered to be a good practice in preparing a disaster-related statistical framework. Implementation arrangements of international cooperation become an important element in the overall context of the Indonesia One Disaster Data.

The Indonesia One Disaster Data is a part of Indonesia's accountability framework towards global commitments, especially the Sendai Framework and SDGs. Therefore it needs to be designed to ensure that disaster-related statistics can be collected alongside other sectors' statistics through national statistical and monitoring mechanisms as an integrated part of a national response to the global commitment.

As a member of regional organizations such as ASEAN and UNESCAP, Indonesia needs to take advantage of all opportunities to disseminate innovations and practices related to disaster statistics, in this regard disaster-related statistics become an inseparable part of regional relations and contribute to disaster management as part of international soft diplomacy.

Internally in the country, an integrated program should be developed to implement international cooperation with international organizations and other Ministries and Agencies that have the relevance to disaster data. In addition to the direct collaboration with disaster management actors, in circumstances where there is no disaster occurrence, advocacy and technical assistance need to be developed as well as capacity building for data collection in various development sectors. That way, more comprehensive data concerning disaster risk can be collected in all sectors at all levels.


DAN PUSAT STATISTIK
PELATIHAN PETUGAS
PENDATAAN PASCA BENCANA
SULAWESI TENGAH 2
15 MEI 2019

THE INDONESIA ONE DISASTER DATA BASIC COVERAGE

One of the most important uses of disaster-related statistics is to analyze the trends across the various disaster occurrences to improve the quality of risk assessments. Usually, this requires analysis for a long period, perhaps in the form of a long-term trend of 50 to 100 years. For this reason, it is necessary to document the characteristics of all disaster events clearly and consistently that happen throughout the period.

In this regard, Indonesia One Disaster Data basic coverage covers all stages of disaster management in accordance with the provisions of the law with the following stages:

1. Pre-disaster, a situation where no disaster occurs and where there is a potential for disaster to occur;
2. When responding to disasters that can include emergency preparedness, responses and transitions; and
3. Post-disaster including rehabilitation and reconstruction.

THE INDONESIA ONE DISASTER DATA BASIC COVERAGE

<table>
<tr><td>Pre-disaster</td><td colspan="3">When it happens and after the disaster</td></tr>
<tr><td>Risks</td><td>Events</td><td colspan="2">Impacts</td></tr>
<tr><td>Hazards
Exposure
Vulnerability
Resilience</td><td>The characteristics of events
• Type
• Time
• Place
• Identifier
• Status</td><td>Immediate impacts on
• Humans
• Material/economic losses
• Basic services
• Environment/cultural heritage</td><td>Indirect impacts</td></tr>
<tr><td colspan="4">Expenditures
Implementation of Disaster Management (administrative activities, research and development on prevention, risk reduction, mitigation, preparedness, emergency response, recovery)</td></tr>
</table>

Almost all elements in the table above can be measured, or estimated from direct observation and can be collected into a centralized database for disaster-related statistical purposes. Indirect impacts, on the other hand, can only be estimated through the application of assumptions or modelling based on the analysis of value chain scenario impacts on the economy or other changes in social conditions.

1. DISASTER RISK STATISTICS

Disaster risk is defined as:

> *"The potential loss of life, injury, or damage or destruction of assets that can occur in a system, community or community within a certain period, is determined probabilistically as a function of hazard, exposure, vulnerability and resilience*[5]*"*

High and low risk of disaster in an area is determined by the magnitude of the hazards[6] (e.g. energy strength from earthquakes or storm categories) that are related to socio-economic factors that cause exposure, vulnerability and resilience (UNISDR, 2015).

Disaster risk is dynamic and therefore for measurement purposes collaboration between BNPB, BPS-Statistics Indonesia and other official statistical providers is needed to cover areas such as demographic change, poverty and inequality, economic structure, financing, economic production, ecosystem conditions, and land management, etc.

These risks are geographically concentrated and uneven, so measuring them requires a broad enough general picture that takes into account differences in the level of risk, area coverage, and characteristics of the population. The measurement must also be able to produce disaggregated statistics for vulnerable localities that have relatively higher risk than others.

The Disaster Risk Index (DRI) approach is developed based on the type of hazard either singly (for example, floods or storms) or compounded that cover a variety of hazard types. Thus, geographically, an area is considered high risk solely based on hazards and without regard to administrative boundaries.

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[5] UNISDR, 2017

[6] The magnitude of the hazard (Magnitude) used here, refers to the hazard (not disaster) and is clearly different from the geographical scale of the disaster or the scale of the impact.

Hazard

Hazard is a phenomenon, event, process or human activity that has the potential to cause death, injury or other health impacts, property damage, social and economic disruption or environmental damage.

To be treated as information, hazard needs to be described by completing the following grids:

- Scope: geographical area and administrative level
- Time: the frequency and duration of hazard
- Dimensions: the scale and intensity of the hazard
- Probability: the possibility of hazard
- Vulnerability: physical, economic, environmental and social[7]

One way to describe a hazard is to use the HotSpot approach. This approach is patterned after models that have been used in the domain of biodiversity statistics. The analysis is applied at a central point on a geographical map that does not always adhere to administrative boundaries. Data showing a relatively high chance of hazard is then overlaid with the geographic information related to exposure, vulnerability, and resilience. BNPB's InaRISK scheme, for example, utilizes statistics on exposure, economic activity (obtained from local tax revenue records), and children (from administrative records on enrolment in schools) to illustrate the level of risk.

Geographic information systems (GIS) can be a platform that is very helpful for integrating and generating statistical summaries. The results can be presented in the form of a risk map, at different geographical levels, and also at the desired administrative scope - for example, national, provincial, or district/city.

EXPOSURE

Exposure assessment aims to estimate at-risk elements, namely the number of people, housing, infrastructure, buildings or built-up areas, facilities, land use, production capacity, and other important variables that are potentially affected when an adverse event occurs due to a hazard of disaster.

[7] European Commission (2010)

Data on exposure is one of the three basic pre-disaster risk metrics. In addition, exposure data is also a statistic used as a basis for assessing impacts after a disaster.

Exposure is measured by using several datasets, namely:

a) data on the chances of one or several hazard obtained from natural observation bodies;
b) data such as population and housing censuses; and
c) other data on infrastructure, land cover such as agricultural areas based on crop types, and various other important ecological areas.

The overlapping fields between the three datasets are a description of exposure to a hazard or set of hazards.

InaRISK, again, is an important example of the description of exposure. In this scheme, hazard, vulnerabilities, and resilience are calculated. InaRISK uses 9 different types of hazard related to frequency and access to early warning systems. Then, using cross-space data analysis and superimposed grid assimilation, predictions about the probabilities and magnitude of the impact of a disaster event are conducted according to a scenario. These impacts can include potential deaths, material and economic losses, physical damage, and natural resources.

VULNERABILITY

Vulnerability is defined as the characteristics or conditions that are determined by physical, social, economic and environmental factors or processes that increase the chance of being negatively impacted on the part of an individual community, assets or systems against the effects of hazard. Vulnerability statistics are statistics of exposure that are further disaggregated by sex, age, income, and disability.

Statistics on vulnerability that are collected and updated regularly based on geographical areas, especially for disaster-prone areas, provide a priori information about the level of vulnerability and coverage of the region. This information is useful for refining the objectives of disaster risk reduction strategies or improving preparedness at both local and national level.

Disaster events have different degrees of impact on the population. This level is determined by the characteristics of individuals related to the limitations of strength and skills to deal with the consequences caused by disaster events, especially if the type of disaster threatens physical endurance.

Listed below are a few characteristics that determine the level of vulnerability:

- Children, elderly, and disability situations, for example, would render one person or community more vulnerable than another even though the hazard may be the same.
- Gender, for example, can be a vulnerability factor in terms of livelihood opportunities and participation in recovery efforts.
- Group characteristics such as poverty can be the basic information to determine vulnerability as they often associate with unhealthy and insecure environments and low levels of education.
- Physical characteristics such as the state of infrastructure and the building environment, as they are determined by limitations and other socio-economic or environmental disparities. Poverty and the lives of poor communities in urban areas, for example, force residents to live and work in areas that do not meet security and safety requirements in areas exposed to hazard[8].
- Physical characteristics such as land, water bodies, and pollution also form physical vulnerabilities that determine the level of the impact of disasters on life and health makes emergency responses more complicated when disaster events occur, and makes recovery costs higher.
- Local characteristics such as difficulty of accessing water, inadequate infrastructure, and limited toilet facilities, for example, make certain areas vulnerable to being affected by disaster events. Especially if the type of hazard involves the need for availability of water and toilets as part of basic services, and is very and increasingly needed when entering the rehabilitation and reconstruction phase.
- Geographic location, for example, rural areas, is an element of vulnerability due to limitations and gaps in transportation access, health facilities, and other crucial infrastructure or support services. However, it should also be noted that other aspects of rural communities such as the family system and local wisdom, also underlie resilience capacity.

[8] Slum households suffer from lack of access to good water sources, access to sanitation facilities, adequate living space, durability of housing or guarantees of ownership. (UN-Habitat, 2016)

- Population density, on the other hand, is one of the defining characteristics of vulnerability in urban areas. The concentration of the population in normal daily conditions is indeed necessary to launch economic activities and facilitate the provision of infrastructure, facilities and services. But precisely such population density is a vulnerability, especially when overlaid with elements of poverty, chaotic and unplanned settings, and limited basic services related to safety and security.

The various characteristics of individuals, groups, and territories can be combined and intertwined to form a compounding vulnerability that might not have existed before.

Therefore, especially for localities with high exposure, vulnerability statistics need to be collected, which contain basic demographic, social and economic characteristics, both from existing population databases and new data if needed.

Vulnerability statistics can be gathered through following elements:

- household income and expenditure;
- education participation by age group;
- household assets such as housing types;
- the development of age groups such as the nutritional status and health of children;
- type of work; and
- distribution of urban and rural areas.

RESILIENCE

Resilience implies a system's capacity against the hazard of disaster and its ability to restore function and development after disaster events occur, in such a way, without suffering from permanent negative impact. Ideally, the recovery takes advantage of opportunities for future improvement through the "build back better" approach.

Resilience itself as a concept implies behaviours or actions aimed at overcoming, controlling, tolerating, or reducing the situation of exposure to hazard.

Level of resilience is determined by the existence of access to information and knowledge about hazard, resources, and opportunities. Information about resistance becomes the basis in determining the level of resilience including preparedness (Wisner et al., 2004).

Strategies to overcome the resilience gap mostly grow and occur naturally without government programs. Households, infrastructure, business, society, socio-ecological systems, up to the whole country, do various ways to overcome such gaps and are therefore difficult to measure.

For example, one strategy for dealing with drought is to migrate to find livelihoods outside the drought area, both temporarily and permanently. This gradual movement of people is difficult to measure. Such phenomena can sometimes be captured through statistics, censuses, or population administration records. However, it is rather difficult to link such migrations with hazards, especially if the event is rather far in the past, and the process is flowing.

Other strategies can be captured through statistics based on government records such as household or business readiness surveys in areas exposed to hazards that include, for example, increases in spending and household costs.

Information about resilience and its gaps provides the basis for designing and implementing disaster risk reduction activities, including through education programs, early warning systems, and other approaches that strengthen resilience through increased preparedness.

Resilience statistics become more useful when the data is disaggregated by sex, age, income group, type of disability and urban and rural areas.

2. DISASTER EVENT STATISTICS

Disaster Management Act 24/2007 contains the following definition of disaster:

1. an event or series of events caused, both by natural factors and/or non-natural factors as well as human factors ;
2. threatening and disrupting people's lives and livelihoods
3. resulting in human casualties, environmental damage, property losses, and psychological impacts.

In order to operationalize the provisions of the legislation, the recording of disaster events needs to record the characteristics of each disaster event for which data is needed to create relationships between variables in developing time-series statistics, such as, long-term trends from the impact of disasters. Disaster event recording needs to include:

DISASTER EVENT

Time: date, year, time and duration of the emergency
Place: coverage area both in terms of administrative area (province, district, city) and geographical area)
Types of hazard: a large group of types of disasters that include natural, non-natural, and social disasters. Each of them still needs to be subdivided into types[9], which later, need to be compiled in a list or catalogue of events that are officially announced as part of the metadata.

THRESHOLD EFFECT

Considering that not all events are disasters, only events that cause life-threatening and/or disruptive effects are referred to as disasters. For the sake of uniformity and consistency, a threshold criterion is needed to differentiate disaster events from ordinary events.

Prior to the establishment of the Indonesia One Disaster Data, the BNPB Operation Centre received all types of incidents reported by BPBD, local government agencies and ministries/Ministries and Agencies. On the other hand, Provincial BPBDs receive reports from district/city BPBDs.

Without the determination of the threshold of consequences, an event that is reported unilaterally by an agency as a disaster event may not have the corresponding magnitude of other events that are reported by other agencies.

Therefore, the threshold of effect is needed when the BPBD and or BNPB compile the data as a tool to filter which data meet the criteria to be considered a disaster event and which are not. Only then can disaster event data be analyzed and compared properly.

For example, EMDAT[10] implements that an event can only be entered into a database when at least one of the following criteria is met:

- Ten (10) or more people were reported killed
- One hundred (100) or more people are reported to be affected
- The government establishes a state of disaster emergency
- The government requests international assistance

[9] See Peril Classification and Hazard Glossary - IRDRwww.irdrinternational.org ›IRDR_DATA- Project-Report-No.-1.pdf
[10] https: // www.emdat.be/explanatory-notes

The BNPB Operation Centre will continue to record hundreds of thousands of events reported by BPBD and other sources, but for the sake of consistency in the Indonesia One Disaster Data, may be only hundreds of events or less that can be categorised as disaster events in the database.

IDENTIFIER

For the purpose of recording, reference, and tracking in a multi-hazard database, each disaster event needs to be given a unique register code. A disaster register system such as GLIDE[11] for example, is an appropriate choice to ensure that all events that meet the criteria for disaster events can be recorded and that the records do not overlap.

The GLIDE number component consists of two letters to identify the type of disaster (e.g. EQ - earthquake); disaster year; six-digit serial number of disaster events; and a three-letter ISO code for the country of the incident.

> The following are examples of disaster event numbering in the global register:
> Central Sulawesi Earthquake: EQ-2018-000033-IDN
> Sunda Strait Tsunami: TS-2018-000423-IDN
> Mount Merapi eruption: VO-2010-000214-IDN

STATUS AND LEVELS

Disaster Management Act[12] regulates the scope of government authority to determine the status and level of national and local disasters. Determination of status and level is a proxy for determining whether the event is called a major, medium, or small impact disaster.

Central or local government determines the status and level of disaster events based on indicators that include:

[11] www.glidenumber.net
[12] Art.. 7 Law No. 24 of 2007 concerning Disaster Management; also Government Regulation No. 21 of 2008

- number of victims;
- loss of property;
- damage to infrastructure and facilities;
- wide coverage of the area affected by the disaster; and
- socio-economic impacts caused.

In future, the government would need to devise more operational definitions of disaster status in a Presidential Regulation to guide decision-makers in determining the status of a disaster.

Conceptually, the status of a disaster event is related to the scale of disaster risk, namely Intensive Risk and Extensive Risk[13]. Extensive Risk is used to describe the risk of a disaster event that has the chance to have a low severity impact, but the frequency of events is high or often occurs, especially in the form of disaster events that are localised or occurring at local level. For example, floods, landslides, localised tempest etc. In the aggregate, across-disaster, because it is more common, small and medium-sized disasters tend to have greater impacts.

Conversely, Intensive Risk refers to the risk of occurrence of catastrophic events that rarely occur, but if it has already happened it will have a very severe impact. This can be seen in the case of the Aceh Tsunami, the Yogyakarta earthquake, the liquefaction in Central Sulawesi, etc.

Emergency Status

For the purpose of accuracy, there is the need for criteria to determine whether or not a disaster event is considered an emergency.

Level

The law also provides that the central and local governments may determine respectively the level of disaster events as district / city, provincial or national disasters.

National disaster is a disaster in which the state of emergency exhibits the characteristics of the long-term and widespread effects on sustainable development. The effects of major disasters often cross

[13] UNISDR, 2015

beyond administrative boundaries. Statistically, however, major disasters tend to produce more data and are often covered by various post-disaster studies.

Provincial or district/city disasters refer to disaster events that have medium or small-scale impacts, as illustrated in the concept of extensive disaster events described above. Medium-scale disasters refer to threshold effects that require responses from several administrative governments such as from several districts/cities or provinces.

3. IMPACT STATISTICS

As alluded, a new event is referred to as a "disaster" if the relevant phenomenon creates an aftermath or consequences that are detrimental to the community. The consequences themselves can be operationally divided into two namely:

- **Immediate consequences** (*effects*): a condition that directly occurs during or immediately after a disaster occurrence which is typically measured in physical units (i.e., a square meter of housing, kilometres of roads, etc.). This is used to explain the total or partial damage to physical assets, disruption of basic services, and damage to livelihoods in the affected area.
- **Aggregate consequences** (*Impact*): a condition that occurs gradually and together as a combined result of several situations that, together, constitute a significant change in momentum (system) that is affected by catastrophic events. This includes all adverse changes to the economic, physical, the environment, mental, and social well-being of humans.

Therefore, data on the impact of disaster events are more focused on the effect of general losses which include damage, losses, and disruptions to services.

Impact data are very important to be input in conducting post-disaster assessment and indicator computation and are compiled in a general compilation which is usually known as a damage and *losses database*.

IMPACT LINKAGES AND DATA AGGREGATION

To be referenced for disaster statistics, impact data requires clarity on the *attribution* whether this data has a direct causal linkage to a disaster event. An example is death, which can be directly linked to a disaster event that is in the catalogue of disaster events. Another example, however, is economic loss, which could be a direct and indirect result of a disaster event; this is somewhat difficult to relate to a disaster event.

Impact statistics need to have a longer range to be able to record direct and indirect effects of a disaster event. Data on direct impacts is usually obtained from observations in the affected area during or after

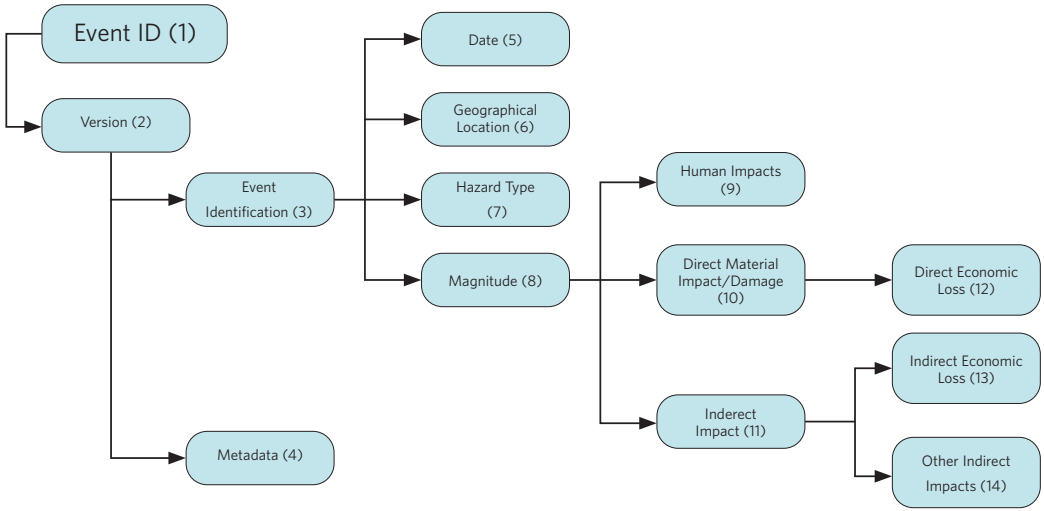
the event of a disaster or delayed effect. For example, a cracked building that had to be destroyed several weeks after the earthquake, people who died after being injured weeks after the event.

An impact database requires a clear and specific structure that involves an impact component, a disaster event identifier, and associated metadata. Impact data are organized by integrating several datasets related to a disaster event into a centralized database. At certain stages, data is compiled with its own metadata, which is linked to a unique disaster event identifier. In that way, the impact data can later be tracked based on the basic characteristics of the disaster, such as time, place, scale, and type of hazard.

The Basic Structure of an Impact Database

The methodological steps for impact statistics can be summarized as follows:

Preliminary data: Observations and assessments of direct effects that are usually carried out as part of disaster response during and immediately after an emergency are summarized and converted into statistics and are compiled according to the geographical area.



Source: adapted version of a diagram in European Commission-JRC (2015)

Figure 4.1 Database model for disaster impacts statistics

Completion: Provides baselines or background statistics on disaster events to help produce preliminary supplementary data metrics for impact statistics. This can include basic infrastructure and population characteristics that were known before a disaster.

Elaboration: Use of tools such as remote sensing imagery, basic and economic service data, sectoral reports, or insurance claims, to deepen the understanding of the extent of damage and losses and about how risk factors determine the magnitude of disaster impacts.

Classification: Use background statistics as contextual information to adjust initial observations of damage and disruption in post-disaster services into comparable units of measurement. Thus the further development of aggregation and disaggregation can be desired.

Indirect impacts: Uses regular time series statistical sources in the national statistical system to establish trends before and after disaster events as a basis for assessing indirect impacts. Surveys or censuses conducted by various Ministries and Agencies such as Population Censuses, Village Potentials, National Socio-Economic Survey (Susenas), Business Surveys, Basic Health Research (Riskesdas), Education Statistics, Indonesian Economic Reports, etc. can generate related data.

For example, the Education Statistics which contains information about the number of schools, students, teachers, and educational infrastructure. On the other hand, the Indonesian Economic Report can provide an overview of the development of economic performance through selected macro indicators to present information on economic growth, inflation rates, foreign trade, maritime economic developments, monetary sector, investment, employment, and tourism.

Impact Aggregation

Impact aggregation is a broad calculation of the impact value of a disaster event to track the description of the value of damage and losses immediately after a disaster event and the changes that occur in a context over a certain period of time. This aggregation is achieved by collecting data in a comprehensive area or periodically, for example, annually. Thus, patterns and trends can be obtained that are statistically more meaningful and reduce a lot of detailed data that is very meaningful but not significant (*data noise*).

Time Series Aggregation

Impact data that have been collected on each disaster event in accordance with the basic structure described in the previous section are stored by BNPB in a nationally centralized database. After data from all disaster events in a certain period have been collected, the impact data can be analyzed based on a specific *query*. For example, aggregation and comparison based on the type of hazard, place, or other characteristics. If the time series is long enough such as for 10 years, then a data pattern will emerge which can then be used as research material to compare the impact between two events that differ or illustrate the likelihood of disaster impact. More importantly, such patterns form the basis for improving disaster management, development planning, and monitoring and reporting of disaster management performance in the regional, national, regional, and global contexts.

Geographical Aggregation

Impact statistics also record a disaster event, based on the basic structure as described above, with reference to the place of occurrence geographically in an area also referred to as a 'disaster site'[14]. After data has been collected by geographical area, impact statistics can be presented according to the type of hazard and region. By utilizing GIS, geographical aggregation can be collected, aggregated and analyzed on a national, provincial, district/city scale up to the village. Data can also be analyzed by referring to certain other types of areas such as watersheds, disaster-prone areas, etc.

Demographic and Social Disaggregation

Disasters have different effects on community members. Disaggregation of data on the impact of a disaster event is needed to enable a comprehensive assessment of the socioeconomic consequences. Then we need to separate affected population data based on social and demographic categories such as

[14] As long as there is no standard methodology for determining 'disaster sites', defining the disaster area can be done by tracing adjacent areas where direct impacts can be observed, as well as identifying with the lowest level administrative reference standards (usually Admin 03) that have basic statistics population as background.

hazard, geographical conditions, gender, age, disability and income. Such disaggregation also reinforces the formulation of evidence-based policies at all levels, including estimating the likelihood of future disasters. For example, age-related disaggregated data can be divided into three age groups, namely: 0-15, 16-64 and 65+. This grouping is in line with international reporting. More detailed sorting such as the age of the baby (0-4 years) can also be done with the consideration that in emergency children of this age depend on parents or others.

IMPACT ON HUMANS

Various forms of data on the impact of disaster events on humans are needed to report aggregate numbers of "affected populations". This data fulfils the need to produce disaggregated statistics about human impacts in order to understand the needs of emergency response and post-disaster recovery. The data can be used for risk assessment to prevent, reduce and mitigate future disaster risks. Impact data on humans also directly meet data requirements related to indicators for monitoring the Sendai Framework and SDGs.

The impact of a disaster event is recorded in the impact tables according to geographic area, type of hazard, or demographic and social category. Some data and statistics report the impact of disaster events on humans as well as material impacts. The same data source, for example about damage to dwellings, can be used to calculate degraded or destroyed dwellings, economic losses, and estimates of the number of people affected.

Final data on the impact of a disaster event on humans need to be stored in a centralized compilation of disaster impact statistics on the relevant disaster event. During the emergency response phase, it can become part of the Emergency Response Command Post data, and after that, it will also be collected at the Disaster Portal. In addition, final data compilation must be ensured so that it can be included in a broader official administrative records system such as the civil registration and statistics system, and becomes a source of long-term official statistics on death and health.

Deaths and Missing Persons

Deaths and missing persons is the impact of a disaster event that needs to be clearly defined and classified according to rules and regulations. Regarding deaths, it is necessary to emphasize the causes, where and when it occurred after the disaster. As for missing persons, it is necessary to be strict about reporting procedures and when and for how long these people were not found after a disaster.

In general, the definition should include:

1. deaths or missing persons that occur immediately during an emergency, or deaths caused by injuries or illnesses suffered during an emergency, and are believed to be caused by a disaster event, and
2. deaths that are not directly related to disaster events. An example is death due to illness caused by a result of a disaster event, for example due to obstruction of access to water and sanitation.

Estimates for the deaths and missing persons are usually reported at some stage as official BNPB statements via the press to the public. Over time after reviewing the source and verifying the data collected, BNPB can improve the data on mortality and other impacts on humans.

Injury and Illness

Another impact in the event of a disaster on humans is injury and illness. Injuries can be recognized as a direct result of a catastrophic event. The type and characteristics of events and the vulnerability of the population also determine what kind of consequences are likely to happen as impact on humans.

For example, the earthquake caused many broken bones, and volcanic eruptions caused burn injuries. This data can be obtained either from direct observation, reports to command posts, or from records of medical posts and Puskesmas.

Data on the phenomenon of illness is somewhat more complicated in the way it is collected because illness usually arises not immediately after a disaster event. Moreover, its type and severity cannot also be directly related to the disaster event in question. For example, upper respiratory infections (ARI) can occur several weeks after an earthquake or forest fire, dysentery, and cholera can occur several days after the flood event, even after the flood itself has receded and passed.

Shelter

The term displacement is used for all types of situations where people are compelled to leave their homes or places of habitual residence as a direct result of a disaster. This can happen starting from evacuation, living in emergency tents, living in temporary shelters, to then relocating to permanent shelters, or resetting to a completely new territory.

Evacuation is the temporary transfer of people and assets to a safer place before, during or after a disaster event for protection purposes. The evacuation itself can occur by the decision of the population itself, or in an organized manner by the order and "coercion" of the authorities.

Data on evacuation is useful both for assessing the impact of disaster events on the population, as well as for evaluating the effectiveness of programs or approaches to disaster risk reduction. For example, the number of displaced people can be a clue to the effectiveness of an early warning system.

Displacement is usually caused by damage or destruction of the house. As with evacuations, the movement can be independent or organized. The government and emergency response actors can provide shelter tents or temporary shelters. Then as part of the rehabilitation and reconstruction phase, most of the displaced people can be helped to repair or rebuild their homes to be assisted to return home. For a small proportion of the displaced whose territory becomes uninhabitable, relocation to permanent residences or resettlement to new areas is carried out. Then evacuation statistics can be divided into temporary or permanent displacement.

Population movements, especially evacuation and displacement, can be captured from reports on emergency response and rehabilitation/reconstruction programs, through population records and civil records, or population censuses. However, it is rather difficult to link evacuation and evacuation to past catastrophic events specifically. It is even more difficult in the case of migration. In some circumstances, this can be overcome by using specific questions in a special survey or census.

Livelihood

The aftermath of a disaster event on livelihoods is part of a global indicator. Livelihood is defined as: "capabilities, productive assets (both living and material) and activities required to fulfil means of living, sustainably and with dignity."

This category includes effects on employment where the unit of measurement is more or less the same as measuring disruptions to essential services, namely a) the number of people whose works are affected by a disaster and b) the number of days they cannot work. Data can be obtained, for example, from specially designed household surveys.

It is important to remember that unlike other effects on life, livelihoods are an indirect consequence that has the potential to affect people outside the affected geographical area.

Material Impact

Direct material impacts, or damage, are the scope for assessing direct economic impacts. Direct Material Impact is measured based on observing the direct effects of a disaster event, that is, "damage" to *the* physical *stock*, whether partial or total, which is relatively immediate after the event. Usually, this data is generated from reports from emergency response activities. At this initial stage, data usually uses physical measurements. For example, related to houses and dwellings, number of units or buildings, site area in cubic meters, and categories of damage or destruction.

Observation of material impact at an early stage becomes the basis of estimating the scale of the impact from an economic point of view, both in terms of volume[15] and in monetary value. Material damage data compiled in a national database by following a determined structure and following a time series reporting system can be the basis for reporting on economic impacts.

Besides the economic aspects, material impacts can also be reported in terms of the number of people affected and, if possible, disaggregated by gender and income category.

On the other hand, the Indirect Impact, in the form of flow or *flow* "loss" of the economy, refers to the "decline in economic value as a result of damage and/or the direct result of disasters on people and the environment[16]. Indirect impact on individuals, businesses and communities sometimes continue for years or even decades after a disaster.

In addition to housing and dwelling, another important element related to the direct material impact on physical stocks is critical infrastructure, such as "physical buildings, facilities, networks, and other assets that provide

[15] See the definition of measurement in terms of volume in the 2008 National Account System
[16] UNISDR 2017

services that are important for the social and economic functions of a community or society.[17]". A list of critical infrastructure needs to be made as a subgroup classification of direct material impact objects.

In addition, it is also necessary to include other components of the *built environment* and cultural heritage buildings.

Material impacts also include damage to land and other natural resources, especially agricultural land, destruction of trees, and damage to critical ecosystem conditions such as forests and water reservoirs. Land and natural resources are part of the overall scope of economic assets included as assets in the National Account System. Environmental assets are defined as "elements that live naturally and not live on Earth, which together constitute a biophysical environment, which can benefit humanity[18], and they could be important components for the basic scope of statistics related to disasters.

Impact Of Agriculture

In an agrarian country such as Indonesia, the agricultural sector is the primary land user and plays an important role. Therefore, the agricultural sector is often exposed to significant impacts from disasters.

As with physical damage, due to catastrophic events in agriculture[19] also involve damage (physical assets *stock* that suffered total or partial destruction), and losses (changes in economic *flow* that arise in the future).

The impact of each agricultural sub-sector can be divided into two main components, namely:

- Damage to production: the value of destroyed agricultural inputs (seeds, fertilizer and animal feed) and output (stored products) and lost agricultural production.
- Damage to assets: the value of destroyed facilities, machinery, equipment and essential infrastructure calculated both in terms of physical units and monetary price values. The calculation is based on repair or replacement costs.

[17] UNISDR 2017

[18] See the Economic-Environmental Accounting System / System of Environmental-Economic Accounting (SEEA) 2012 - The Central Framework is an internationally agreed standard for producing comparable statistics about the environment and its relationship with the economy, following the same accounting structure as the National Balance System (SNN))

[19] The United Nations Food and Agriculture Organization (FAO) collaborates with UNISDR to develop an agricultural damage and loss assessment methodology that is integrated into an indicator structure for direct economic loss.

Production loss assessments are carried out for all[20] primary and seasonal crops. While damage (*stock*) seasonal plants rated from loss can be recovered quickly without affecting the next harvest, (*flow*) losses of the anticipated market value (but not materialised) of the affected products.

Annual crop damage is calculated from replacements that will take a long time beyond the coming season, and the loss is measured from the decrease in yields that are considered to occur.

Livestock, forestry assets both cultivated and non-cultivated forests, and aquaculture are included as part of direct economic losses.

Calculation of financial values for statistics can be done as follows:

a. Pre-disaster value of annual plants or animals that died due to disaster;
b. Cost of replacing fully / partially damaged assets, at post-disaster prices;
c. Difference between the expected and actual value of annual plants and animals that survived in the year of disaster; and
d. Decrease value that is considered to occur from the full recovery of plants and/or replacement of dead animals.

Impacts on the land itself, or land improvement, must also be included in principle. Damaged or destroyed agricultural buildings and machinery are valued based on replacement costs, as is generally done for direct economic loss measurement.

Economic Losses

Estimates of economic losses, "the financial value of total or partial destruction of physical assets in the affected area", are crucial data and statistics. For example, RPJMN Teknokratik 2020 - 2024 launched a plan to prevent GDP losses due to "economic losses as a direct result of disasters" to 0.021% in 2024". The target C indicator in the Sendai Framework also has indicators of economic damage, which are also targeted under the SDGs - related to poverty reduction (Goal 1), sustainable cities and human settlements (Goal 11), and climate change actions (Goal 13).

[20] Primary plants are plants that grow directly from the soil without having to go through processing, except cleaning

As alluded earlier, the effects of direct material damage are more easily observed explicitly. Impacts in terms of economic losses are more difficult to attribute through direct causal links to disasters. Therefore, the calculation requires estimation or data from various other data sources.

Economic loss statistics need to be made with a clear measurement concept, which is applied consistently. Conceptual and operational clarity is needed to avoid confusion, mixing, and double counting between valuations of *stock* and *flow*.

Several types of economic losses are implicitly included in the national account and other economic statistics. But this cannot necessarily be separated into impact variables because disaster events according to accounting rules, some values will appear as positive contributions to key indicators such as GDP and financing[21].

Post-disaster recovery causes short-term increases in employment, production activities and income. This sometimes gives the impression of resilience and economic growth, but in reality, this phenomenon will not directly affect GDP calculations.

Assets are defined in the National Account System (SNN) as stored values.

> *"Representing the benefits or a series of economic benefits obtained by the owner by owning or using the unit concerned for a certain period of time. This is a way of transferring value from one accounting period to another[22]".*

In other words, assets have an intrinsic value that is represented by the benefits expected for the owner, and this value can be lost or reduced directly by the disaster.

Direct economic losses are based on replacement costs such as the rehabilitation and reconstruction of damaged or destroyed assets, which represent the flow of financial resources needed to return physical assets back to their pre-disaster conditions. This measurement is quite practical because (a) it is easier to interpret the value of losses for analytical purposes, (b) this measurement can be compared directly with

[21] For example, the reconstruction or repair of assets after a disaster is a productive activity that increases employment and generates income so that in the short term it can increase GDP

[22] SNA 2008, paragraph 3. 30

GDP as part of a broader economic productive activity, (c) the calculated value is also a component of the disaster risk reduction expenditure accounting, and d) the same value is also a measurement of financing for post-disaster recovery in the Sendai Framework and SDGs.

Some of the main sources for estimating replacement cost values for damaged or destroyed assets can be used together to complement each other. The Ministry of Public Works, which is responsible for the type of associated infrastructure (roads, buildings, agricultural land, etc.), can carry out this assessment as part of emergency response and early recovery. The assessment can include estimated replacement costs based on available (pre-disaster) statistics based on average unit costs by type of infrastructure in the affected area.

Estimates based on average costs always often have the potential to be inaccurate. Therefore the average cost per unit or another *proxy* for estimating replacement costs needs to be quantified and

entered into the metadata.

Damage and economic loss data can be obtained from expenditure reports from government agencies. For example, the Ministry of Transportation for roads, the Ministry of Public Works for other infrastructure, business sector surveys, or disaster insurance claim record reports[23]. If the data is collected properly, it can be used to produce an estimate of aggregate expenditure for post-disaster recovery.

The primary objective of measuring direct economic loss indicators is to measure the recovery of physical assets. But not all assets that are damaged or destroyed will be recovered. Indeed, assets that had existed before a disaster can be replaced, but some assets that can only be written off, and some that can only be replaced by completely new assets.

The compilation of economic impact statistics is intended to assist various economic analyzes, including indirect assessment of the impact of economic losses. In addition, it can be used to calculate costs in post-disaster rebuilding and a broader measurement of disaster risk reduction expenditure, including costs for building back better.

[23] It should be noted that not all replacement expenses can be observed (or even incurred), not all assets have been insured, and appropriate proxies are not always available (e.g. average unit costs for affected assets). Therefore, some combination of these statistical compilations with proxy based estimation becomes a common practice to arrange replacement costs.

This cost of "building back better" is a new expenditure, added to the cost of recovering ordinary losses, to finance the structural efforts intended to reduce the risk of future disasters. This aspect is also a useful statistic, and is an important component of overall financing data related to disaster risk reduction.

Economic Losses and National Account System (SNN)

Policymakers need a picture of the indirect impact of a disaster on economic activity by sector and the overall economy. In the case of a large disaster event, analysis is needed using a national account and statistical sources.

Indirect economic losses tend to be far greater in value than damage. Therefore a good measurement of damage value is very important because this input data becomes the basis for the assessment and modelling of the impact of indirect economic losses later.

The value of the direct impact on the asset, which is valued in terms of losses on the asset base value, has been explicitly included in the SNN through a special record called catastrophic loss[24]. Changes in the stock of assets that do not have a direct or explicit effect on the flow in the accounting framework, such as production and income, are presented as a special type of change ("other volume changes") on physical assets.

[24] Volume changes that are recorded as large losses in other changes in the asset account volume are the result of large-scale, separate and recognizable events, which can destroy large amounts of assets in any asset category. Such events are generally easily identified. For example, large earthquakes, volcanic eruptions, tidal waves, severe storms, drought and other natural disasters; acts of war, riots and other political events; and technological accidents such as chemical spills or the release of radioactive particles into the air. Major losses include, for example, decreases in soil quality caused by heavy flooding or wind damage; destruction of assets caused by drought or disease outbreaks; destruction of buildings, equipment or valuables due to forest fires or earthquakes. "[SNA 12.46]

Economic Impact And Poverty

Economic impact statistics are an important element in understanding the relationship between disaster and poverty reduction. Sorting economic losses by category of survivors is needed for a focused analysis of disaster risk reduction. This can be achieved through disaggregation of statistics on the impact of disasters on humans based on income, especially households affected by damage to dwellings or other assets. This can be combined with vulnerability mapping before and after a disaster.

After each disaster event, statistics should be made about financial assistance or other assistance to households as far as possible in geographical areas. Although home poor households destroyed by disaster impacts involve very small replacement costs from a GDP perspective, but very large from the perspective of the household concerned, especially because generally the impacts are not insured.

Indirect impacts, for example, displacement, job loss or reduced income can be worse. Baseline data and metadata about material impacts and affected people need to be collected and stored to enable a disaggregated analysis that focuses on poverty to achieve recovery and development while *leaving no one behind*.

Disruption Of Basic Services

Disruption to the functioning of a community is one of the most critical elements of a disaster event that is usually associated with a material impact. Statistics on service interruptions can be generated based on basic data that was used for material impact assessments. The measurement of disruption of essential services can be done through the calculation of the number of relevant types of crucial infrastructure that cause disruption of essential services.

UNDRR developed a list of basic services that can be disrupted by disasters to help guide the preparation of statistics for the following indicators[25]:

- Health services (CPC 86: "Human health services")
- Educational Services (ISIC 85);
- Public Administration Services (CPC 91 "Government administration services");
- Transportation Services (ISIC 49: "Land transportation and transportation through pipelines", ISIC 50 "Water transportation", ISIC 51: "Air transportation");
- Electricity and Energy Services (ISIC 35: "Electricity, gas, steam and air conditioning supplies");
- Water Services (ISIC 36: "Collection, treatment and supply of water"); and
- ICT services (CPC 4 "Telecommunications, broadcasting and information supply services")

If additional data are available about the nature of the disruption in basic services, another dimension can also be developed to enrich the analysis, for example, by counting the number of people affected and the length of time of the disruption.

4. STATISTICS OF DISASTER MANAGEMENT FINANCING

There is an assumption that the impact of disasters causes significant social and economic losses on the State. In some cases, the increase in damage and losses is said to exceed the national expenditure on disaster management. Unfortunately, such statements are less supported by evidence, and there is almost no comparable data available on national expenditure on disaster management.

Indeed, hazard and catastrophic events are events that occur randomly in terms of time and location. But the implementation of disaster management as a series of efforts including the establishment of development policies that covers disaster prevention activities, emergency response, and rehabilitation[26], are government activities that are regulated, planned, implemented and evaluated; and therefore the financing can be calculated.

[25] UN Central Product Classification # (CPC rev 2.1) Product Classification , in Section 9: "Community, social and personal services" and in the International Standard Industry Classification for All Economic Activities (ISIC Rev 4) Part O, P or Q.
[26] Law No. 24 of 2007 concerning Disaster Management

With such a rationale, statistics on disaster management financing can be compiled on an on-going and periodic basis, for example, as an annual account. In this way, disaster management financing statistics can become an integrated and relatively conventional statistical domain as an extension of existing national accounts.

SPENDING

Disaster management financing statistics aim to calculate disaster management expenditure as part of the annual routine expenditure. In this way, the government can track financing trends in reducing disaster risk. Damage, loss and response and recovery assessments have also become more measurable. Moreover, government funding and other actors after the disaster were also used to estimate direct economic losses.

Funding statistics are usually collected on a national scale. It should be noted that this statistic also covers aspects of transfers, including transfers from national budgets, or international sources, to projects and local governments. The compilation of statistics about this transfer is very important to find out who the beneficiaries are and the potential gaps or opportunities for interventions aimed at reducing risk.

This operation is largely funded by public funding. In particular, preparedness, emergency response and disaster recovery activities are usually transferred from the central government budget to the local government, and/or in certain cases transfers from international sources to the national and or regional budget.

The financing of disaster management in the National Account System is implicitly recorded as part of a broader classification of national aggregate transactions. So it is still difficult to track precisely except by monitoring it through the balance of payments and national account statistics such as types of transfers and other activities (production, investment, employment) in the economy.

TRANSFER

There are two complementary approaches that can be applied to produce statistics on disaster management financing, especially in terms of quantifying financial value, disaster management transfers and expenditures.

First, make a focused transfer analysis from the relevant Ministries and Agencies and analyze transfers and expenditures for geographic areas and specific time periods where large-scale disaster recovery is taking place. Government financial and statistical data can be obtained from administrative records, survey results, or censuses of business and household activities. The context of large-scale disaster recovery also allows analysis that can show trends that are specific and temporary in nature. This can be the basis of estimated expenses for disaster management activities in recovery in the area concerned. In addition, coordination mechanisms can also be established and exchange data between government agencies to obtain *proxy* measurements that are useful for tracking activities that have the characteristics of disaster risk reduction or *Disaster Risk Reduction Characteristic Activities* (DRRCA).

The second approach is to develop a series of balance sheets and functional indicators that track all types of transfers and expenditures that have specific objectives for disaster management. Statisticians can develop certain functional classifications to determine domains that are considered important across sectors of the economy, for example, health, tourism, education, environment, etc. Such a balance sheet is often designed as a "satellite account" specifically used to extract data from the Sistem Neraca Nasional (SNN) or a National Account System. The satellite account has the same accounting structure and rules as the core SNN, but with a scope specifically designed to monitor activities related to disaster management.

The classification of disaster management activities can have the following scope:

a. Disaster Risk Prevention;
b. Disaster Risk Reduction;
c. Emergency Response;
d. Disaster Recovery; and
e. General Government, Research & Development, Education Expenditures

The transfers that have the characteristics of disaster management include:

a. Internal transfers between government services;
b. Risk transfer, insurance premiums and compensation;
c. International transfers related to disasters; and
d. Other transfers

Typical outputs from disbursement accounts or transfers of disaster management activities based on the basic System of National Accounts (SNA) framework include:

a. Total national expenditure with the aim of disaster management;
b. Disaster management expenditure based on funding sources, for example, central government, local government, private sector;
c. Disaster management expenditures and transfers;
d. Disaster management expenditure by type of activity, for example, disaster preparedness, recovery and reconstruction, early warning systems;
e. The value of transfers from the central government to local governments; and
f. The value of transfers from international donors, namely, development assistance (ODA) related to disaster management.

INTERNATIONAL ASSISTANCE

Overseas development assistance (ODA) is a flow of funds that a) is provided by official institutions or by their implementing agencies; and b) every transaction whose main purpose is to promote economic development and the welfare of developing countries which around 25 percent has soft loan or grant elements. It is estimated that about 80 percent of international humanitarian aid flows are related to conflict or other types of complex disaster situations involving refugee crises or violent conflicts.

Humanitarian assistance is part of ODA related to three sectors: Disaster Prevention and Preparedness; Emergency Response; and Reconstruction Assistance and Rehabilitation.

At certain times, such as immediately after large-scale disasters, and sometimes emergencies that lead to increased disaster management spending and international transfers, which can be tracked through regular compilation of disaster management statistics and then linked to specific disasters for analysis.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LESSONS LEARNT

BNPB, BPS-Statistics Indonesia Statistics Indonesia, and UNFPA consider the development of the Indonesia One Disaster Data to be a good practice that is worth documenting and sharing. This is particularly relevant given that the disaster management system in Indonesia has been striving to improve disaster data, and that the international community is looking for models in the quantitative progress monitoring and reporting on global frameworks.

Setting The Stage

Application of the disaster-related statistical framework for Indonesia germinated when the professional staff of BPS-Statistics Indonesia, UNFPA, and Pujiono Centre, deliberated the issue in a Regional Expert Working Group Meeting on Disaster-Related Statistical Framework, organised by UN ESCAP in Bangkok at the end of November 2018. This was preceded by a Regional Workshop on Gender and Statistics organised by UN Women. At that time, BPS-Statistics Indonesia was developing a proposal for Data Standards for Emergency Response in the aftermath of the Central Sulawesi Earthquake in the later part of 2018. While the development of disaster statistics is one of the quick wins in the Social Statistics division of the BPS-Statistics Indonesia, the proposal turned out to be rather too elaborate and too extensive to be funded by any donor at the tail end of the emergency response.

In part reacting to the, yet again, gaps in disaster data in the cascading disasters in Lombok and Central Sulawesi, BNPB included the strengthening of the sub-directorate in disaster statistics and the launching of an Indonesian Disaster Portal in an internal business processes restructuring. At the same time, a Presidential regulation on Indonesia One Data presented a strategic opportunity to improve and enhance the quality of governance and better utilisation of government data, not limited only to policy-making but also as a form of meeting the data requirements of the public.

Responding to the development, UNFPA in close coordination with BPS-Statistics Indonesia endorsed Pujiono Centre's suggestion to convert the Data Standards for Emergency Response project proposal into applying Disaster-related Statistical Framework under the national statistical system leveraging the works accumulated under the Disaster-related Statistical Framework of UN ESCAP.

The decision to broaden the work necessitated layers of work namely the development of the statistical framework and, at a later date, technical elaboration into the more pragmatic tasks of data collection, management, and presentation.

The first part of framework development was to delve into the institutional arrangements. The first phase of the Project was undertaken by the BPS-Statistics Indonesia with the support of UNFPA, and in collaboration with BNPB under an existing MOU. This coordination was important to project joint ownership and coherence. BPS-Statistics Indonesia serves as the custodian of the national statistical system with authority over the methodologies, business processes, and the many domains in the overall population data. BNPB, on the other hand, is the mandated leading agency in the disaster management 'sector' that has the substantive and authority technical mastery of the disaster management and thus the disaster-related data as a domain within the national statistical system.

Lessons learnt in this phase include the success in framing the issue of disaster data within the policy drive to an intersectoral converge under overarching national policy Indonesia One Data. In a more practical term, this phase saw the connection between the need to organise the disaster-related data, and the regional and global level need for solutions towards quantitative progress monitoring and reporting. In hindsight, it was realised that proponents of the Project underestimated the complexity of the regional framework when it needs to be applied to the national context where there are multitudes and layers of data and technical complexity. Finally, it was important to note the value of clarifying the roles of the national statistics office and national disaster management agency to promote shared ownership of the Framework.

Building The Framework

The first task in this stage was a review of the policies to establish the policy drivers and other and regulations governing disaster - related statistics. At the legislative level, the Project reviewed the various Acts, including those on disaster management, statistics, local governance, and access to information. Reviews on international documents include the Sendai Framework on Disaster Risk Reduction and Agenda 2030 on Sustainable Development Goals. At the policy level, the Project reviewed governments implementing regulations, including a new policy on Indonesia One Data, and the policy on minimum standards of local government services on disaster management. At a practical level, the Project reviewed the Decision of the Chief of BNPB regarding the disaster data. The principal sectoral and technical reference include ESCAP

Disaster-Related Statistical Framework, Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework on Disaster Risk Reduction: Collection of Technical Notes on Data and Methodology (UNDRR), and Peril Classification and Hazard Glossary (IRDR).

The review helped the Project to define the scope of, and the appreciation to, the complexity of disaster-related data at different levels. It also directed how those data are to be connected at the national, regional and global levels. In practice, the consultation process took much longer. Lots of energy was spent consulting the line ministries individually and in workshops. This could have been more effectively accomplished through the Ministry of Development Planning, where all of these policies converge into the national development planning system. Not to say the least that the Ministry is the national secretariat for monitoring and reporting of most international frameworks.

Content-wise, the Project relied a great deal on the output of the UN ESCAP Expert Group on Disaster-Related Statistical Framework. On policy framework, institutional arrangements, and business process, the Project leveraged the provisions of the Indonesia One Data Policy.

In this phase, principal actors took a major shift in perspective from an emergency response-oriented perspective into a more wholesome range of disaster risk management, which encompasses disaster risks, disaster occurrence, disaster loss and damage impacts, and the associated investment.

In terms of institution arrangement, the Project reached out to ministries and agencies that have stakes in disaster-related data. Typically they have their disaster-related databases about their respective mandates and portfolios. Initially, the ministries and agencies were sceptical about the proposal to build more comprehensive statistics. This was largely because of the concerns that such a Framework may require complex data and unfamiliar multi-layered business processes. Later, they showed more interest when the complexity was clarified, and concepts were translated into operational considerations.

The Project presented to the counterpart agencies the potential advantages and benefits from joining the scheme, e.g. the prospect of shared data, easier coordination with other sectors, and ultimately the scope for them to make better use of disaster data for their own ministry' or agency's disaster emergency response as well as business process and, finally, the opportunity for them to align their works with that of other agencies under a coordinated approach at the national level.

Taking the cue from the Disaster - Related Statistical Framework that was developed at the Asia-Pacific regional level, and guided by the policy under the Indonesia One Data, the Project developed the first draft of the disaster-related framework, which was enriched by results of consultations with principal agencies and related ministries and agencies. At a later stage in the series of consultations, participants agreed that it would be more strategic to present the Framework as Indonesia One Disaster Data. This will allow establishing the connections between the Disaster-related Framework and Indonesia One Data, and secondly to send a clear message that the disaster-related statistics employ the framework, the logic, and the mechanisms that are already enshrined in the Indonesia One Data policy.

Linking of the global, regional with national and sectoral agenda served well the development of the Framework that was fused into national contexts. The DRSF also allowed participants to break down the framework into policy and institutional arrangements from the technical parts of the work. In this regard, considerable energy was spent in delving too early in clarifying and defining terminologies, a work that could have been served better by adapting the globally already agreed terminologies.

In hindsight, the Project could have more aggressively pursued the interagency strategic engagement when it downsized the global and regional framework into national contexts and when it generated local challenges and good practices.

Fostering Commitment

In this phase, BPS-Statistics Indonesia, BNPB, line ministries, and agencies achieved the shared buy-in to the Indonesia One Disaster Data. This was based upon the acknowledgment of the urgency of having such a framework to advance the disaster management and its incorporation into development planning processes.

The need for an integrative framework became apparent when, during the series of consultations, participants conducted the inventory of the sectoral policy, portfolios, and existing data gaps. In the process, they jointly discovered that none of the agencies has formally prescribed roles and responsibilities in disaster management. Each ministry and agencies develop their portfolios and, accordingly, their disaster-related databases, with different names, formats, and usage.

Those agencies with well-established disaster-related data within their data environment were rather non-committal to the framework development process, while those that found cleavages were keener to

engage. Others who have gone through previous similar exercises were doubtful that this effort would solve any problem. Through the series of workshops, however, gradually interconnection among agencies, where mandates, activities, and data are interchanged and shared.

Subsequently, participants suggested validating the draft Framework at sub-national level on a pilot basis. Local governments, in the absence of any guidance, developed their databases. These are, by and large, emergency response-related data where components of risks and disaster investments are missing altogether. Data is short-lived as it dissipates with the conclusion of the disaster emergency phases. Disaster events were not clearly defined and no available methodology to categorise events and their impacts. There was no linkage between the provincial disaster management agency and its sectoral line offices, nor there is a clear linkage with the district and city local governments.

The local governments expect national leadership concerning accounting disaster management. Firstly, to help justify local budget expenditure by demonstrating the efficacy of disaster management programs. Secondly, to help interact with other sectors in terms of development planning and monitoring and reporting. The piloted province expressed an interest to be a site for pilot implementation once the framework is rolled out. Overall, the pilot validation confirmed that a local government needs a disaster-related framework to improve the business process in disaster management.

Around this time, Pujiono Centre established and followed through UN ESCAP's plan to organize a Regional training on a disaster-related statistical framework, which BPS-Statistics Indonesia welcomed to host the training workshop in Indonesia. Participants from the Asia-Pacific countries confirmed the need for such a framework in their countries, which are at different stages of organizing disaster-related data. The Philippines, for instance, is developing a national account on disaster management. By and large, no country has undertaken a comprehensive disaster-related statistical framework such as that Indonesia is developing. The regional training convinced disaster management actors in Indonesia that they have been on the right path to adopt the disaster-related statistical framework as a priority, and that the eventual success will be good practice for the region.

At a national conference, BPS-Statistics Indonesia, BNPB, and line ministries as well as UNFPA, arrived at a common agreement to proceed with the development of a national framework to develop the technical aspects of data instruments and mechanisms. It included the classification of disaster hazards and occurrences, setting the threshold of disaster events, and establishing a system for disaster registry.

This phase witnessed the shift of perspectives of sectoral ministries as well as the growing interest and willingness to converge into a national framework for a more interconnected data within the realm of disaster management and in the broader contexts of the National Medium -Term Development Plan (RPJMN). To that end, the process also fostered the climate to cooperate towards developing policy and regulatory frameworks for sharing disaster-related data beyond technical arrangement. The agencies need this national framework to justify activities proposals for the budget to finance the activity and actually to execute the commitments. This is carried out only when such activities are approved within the matrix of activities of their ministries as well as by the Ministry of National Planning.

The Project briefed the United Nations Humanitarian Country Team and members of civil society on the progress of the work and the opportunity to discuss how the statistics fit in the on-going reform in the humanitarian system in the country.

Ministries and line agencies demonstrated the wait-and-see attitude during this phase. Some changes in personalities in the BNPB also affected the climate of interactions among line ministries. Some of them expressed keen interest to move forward with more practical and applicable actions that could serve as shared starting points to make changes such as common definitions, terminologies, and categories of hazardous events, etc. In hindsight, the Project could have put more energy in the few one-on-one consultations it conducted to solicit direct inputs.

MOVING FORWARD

The Project significantly benefited from many events, namely the declaration of the Indonesian industrial revolution 4.0 and the Indonesia One Data programmes. Additionally, the fact that disaster statistics is one of the quick wins of BPS-Statistics Indonesia and the restructuring in the BNPB that recognises the role of statistics. Meanwhile, UN ESCAP Regional training on Disaster-Related Statistical Framework was held in the country and the on-going enhancement of the humanitarian system in the United Nations Humanitarian Country Team.

From here onward, some opportunities will foster further progress in disaster-related statistics, particularly moving forward to accomplishing the more technical aspects of the work. This includes the

scope to enrich the disaster-related data in the subsequent socio-economic census and the Statistics of Village Potentials. On BNPB's side, the operationalisation of the National Emergency Operation Centre will entail an opportunity to improve the disaster registry and, alongside, the need to improve disaster events' reporting. It includes the definitions, classifications, and emergency threshold, which lead to the establishment of a unified portal for disaster-related data statistics in Indonesia.

UNFPA has embedded continuing support to the Project in its multi-year work plans. Similarly, UN Women offers BPS-statistics Indonesia the potential support in the incorporation of gender and women's perspectives into the national statistics and the development of a Satellite Account on disasters. The UN Humanitarian Country Team has been supporting the government in the revision of the disaster management legislation and in the development of new standard operating procedures for disaster management and humanitarian action to include the improvement of disaster-related data.

Some opportunities that could have been optimized in this phase include the connection between national and that of regional and global level efforts that could have facilitated a higher flow of information. This is key considering the bottom-up approach in the process in Indonesia, where it required the clarity of concepts, the need for disaster data to improve disaster management performance on the one hand and to help progress monitoring and result reporting to meet regional and global commitments on the other hand.

At this juncture, a national disaster-related framework is already established in Indonesia. The next steps will constitute the translation into, and the adoption of, technical guidelines and mechanisms by principal actors and their sectoral and local partners. At the same time, there is the need to develop a regulatory framework to set the rule of the game in disaster data management.

APPENDICES

ANNEX-1: GLOBAL DISASTER MANAGEMENT COMMITMENT

Sendai Framework

The Sendai Framework for Disaster Risk Reduction was produced at the Third UN World Conference in Sendai, Japan, in March 2015. The Sendai Framework was followed by an intergovernmental process to reach agreement on terminology and indicators aimed at assisting the wrangling between the processes of compiling official statistics at the national level with the need to prepare global indicators.

The Sendai framework contains targeted results in 2030, namely a significant reduction in disaster risks and losses on life, livelihoods and health and on economic, physical, social, cultural, environmental assets by individuals, businesses, communities and countries.

The Sendai Framework is a 15-year, voluntary, non-binding agreement that recognizes that the State has a primary role to play in reducing disaster risk, and shares that responsibility with other stakeholders including local governments, the private sector and other stakeholders.

This framework applies to disaster risks on a small and large scale, often and rarely, which comes suddenly or gradually, caused by nature or the danger posed by humans and risks related to the environment, technology and biology. The Sendai Framework is intended to be a multi-hazard disaster risk management guide related to development at all levels and across sectors.

The final outcome expected from Disaster Risk Reduction until 2030 is to reduce the risk of disasters and loss of life, life and health in economic, physical, social, cultural and environmental assets of individuals, businesses, communities and countries.

For this purpose, **the general objectives** are as follows:

Preventing the emergence of new and reducing the risk of existing disasters through integrated and inclusive measures in the economic, structural, legal, social, health, cultural, educational, environmental, technological, political, and institutional fields. This is to prevent and reduce exposure to hazards and vulnerability to disasters as well as increase preparedness in response and recovery, and strengthen resilience.

To support the assessment of global progress in achieving the expected results and objectives of this framework, seven global targets have been agreed. These targets will be measured at the global level and will be complemented through work to develop appropriate indicators.

National targets and indicators will contribute to achieving the expected results and objectives of this framework.

The seven global targets and their indicators are as follows:

Global target A: Substantially reduce deaths due to global disasters by 2030, with the aim of reducing the average per 100,000 global deaths between 2020-2030 compared to 2005-2015.	
A-1 (cmp.)	Number of deaths and missing people related to the disaster, per 100,000 populations.
A-2	Number of deaths caused by disasters, per 100,000 populations.
A-3	The number of people lost due to the disaster, per 100,000 populations. *The scope of the disaster in this target is further defined in paragraph 15 of the Sendai Framework for Disaster Risk Reduction 2015-2030 and applies to small and large-scale, frequent and rare, sudden and slow disasters caused by natural disasters or man-made hazards, and related environmental, technological and biological hazards and risks.*

Global target B: Substantially reduce the number of people globally affected by 2030, which aims to reduce the global average per 100,000 between 2020-2030 compared to 2005-2015.	
B-1 (cmp)	The number of people directly affected by the disaster, per 100,000 populations.
B-2	Number of people injured or sick caused by disasters, per 10,000 inhabitants
B-3	The number of people whose homes were damaged was caused by the disaster.
B-4	The number of people whose homes were destroyed was caused by the disaster.
B-5	Number of people whose livelihoods have been disrupted or destroyed, related to the disaster.

Global target C: Reducing economic losses from disasters directly related to global gross domestic product (GDP) by 2030.	
C-1 (cmp)	Direct economic losses from disasters related to global gross domestic product.
C-2	Direct agricultural losses caused by disasters. *Agriculture is understood to cover the sectors of plants, livestock, fisheries, beekeeping, aquaculture and forests as well as related facilities and infrastructure.*
C-3	Direct economic losses to all other productive assets that are damaged or destroyed caused by the disaster. *Productive assets will be disaggregated according to economic sectors, including services, according to international classification standards. Countries will report on economic sectors that are relevant to their economy. This will be explained in related metadata.*
C-4	Direct economic losses in the housing sector caused by disasters. *Data will be sorted according to damaged and destroyed dwellings.*

C-5	Direct economic losses due to damage or destruction of critical infrastructure associated with disasters. *Decisions regarding critical infrastructure elements that will be included in the calculation will be left to Member States and explained in the accompanying metadata.* *Protective infrastructure and green infrastructure must be included if relevant.*
C-6	Direct economic losses due to damaged or destroyed cultural heritage caused by disasters.

Global target D: Significantly reduce disaster damage to critical infrastructure and disruptions to basic services, including health and education facilities, including through the development of their resilience by 2030	
D-1 (cmp.)	Critical infrastructure damage associated with disasters.
D-2	Number of health facilities destroyed or damaged caused by disasters.
D-3	Number of educational facilities destroyed or damaged caused by disasters.
D-4	The number of critical infrastructure units and facilities that were destroyed or damaged related to the disaster. *Decisions regarding critical infrastructure elements that will be included in the calculation will be left to Member States and explained in the accompanying metadata.* *Protective infrastructure and green infrastructure must be included if relevant.*
D-5 (cmp.)	Number of disruptions to basic services related to disasters.
D-6	Number of disruptions to education services related to disasters.
D-7	Number of disruptions to health services related to disasters.
D-8	Number of disruptions to other basic services related to disasters. *Decisions regarding the basic service elements to be included in the calculation will be left to Member States and explained in the accompanying metadata.*

Global target E: Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020.	
E-1	Number of countries that accept and implement national disaster risk reduction strategies in accordance with the Sendai Framework for Disaster Risk Reduction 2015-2030.
E-2	Percentage of local governments that accept and implement local disaster risk reduction strategies in accordance with national strategies. *Information must be provided at the appropriate government level below the national level with responsibility for disaster risk reduction.*

Global target F: Substantially increase international cooperation to developing countries through adequate and ongoing support to complement their national actions for the implementation of this framework by 2030.	
F-1	Total official international support, (official development assistance (ODA) plus other official flows), for national disaster risk reduction measures. *Reporting the provisions or acceptance of international cooperation for disaster risk reduction must be done in accordance with the modalities applied in each country. Recipient countries are encouraged to provide information about the estimated amount of national disaster risk reduction expenditure.*
F-2	Total official international support (ODA plus other official flows) for national disaster risk reduction measures provided by multilateral institutions.
F-3	Total official international support (ODA plus other official flows) for national disaster risk reduction measures is provided bilaterally.
F-4	Total official international support (ODA plus other official flows) for technology transfer and exchange related to disaster risk reduction.
F-5	Number of international, regional and bilateral programs and initiatives for the transfer and exchange of science, technology and innovation in disaster risk reduction for developing countries.

F-6	Total official international support (ODA plus other official flows) for capacity building for disaster risk reduction.
F-7	Number of international, regional and bilateral programs and initiatives for capacity building related to disaster risk reduction in developing countries.
F-8	Number of developing countries supported by international, regional and bilateral initiatives to strengthen statistical capacity in their disaster risk reduction.

Global target G: Substantially increase international cooperation to developing countries through adequate and ongoing support to complement their national actions for the implementation of this framework by 2030.	
G-1 (cmp. G2- G5)	Number of countries that have a multi-hazard early warning system.
G-2	Number of countries that have multi-hazard monitoring and forecasting systems.
G-3	Number of people per 100,000 covered by early warning information through local governments or through national distribution mechanisms.
G-4	Percentage of local governments that have plans to act based on early warning.
G-5	Number of countries that have accessible, understandable, usable, and relevant disaster risk information and assessments available to people at national and local levels.
G-6	Percentage of population exposed to or at risk for disaster protected through pre-emptive evacuation after early warning. *Member States who are in a position to do so are encouraged to provide information about the number of people evacuated.*

In an effort to achieve the expected results and objectives, priority actions are set as follows:

1. *Understand disaster risk;*
   Disaster risk management and management policies must be based on an understanding of disaster risk in all dimensions of vulnerability, capacity, people and assets exposed, hazard characteristics and the environment. Such knowledge can be utilized for the purpose of pre-disaster risk assessment, for prevention and mitigation as well as for the development and implementation of adequate preparedness and effective response to disasters.

2. *Strengthening governance to control disaster risks;*
   Disaster risk management at the national, regional and global levels is essential for effective and efficient control related to disaster risk. A clear vision, plans, competencies, guidelines and cross-sectoral coordination and participation of relevant stakeholders are needed. Strengthening disaster risk governance for prevention, mitigation, preparedness, response, recovery and rehabilitation is needed to encourage collaboration and partnership mechanisms across institutions and for the use of instruments relevant to disaster risk reduction and sustainable development.

3. *Investment in disaster risk reduction for resilience;*
   Public and private investment in disaster risk prevention and reduction through structural and non-structural steps that are important to enhance the economic, social, health and cultural resilience of individuals, communities, countries and their assets, as well as the environment. This is to encourage innovation, growth and job creation. These steps are effective financing and have the role of saving lives, preventing and reducing losses and ensuring effective recovery and rehabilitation.

4. *Improve disaster preparedness for effective responses, and to "build back better" in recovery, rehabilitation and reconstruction.*
   Stable disaster risk growth, including increasing people and assets exposed, combined with lessons learned from past disasters, demonstrates the need to further strengthen disaster preparedness and response, by taking action to anticipate events, integrating disaster risk reduction in preparedness and ensuring response capacity and effective recovery at all levels. Empowering women and people

with disabilities for public leadership and promoting gender justice and access to generally accepted responses, the rehabilitation and recovery approach to reconstruction is the key. Disasters have shown that the recovery, rehabilitation and reconstruction stages need to be prepared ahead of the disaster, this is an important opportunity to rebuild better, including by integrating disaster risk reduction into development steps, making the nation and community resilient to disasters.

ANNEX-2: SUSTAINABLE DEVELOPMENT GOALS (SDGS)

The 2030 Agenda for Sustainable Development sets 17 Targets and 169 targets for poverty alleviation and achieving sustainable development. In March 2016, the 47th Session of the United Nations Statistical Commission (UNSC) approved the Global Indicators Framework, which set 230 indicators to measure progress towards the Sustainable Development Goals. In SDG, there are 11 disaster-related targets, spread among 17 objectives, and are covered by 5 indicators, including under Goal 1: "End poverty in all its forms everywhere", Goal 11 "Make Cities and Human Settlements, Inclusive, Safe, Resilient and Sustainable" and Goal 13 "Take Urgent Action to Combat Climate Change and Its Impacts." Interagency Expert Group (IAEG) on SDG indicators decided that the definition of these indicators will be harmonized with indicators adopted for international monitoring towards the Sendai Framework.

Disaster risk reduction crosses the various objectives listed in *Sustainable Development Goals* (SDGs).

Objectives 1. To end poverty in all its forms everywhere
Goal 1.5 In 2030, build resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to extreme events related to climate and other disasters such as economic, social and environmental.

Objective 2. End hunger, achieve better food and nutrition security, and encourage sustainable agriculture Goal 2.4 By 2030, ensuring sustainable food production systems and implementing resilient agricultural practices that increase productivity and production, help protect ecosystems, strengthen the ability to adapt to climate change, extreme weather, drought, floods and other disasters; and which can progressively improve the quality of land and land.

Objective 3. Ensure a healthy life and promote prosperity for all ages Goal 3.d Strengthen the ability of all countries, especially developing countries, for early warning, risk reduction and management of health risks at the national and global level.

Objective 4. Ensure the quality of inclusive and equitable education and encourage lifelong learning opportunities for all.
Goal 4.7: In 2030, ensure that all learners obtain the knowledge and skills needed to encourage sustainable development including, among other things, through education for development and sustainable lifestyles, human rights, gender equality, a culture of peace and non-violence, global citizenship and respect for cultural diversity and cultural contribution to sustainable development.
Goal 4.a Build and improve educational facilities that are child-friendly, disability and gender and provide a safe, non-violent, inclusive and effective learning environment for all.

Objective 6. Ensure the availability and management of sustainable water and sanitation for all.
Goal 6.6: In 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

Objective 9. Build resilient infrastructure, encourage inclusive and sustainable industrialization and encourage innovation.
Goal 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and cross-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all.
Goal 9.a: Facilitate sustainable and resilient infrastructure development in developing countries through increased financial, technological and technical support for African countries, underdeveloped countries, developing countries, landlocked countries, and Countries Island developing nations.

Objective 11. Make cities and human settlements inclusive, safe, resilient and sustainable Goal 11.1: In 2030, ensure all access to adequate, safe and affordable basic services and improve slums.
Goal 11.3: In 2030, increase inclusive and sustainable urbanization and participatory, integrated and sustainable human settlement planning and management capabilities in all countries.

Goal 11.4: Strengthen efforts to protect and preserve the world's cultural and natural heritage Goal 11.5 By 2030, significantly reduce the number of deaths and the number of people affected by disasters including those related to water, and substantially reduce direct economic losses relative to gross domestic product globally, with a focus on protecting the poor and vulnerable people.
Goal 11.b: In 2020, substantially increase the number of cities and settlements taking and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, disaster resilience, and developing and implementing holistic disaster risk management in all levels are in accordance with the Sendai Framework for Disaster Risk Reduction 2015-2030.
Goal 11.c: Support the least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings using local materials.

Objective 13. Take immediate and extraordinary action to combat climate change.
Goal 13.1 Strengthen resilience and adaptability to climate and natural hazards in all countries.
Goal 13.2 Integrate climate change actions into national policies, strategies and planning.
Goal 13.3 Improve education, increase human and institutional awareness and capacity in climate change mitigation, adaptation, impact reduction and early warning Goal 13.a Carry out commitments made by developed country parties to the United Nations Framework Convention on Climate Change that sets goals mobilize $ 100 billion per year by 2020, from all sources, to meet the needs of developing countries in the context of meaningful mitigation actions and implementation that is transparent and fully and as soon as possible capitalizes and operates the Climate Green Fund.
Goal 13.b Promote mechanisms for effective planning and management related to climate change in the least developed countries, including focusing on women, youth and local communities and marginalized communities.

Objective 14. To conserve and use oceans, oceans and marine resources in a sustainable manner for sustainable development

Goal 14.2 In 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by increasing resilience, and taking action to restore them to achieve healthy and productive oceans

Objective 15. Protect, restore and encourage the use of sustainable terrestrial ecosystems, manage forests sustainably, fight desertification, and stop and reverse land degradation and stop the loss of biodiversity

Goal 15.1 In 2020, ensure the conservation, restoration and sustainable use of terrestrial and terrestrial freshwater ecosystems and their services, especially forests, wetlands, mountains and dry lands, in line with obligations under international agreements.

Goal 15.2 In 2020, Promote the application of sustainable management of all types of forests, stop deforestation, restore degraded forests and substantially increase global reforestation and afforestation

Goal 15.3 In 2030, fight desertification, restore degraded land and land, including land affected by desertification, drought and flooding, and strive to achieve a land-neutral, neutral world

Goal 15.4 In 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to increase their capacity to provide important benefits for sustainable development.

Goal 15.9 In 2020, integrate the values of ecosystems and biodiversity into national and local planning, development processes, strategies and poverty alleviation calculations.

ANNEX-3: LINKAGES OF THE SDGS INDICATORS AND THE SENDAI FRAMEWORK

SDG indicator		Sendai indicator
Objectives 1. To end poverty in all its forms everywhere		
1.5.1	The number of deaths, missing persons and people directly affected by the disaster per 100,000 population	A1 and B1
1.5.2	Direct economic losses from disasters related to global gross domestic product (GDP)	C1
1.5.3	Number of countries adopting and implementing national disaster risk reduction strategies in accordance with the Sendai Framework for Disaster Risk Reduction 2015-2030	E1
1.5.4	The proportion of local governments that adopt and implement local disaster risk reduction strategies are in line with national disaster risk reduction strategies	E2
Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable		
11.5.1	The number of deaths, missing persons and people directly affected by the disaster per 100,000 population	A1 and B1
11.5.2	Direct economic losses in relation to global GDP, damage to critical infrastructure and a number of disruptions to basic services, which are associated with disasters	C1, D1, D5
11.b.1	Number of countries adopting and implementing national disaster risk reduction strategies in accordance with the Sendai Framework for Disaster Risk Reduction 2015-2030	E1

11.b.2	The proportion of local governments that adopt and implement local disaster risk reduction strategies are in line with national disaster risk reduction strategies	E2
Goal 13. Take immediate action to combat climate change and its effects		
13.1.1	The number of deaths, missing persons and people directly affected by the disaster per 100,000 population	A1 and B1
13.1.2	Number of countries adopting and implementing national disaster risk reduction strategies in accordance with the Sendai Framework for Disaster Risk Reduction 2015-2030	E1
13.1.3	The proportion of local governments that adopt and implement local disaster risk reduction strategies are in line with national disaster risk reduction strategies	E2

ANNEX-4: STATISTICS AND DISASTER MANAGEMENT

Governments, communities and stakeholders face different issues and challenges. Therefore, it is demanded to make policies and decisions that vary according to the situation at hand. For that, they need a database that suits their needs.

Reference: Developed by the Asia-Pacific Experts Group in collaboration with UNECE TF-MEED

Typical issue issues	**Typical policies and plans that must be made**	**Examples of usage statistics**
PRE-DISASTER? There is no potential for disaster: **risk assessment and risk reduction** Disaster risk can be estimated but not known for certain Development investment must be informed by a risk profile Using the best available knowledge so that development does not exacerbate existing disaster risks (and or create new ones)	• Prioritize financing in risk reduction • How to finance in development while avoiding new risks • Integrated policy to reduce exposure and capacity building for vulnerable groups (including, potentially, through relocation outside the hazard	• Dynamic hazard profile (magnitude, temporal, and spatial distribution) • Vulnerability and exposure lines: (demographic and socio-economic statistics) such as exposure settings in hazard-prone areas and identify vulnerable groups • Records and trends from past disaster experiences, for example, the effectiveness of early

There is a potential for disaster: **Mitigation and Preparedness** • Risk profile changes when new information becomes available and developments in potentially vulnerable areas occur • Early warning systems and other monitoring systems, if available, provide information about risks and possibilities to reduce impacts • Prepare emergency response capabilities according to potential disasters, and be alert to move assets when needed	• Introduction of new steps to reduce disaster risk • Introduction of mechanisms to enhance or ensure adequate early warning and adequate preparedness • How to invest in risk reduction measures as an integrated part of broader poverty reduction initiatives and sustainable development • Do and how to prevent development in hazardous areas	• Scale, location and other investment characteristics in disaster risk reduction • Signs of risk that develop slowly approaching the threshold for potential disasters • Level of awareness, preparedness, and investment in disasters by households, businesses and communities • Identify factors that cause and / or worsen disaster risk, for example environmental degradation, extremely vulnerable infrastructure, or extreme poverty.
WHEN DISASTERS HAPPENED Emergency Preparedness • Imperative is to act quickly and efficiently to save lives and reduce unnecessary suffering • Scale of injection of adequate resources to control the crisis • Urgent requests to meet the enormous needs for places where vital systems and basic service delivery are affected	• Determine the geographical location and prioritize the need for emergency assistance • How to make the most efficient response • How to manage the needs provided while local suppliers for goods and services are also affected (what kind of temporary effort is needed to overcome the difficulties faced by local service suppliers) • How to implement emergency response while laying the foundations for medium and long-term recovery	• Disaster events, including the scale of disasters and temporal, and spatial distribution of events • Types and characteristics impacts such as instantaneous or gradual events, intensive or extensive impacts • Instant indication of impacts on populations, damage, losses and disruptions to basic services • Recovery needs, potentially increasing • Disaster response: who, what, where, when and how much

Medium and long term recovery • Not fulfilling humanitarian needs • Risk that fragile communities can retreat to new emergency crises if recovery needs are not met • Fewer highlights in the initial response can translate to fewer resources for recovery • Often the normal development policy planning cycle is continued with many requirements but, with fewer resources due to disasters	• How to prioritize recovery of the economic sector and determine the appropriate scale of rebuilding efforts in the affected location • How to determine the appropriate level of financing needed for total recovery from disaster impacts: • Return to consideration of risk identification and future mitigation (see risk assessment)	• Comprehensive and credible post-disaster assessments for damage, loss and malfunction / services • Requirements for economic recovery, for example, direct and economic losses. • community, locality and sector resilience • Post new disasters for calculation of future incident risk

ANNEX-5: GLOSSARY OF TERMS

Walidata Bencana (Disaster Data Custodian) is an Agency that carries out the data collection, inspection and management activities as well as disseminating data submitted by disaster data producers. In this case, the National Disaster Management Agency (BNPB).

Walidata Bencana Pendukung (Supporting Disaster Data Custodi) is an Agency that carries out data collection, inspection and management activities as well as disseminating data submitted by data producers in their regions. Supporting Custodian of Disaster Data is the provincial or district / city BPBD or OPD for Disaster Management.

Statistics Data Advisor is an Agency that conducts the process and quality assurance related to statistical data, namely the Central Statistics Agency (BPS).

Provincial / district / city Statistics Data Advisors are provinces / districts / cities BPS that provide guidance in relation to disaster data in their areas.

Geospatial Data Advisor is an agency that provides the guidance related to geospatial data, namely the Geospatial Information Agency.

Walidata (Data Custodian) is the Ministry that carries out data collection, inspection and management activities as well as disseminating data submitted by the Walidata Disaster at the central level. In this case, the Ministry of Communication and Information Technology (Kominfo).

Provincial / district / city Walidata (custodian) is a local Communication, Information, and Statistics office (Diskominfotik) that carries out data collection, inspection and management activities as well as disseminating data submitted by the Walidata Disaster in its area.

Walidata Sektoral (Central Sectoral Data Custodian) is a unit in the Ministry / Agency that carries out the activities of collecting, examining, and managing sectoral disaster data as well as disseminating data submitted by sectoral disaster data producers.

Provincial / Regency / City Supporting Sectoral Walidata is a unit in the provincial / district / city agency that carries out activities of collecting, examining, and managing sectoral disaster data and disseminating data submitted by sectoral disaster data producers in its region.

Data Producers are units in Ministries / Agencies and local governments that produce disaster data.

Central / provincial / district / city One Disaster Data Forum is a means of communication and coordination of Ministries / Ministries and Agencies and/or Local Governments for the implementation of One Disaster Data in the region.

One Disaster Data Portal is a disaster data sharing media at the national and provincial / district / city levels that can be accessed through the use of information and communication technology.

Data Users are Ministries / Agencies, local governments, individuals, and groups of people, or legal entities that use disaster data.

Disaster Management Command Post, hereinafter abbreviated as PDB Control Post, is an agency that functions as a command centre for disaster emergency management operations. It is the main command post in the Disaster Emergency Management Command System to coordinate, control, monitor, and evaluates the implementation of disaster emergency response .

Disaster data is a collection of raw facts or information which forms the basis for describing a thing (object or event) about a disaster. These facts can be in the form of symbols, numbers, words, or images, which are obtained through the process of observation or searching to certain sources and can be processed into more complex forms, such as; information, databases, or solutions to certain problems.

Statistics are a collection of methods, rules regarding the collection, summarization, analysis, processing, and interpretation, as well as a collection of data or databases from a group of raw data on disasters that are collected from many sources, including operational databases from sectoral ministries/agencies, surveys, censuses, monitoring systems, and administrative records. Statistics make it possible to reach a conclusion that facilitates the process of monitoring, reporting and decision making related to improving the implementation of disaster management.

Indicators are numbers generated from the calculation of the statistical database which are used to monitor progress and report achievements and provide information about disaster risk reduction to policymakers, program makers and implementers, and the wider community. Indicators are an evidence base for determining and encouraging actions to reduce risk and create sustainable development in situations without disaster.

Data Standards are standards that underlie certain data.

Metadata is information in the form of structures and standard formats to describe, explain, and facilitate the search, use and management of data information.

Reference Code is a sign containing characters that contain or illustrate certain meanings, intentions, or norms as a unique identity data reference.

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NOTE

This draft was prepared by Dr. Puji Pujiono, MSW., UNFPA consultant, based on the Disaster-Related Statistical Framework http://communities.unescap.org/system/files/final_drsf_manual_190918_reduced.pdf 2019

One Data Bencana Indonesia (Indonesia One Disaster Data) is an initiative launched to be part of the Indonesia One Data program. It is significant to provide context towards a better understanding of disaster risk across hazards, increase the effectiveness of the organization of disaster management, and meet the needs of monitoring and reporting within the framework of the implementation of disaster management. Better disaster data is also expected to help mobilize the participation of all parties in overcoming disaster risks as a whole.

The initiative is to improve and enhance the quality of government data governance that serves both as a basis for policy-making, as well as a form of meeting public data needs of the community in order to enhance the utilization of disaster-related data within the official national statistical system.

Disaster events have decisive impacts on the success of development efforts and the achievement of economic, social and environmental well-being in the short, medium and long term. The availability of systematic data related to disaster management has come to the attention of the government, and it encouraged the National Disaster Management Agency (BNPB) and the National Statistics Indonesia (BPS) to jointly develop the Indonesia One Disaster Data.

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