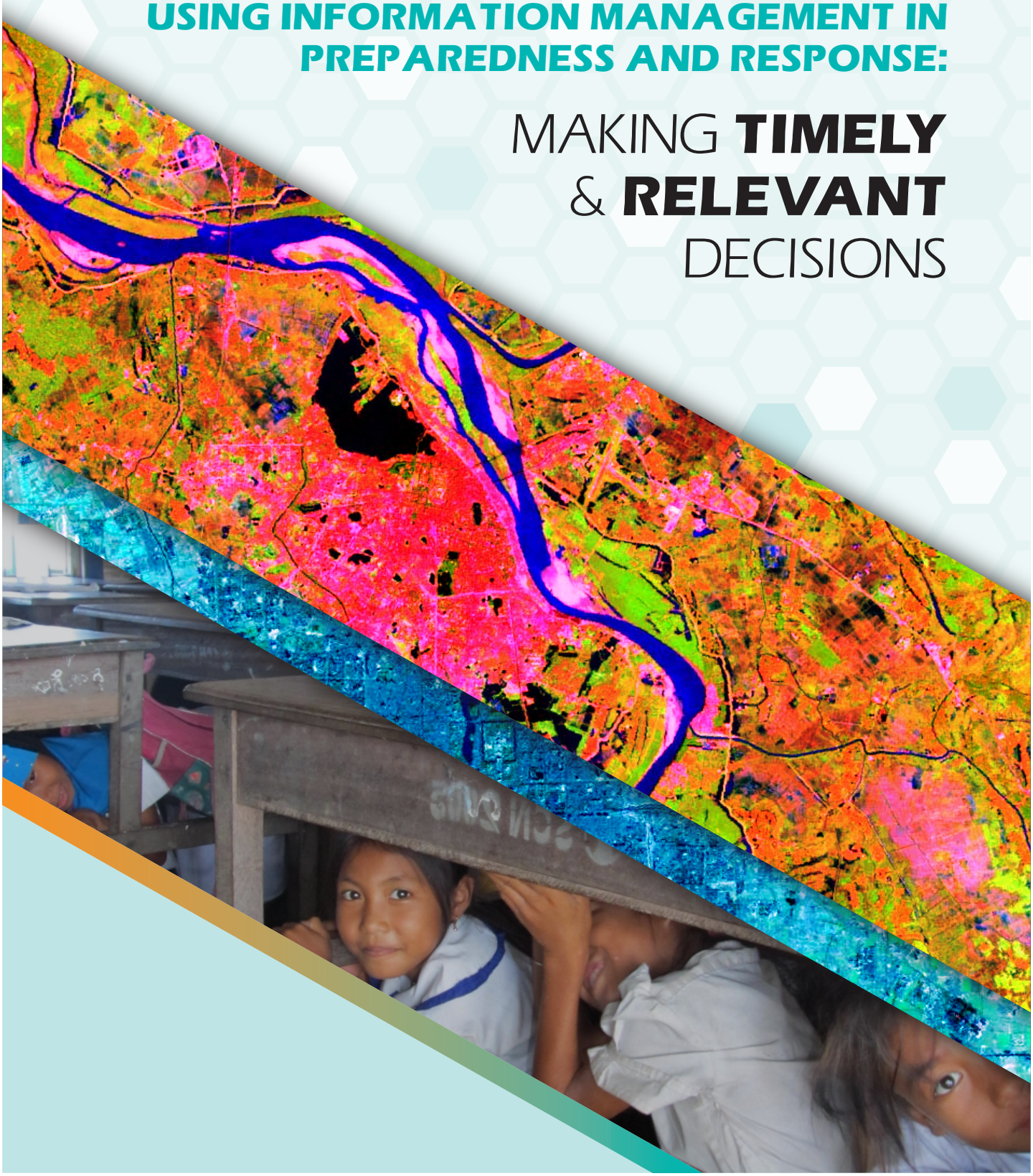
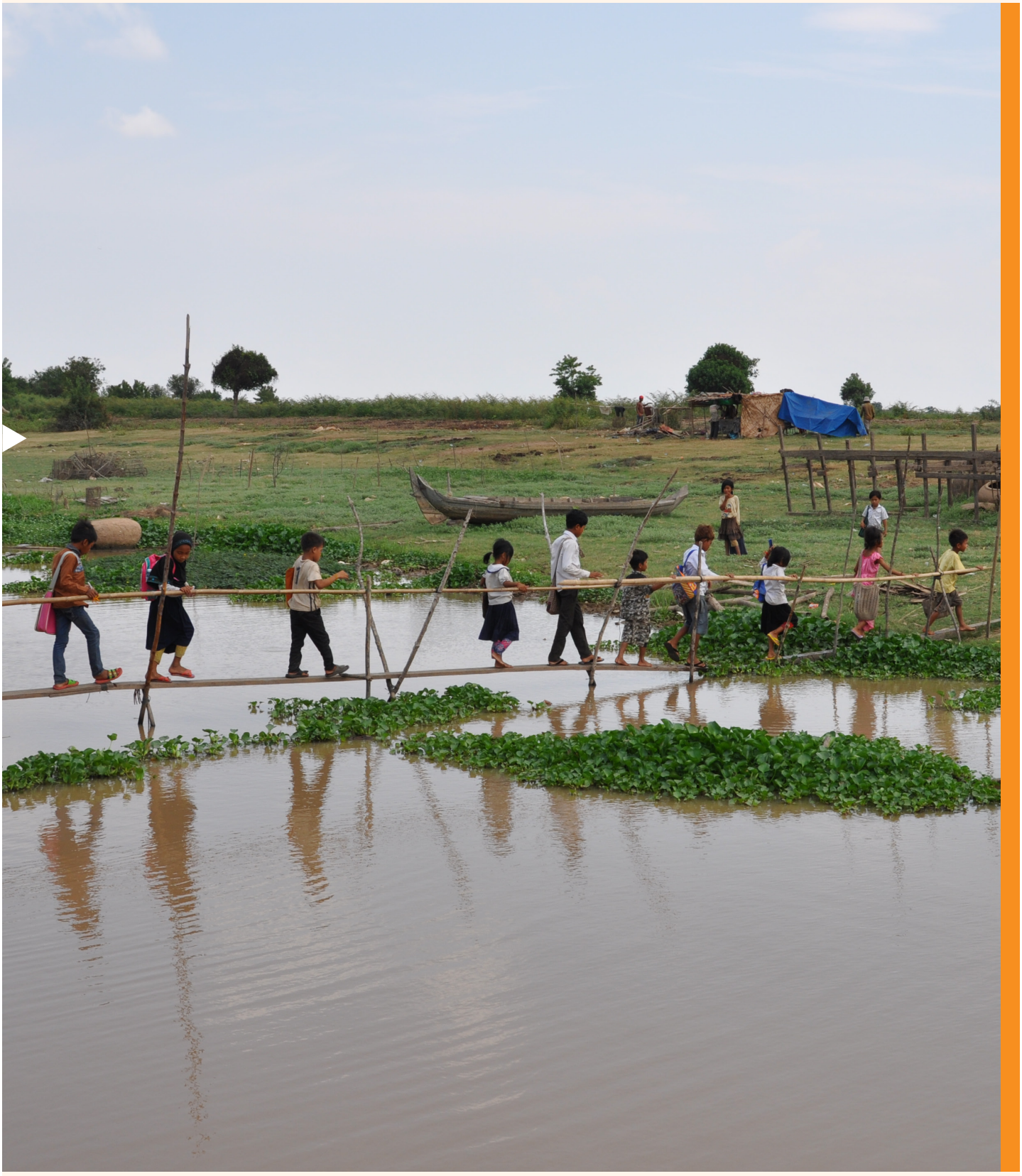
World Vision

USING INFORMATION MANAGEMENT IN PREPAREDNESS AND RESPONSE:

MAKING **TIMELY** & **RELEVANT** DECISIONS





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Written by
Ma. Bernadeth B. Lim
Hector R. Lim Jr.

Layout artist
Lowil Fred Espada

Preface

The Need for This Guidebook

The Asia-Pacific Region has the highest risk of exposure to natural hazards in the world. Seven out of the ten deadliest disasters worldwide since 1980 occurred in Asia. Collectively, these resulted in billions of dollars of losses. Impacts of disasters in the Asia-Pacific region are expected to continue to increase due to the effects of climate change. It is anticipated that natural disasters will increase in frequency and severity. In addition, due to continuous development and population growth, vulnerability of communities also increases. According to United Nations Economic and Social Commission for Asia Pacific (UNESCAP), the 2015-2016 El Nino was one of the strongest El Nino events since 1997-1998. Additionally, it has been observed that typhoons are becoming stronger, which was exemplified by Category 5[1] Typhoons Haiyan and Haima in the Philippines. These examples among others resulted to thousand deaths, millions of damage to property and widespread disruption of economic activities.

In order to abate the impacts of these disasters, disaster risk reduction (DRR) and climate change adaptation (CCA) policies, programs and activities have been adopted by countries in the region to enable them to continue to develop sustainably amidst the inevitable occurrences of natural hazards. Governments have started to incorporate DRR and climate change adaptation into their national strategies and have taken actions to prepare for possible disasters. However, access to accurate data about population and previous disasters is pivotal to facilitate this process. National disaster response policies, strategies and plans cannot be developed without data and proper data management. Information collection and management for preparedness is vital for disaster response strategies. Decision makers need disaster risk models and comprehensive impact profiles that are based on systematic and dependable data. These include information from local and global sources such as the results of historical analyses, geographical information system (GIS) mapping, remote sensing (RS) data, and local knowledge. However, the gathering of this information is not the only need – it needs to be systematically analyzed and used to develop estimates on the predication of natural hazards and impacts of disasters, and to provide and disseminate recommendations for actions to key stakeholders within the country. However, for many developing Asia-Pacific countries, information is rather limited and less organized compared to those in developed countries. Communities are less aware (or in some cases, completely unaware) of where to get timely information; they do not know how to analyze this information; and lack the ability to act on the information provided to them.

1 Category 5 are supertyphoons with wind speed of more than 220 kilometers/hour and more than 120 nautical miles per hour intensities.

The Sendai Framework for Disaster Risk Reduction sets as one of its targets "Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030." The first priority action for the implementation of the Framework is "understanding disaster risk". Information on disasters should reach the concerned stakeholders, and most especially the affected communities, at the appropriate time. The dissemination of information to disaster-affected communities varies greatly across contexts and across the disaster-management cycle (before, during and post disaster). It is important to note that in the post-disaster context, continuous information flow over time is critical within the framework of "build back better".

Purpose of the Guidebook

This guidebook was developed to help disaster management professionals to know and understand the information available, where to find these information, and how to use available information for their disaster management practice, especially for decision making purposes based on evidence. In particular, this guidebook is designed to help Response Managers in their decision-making processes when preparing for future disasters and responding to emergencies.

Target Users

This guidebook is designed for Response Managers which may come from various levels that may include (but are not limited to) the following:

- Government officials in National Disaster Management Offices/Authorities that have oversight of response operations and preparedness planning; and

- Response managers in International NGOs, national level NGOs, CSOs that will respond to emergencies and have more sectoral interests. These will also include development managers in International NGOs, national level NGOs, and CSOs that will develop preparedness planning for their project work.

FIGURE 1. Process flow of information for decision-making

Process of Guidebook Development

The development of this guidebook started with the need for a one stop shop resource for Response Managers on sources of information, how to access information and how to process information for purposes of evidenced-based decision making. First, a plan of work was developed. Then secondary information on disaster management, sources and access to information as well as methods and approaches, were collected from different sources. Interview questionnaires were developed for various levels of response managers and information management practitioners from INGOs, NGOs, NDMOs and CBOs. These practitioners were then contacted to elicit information and resources that were included in this guidebook. Consultations with various audiences from these organizations were also done through workshops that were organized by World Vision International. One workshop was organized in Naypyitaw, Myanmar on September 2016, where representatives from Plan International, Oxfam, Caritas, World Vision, RDC, and other local NGOs attended. Another workshop was conducted in Manila Philippines, on December 2016 where representatives from various National organizations such as Philippine Atmospheric Geophysical Astronomical Services Administration (PAGASA), Department of Scienceand Technology (DOST)-NOAH, Department of Social Welfare (DSW), UNOCHA, and various NGOs such as Plan International, World Vision, Caritas, Save the Children, participated.

Guidebook Structure

The Figure 1 shows the framework of how this book is presented. It consists of an introduction to the guidebook and humanitarian response, 3 main chapters of how information are collected, processed, analyzed and presented for decision making through the aid of tools, and finally how decision making are done according to results of analysis.

Introduction. Gives the importance of information management in the overall disaster management continuum. An overview of the humanitarian response and the data needs for decision making are also presented.

Chapter 1

Information and their sources. Covers types of information that can be used for decision making and where these can be accessed. Information details with reference to population and demographics, CRVS, geospatial, and how these are used for disaster preparedness and response are described. The chapter also presents geoportals for purposes of information sharing and some other sources of information for decision making.

Chapter 2

Approaches and tools, and their application in disaster preparedness and response. The chapter covers a number of approaches and tools that makes use of the information described in the previous chapter, to be analyzed in order to produce results that aids decision making. Approaches such as damage and loss assessment, needs assessment, and risk assessment and corresponding tools to conduct such needed assessments such as historical profile, mapping, ranking, and risk matrix, are featured.

Chapter 3

Evidence-based programming. This chapter presents how outputs of data analysis through approaches and tools mentioned in the previous chapter, are used to prioritize communities affected by a disaster, identify immediate and long-term needs, and design programs and/or strategies to address certain needs for response, rehabilitation and reconstruction. Principle of evidence-based programming and decision making purposes, how information are used for assessment, planning, monitoring and evaluation for preparedness and response strategies are also presented.

Conclusion

Wraps up the guidebook and provides further insights on how information management can help in decisions that prioritizes areas and sectors according to needs and resources available.

This document covers sources of information that are relevant for Asia and Pacific region in addition to some relevant analysis tools and approaches that can be used for data analysis. This guidebook is a living document which provides information on what exists at the period of its development. Hence, this guidebook does not cover all information that are available worldwide for disaster management. It is acknowledged, therefore, that there are sources of information that are not referred to in this guidebook which may be pertinent and relevant depending on the particular country and disaster context. As actors, tools, platforms, innovation on information management will rise, it is important that this guidebook be updated accordingly.

ACRONYMS & ABBREVIATIONS

AAA Affected Area Analysis

ADRC Asian Disaster Reduction Centre

APRSAF Asia-Pacific Regional Space Agency Forum

BPS Indonesia Badan Pusat Statistik Indonesia

CBS Central Bureau of Statistics

CNES Centre National D'Etudes Spatiales

CNSA China National Space Administration

CONAE Argentine Space Agency

CRVS Civil Registration and Vital Statistics

CSA Canadian Space Agency

CSO Central Statistics Office

CSOs Civil Society Organizations

DGs Directorates-General

DLR German Aerospace Center

DMCii (UKSA & DMCii) UK Space Agency (BNSC in 2005)

DRM Disaster Risk Management

DRR Disaster Risk Reduction

EEAS European External Action Service

ESA European Space Agency

EUMETSAT European Organization for the Exploitation of Meteorological Satellites

GDP Gross Domestic Product

Geo-DRM Geo-referenced information systems for disaster risk management

GIS Geographic Information System

ICIMOD International Center for Integrated Mountain Development

IFRC International Federation of Red Cross and Red Crescent Societies

INPE National Institute For Space Research - Brazilian Institute

ISRO Indian Space Research Organization

JAXA Japan Aerospace Exploration Agency

KARI Korea Aerospace Research Institute

LDCs Least Developed Countries

LLDCs Landlocked Developing Countries

MIMU Myanmar Information Management Unit

NGOs Non-Government Organizations

NIS National Institute of Statistics

NOAA National Oceanic and Atmospheric Administration

NRSO National Registration and Statistics Office

PGA Peak Ground Acceleration

PSA Philippines Statistics Authority

RCMRD Regional Center for Mapping of Resources for Development

ROSCOSMOS Russian Federal Space Agency

SIDS Small Island Developing States

TRMM Tropical Rain Forest Measurement Mission

UNDP United Nations Development Programme

UNESCAP United Nations Economic and Social Commission for Asia Pacific

UNHCR United Nations High Commissioner for Refugees

UNICEF United Nations Children's Emergency Fund

UNITAR United Nations Institute for Training and Research

UNOCHA UN Office for the Coordination of Humanitarian Affairs

UNOOSA United Nations Office for Outer Space Affairs

UNOSAT Operational Satellite Applications Programme

UN-SPIDER UNOOSA Spaced-based Information for Disaster Management and Emergency Response

USAID United States Agency for International Development

USGS United States Geological Survey

WFP World Food Programme

WHO World Health Organization

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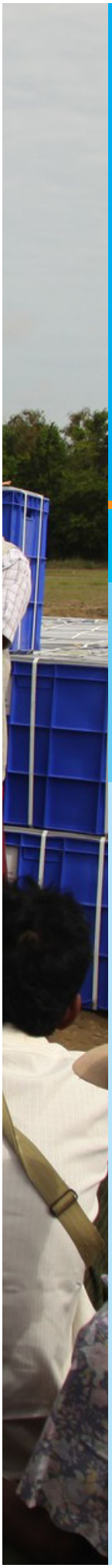


INTRODUCTION: UNDERSTANDING THE HUMANITARIAN RESPONSE CYCLE

This chapter contains information on the following:

- Disaster Management Cycle and information needs
- Decisions Related to Preparedness and Response and Sources of Information Needed
- The humanitarian programme cycle and the need for information

Information Management *is the systematic process of collecting, collating, storing, processing, verifying, and analyzing data and information, and disseminating it to humanitarian stakeholders. Data must be shared and collected in a timely manner to inform decision-making and analysis. Sufficient information management capacity and the use of common tools – are critical elements to the successful implementation of the programme cycle.*
~ UNOCHA

The disaster management (DM) cycle serves as an overarching framework of processes in management of disasters and corresponding information needs. The DM cycle includes three main stages, which are pre-disaster, during and post disaster (see Figure 2). Pre-disaster stage is known as the disaster risk management (DRM) aspect of the disaster management continuum. It is defined as a systematic application of management policies, procedures and practices to identify, analyze, assess, treat, monitor and evaluate risks. This involves "decision making based on the examination of risks, which can be assessed based on hazard, vulnerability, and capacity of people and communities". DRM includes different components such as risk assessment, prevention, mitigation, awareness and capacity building, preparedness and early warning. Post-disaster stage is called crisis/emergency management. It includes response, relief, rehabilitation and reconstruction where the two previously mentioned stages are considered part of the recovery phase.

In order to plan for the different stages and components of the DM, baseline information are important to assess the needs and identify strategies that will address the needs. The strategies will then be fleshed out in the form of plans that includes task, activities, resources (manpower, materials, equipment etc.), schedules.

Figure 3 indicates what needs to be done to support decision making process at different stages of the disaster cycle. Risk assessment prior to the event of a disaster serves as a basis of preparedness strategies such as information education campaign, training and seminars that increase the communities' awareness on risk. Scientific endeavors such as modelling and forecasting in order to understand the nature and likelihood of hazards can also be investigated. Examples of modelling and forecasting can be on the return periods of flood which may include 25, 50, and 100-year return period, Flood evacuation

FIGURE 2. Disaster Cycle[2]

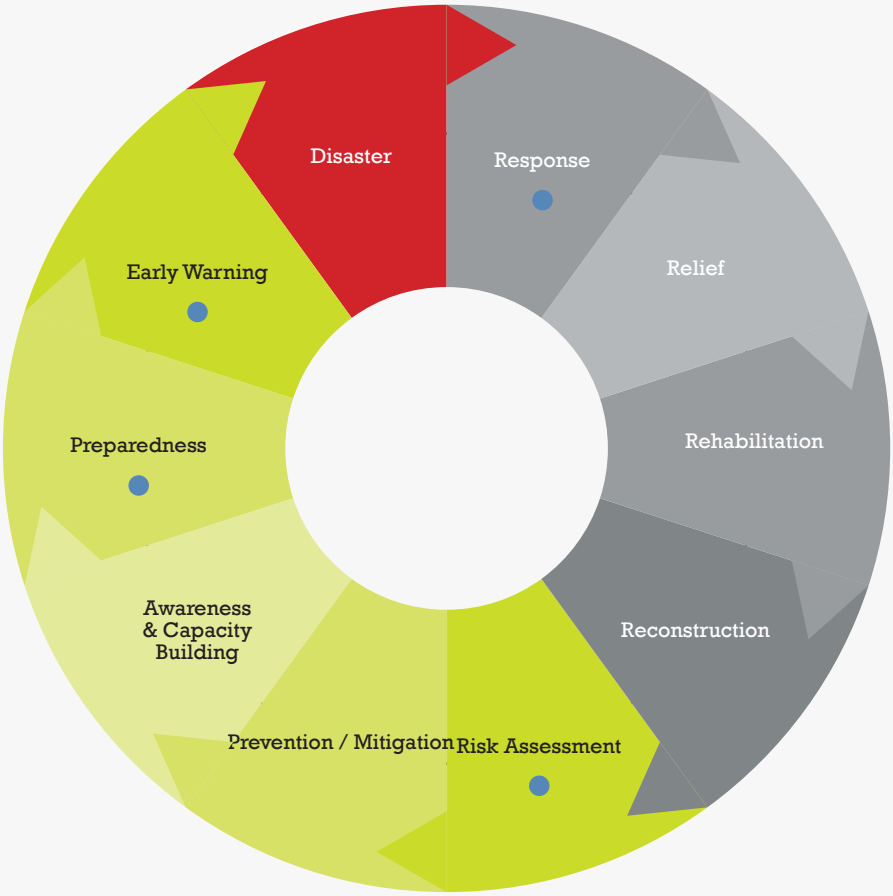


FIGURE 3. Information Needs During Stages of Disaster Cycle[3]

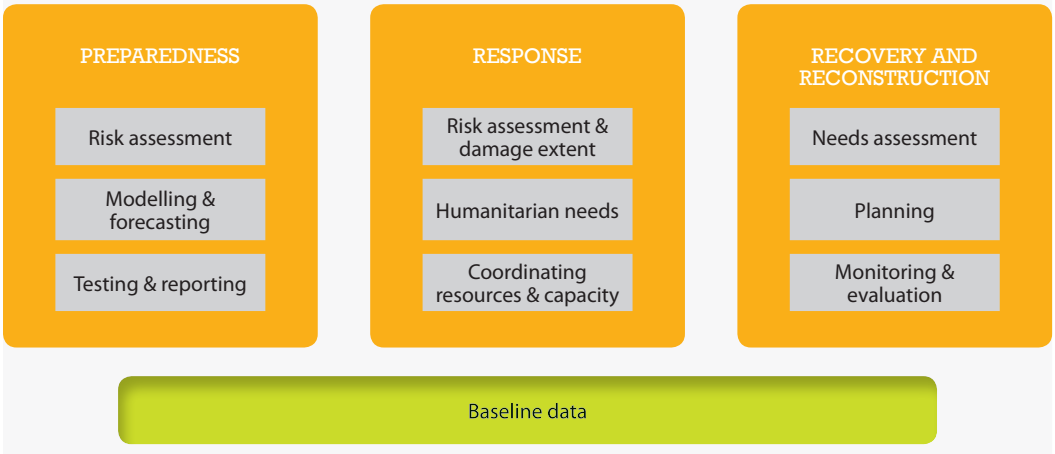


TABLE 1. Decisions Related to Preparedness and Response and Sources of Information Needed

Disaster cycle stage	Actions/decisions to make	Data and information needs	Sources of information
Preparedness	What are the activities to be included in the preparedness plan	Population data disaggregate by age, gender, socio-economic data; information around the potential hazards	Country Statistics office/website; country reports
Response	Operations: Mobilize people and funding resources, HR plans	Number of beneficiaries/ affected communities and people	Government rapid assessment reports, situation reports
	Identify priorities in terms of geographical and sector focus (Health, WASH, Education, Shelter, etc.); geographic prioritization, beneficiary selection criteria	Most affected areas; level of damage; Humanitarian needs overview	Government/ Cluster assessment reports; coordinated assessment reports; Tools (e.g. AAA)
Early Recovery and Rehabilitation	Principles of fair allocation, where to work, what to do, is it going well? Build back better	Prioritization model, livelihood activities; ongoing humanitarian needs, numbers of people still affected, what other humanitarian actors are doing	Government and NGO assessment reports, community engagement; reports from other humanitarian actors

simulation models can be another example. The modelling can eventually be tested which may help in the validation of results. Evacuation drills are some of the exercises for testing and reporting is needed for validation of results. After a disaster strikes (response), assessment of risk and extent of damage, and the immediate needs of the affected communities through participatory rapid assessment (PRA). There are a number of reasons why this assessment is needed. First, this is primarily important to identify humanitarian needs such as food, shelter, clothing among others. Secondly, it is also important in raising funds or supports to address the humanitarian concerns. Thirdly, in order to avoid inappropriate support coming from different sources. Lastly, it is important to identify capacity needs and for more efficient functional coordination among humanitarian actors. Assessment of the extent of damage and the needs assessment is also a basis for recovery and reconstruction planning, implementation as well as monitoring and evaluating attainment of recovery and reconstruction goals.

Table 1 shows some of the decisions that need to be made during each stage, and the data/information needs to support these decisions.

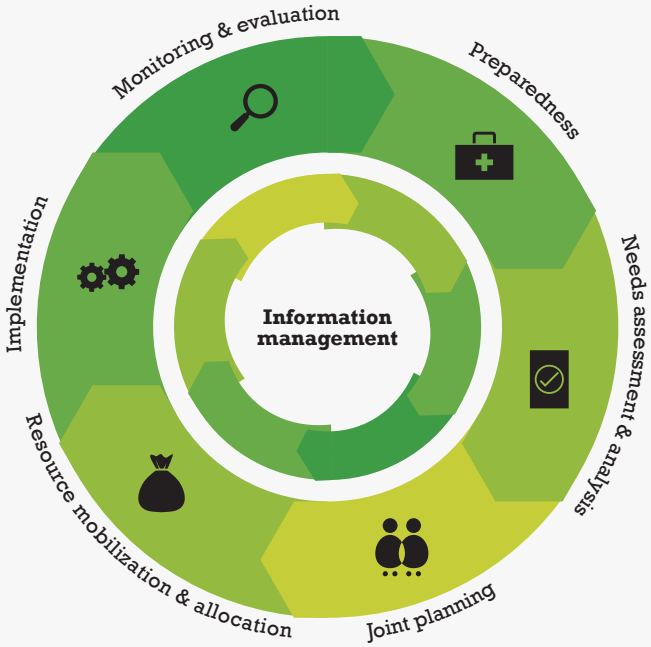
The Humanitarian Programme Cycle and the Need for Information

Information management is integrated in all aspects of the humanitarian program cycle (HPC). HPC is a framework used for effective and strategic delivery of aids to meet the needs of affected people. It is a coordinated series of actions to help prepare for, manage and deliver humanitarian response. HPC cuts across different stages of the DM continuum such as preparedness and response in particular. The affected people are the main source of information and are recipients of the humanitarian programme. The information derived from the affected people as well as other sources is coordinated, managed and analyzed to inform and guide the humanitarian programme. As shown in Figure 4, there are two layers of project management cycle that are implemented. These two layers follow the basic stages of project management which are situational and/or needs assessment analysis, planning, implementation, monitoring and evaluation. The outermost layer depicts the operationalization of these elements through implementation and delivery.

When a disaster occurs, situational awareness is imperative in decision making for response and emergency support. Information is needed on the

2 Asian Disaster Preparedness Center, Bangkok Thailand.
3 UNESCAP (2012). Disasters Without Borders. Chapter 4: Right Information, Right People, Right Time. Available Online at *http://www.unescap.org/sites/default/files/Chapter%204%20.pdf*

FIGURE 4. Disaster cycle[4]



scale of damage in an area and the location of the affected population, along with logistical information such as the location of hospitals, undamaged roads and bridges and communication infrastructure. In the days and weeks following a disaster, information concerning the international agencies and NGOs operating in the area and the distribution of resources is needed to ensure aid reaches those who need it most and efforts are not duplicated, wasting precious time and resources. As a mechanism of coordination, the cluster system is activated for such functions. Assessments and information collection is usually led by the country NDMO in addition to planning and coordination responsibility. Disaster managers and responders require timely and accurate information to understand and communicate the situation on the ground to others.

In sudden onset crises, decisions may need to be taken based on limited or incomplete information. Therefore, projections may need to be done in addition to some "judgement calls" based on the information available. There is an urgent need to quickly provide overall direction to the response to allow for the mobilization of action and resources. In such a situation, the application of the HPC should begin immediately and be flexibly applied.

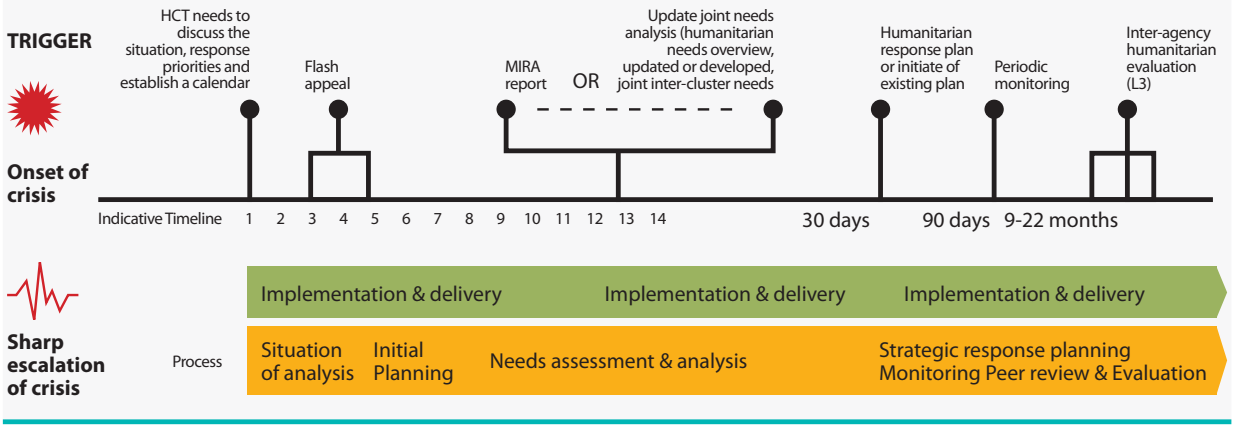
In a protracted crisis situation, particularly where there is a sharp escalation, a considerable amount of work may have already been done to identify vulnerable populations, assess and monitor their needs, and define and cost elements of the response. In both sudden onset and protracted crises, it is important to also take stock of what is in place to avoid duplication or overlap and ensure that there is only one joint planning framework in place at any given time. To ensure well-coordinated action in the fast-moving environment of a sudden-onset crisis or sharp escalation of an existing crisis, the following are actions taken in general under each stage as indicated in Figure 5.

Pre-crisis: Preparing for a response is done to ensure immediate actions taken when an emergency takes place. In this stage, information are prepositioned to identify needed actions as necessary. Based from initial information gathered, thresholds are identified from risk analysis, then a contingency plan is prepared or updated.

Day 1 after the onset/sharp escalation: A meeting is convened to discuss the scale and magnitude of the crisis. The meeting results to an analysis of the situation and existing capacities; statement of strategic priorities to be shared to public and concerned agencies; and timeline of actions to be

4 UNOCHA (2016). Presentation made during the Workshop on Information Management, Manila Philippines 2016.

FIGURE 5. Actions taken and timelines upon the onset of a crisis[5]



taken. In this stage, collection, consolidation and analysis of information needs to begin immediately.

Days 3-5: A flash appeal is prepared based on earlier analysis. UN flash appeal is an initial inter-agency humanitarian response strategy and resource mobilization tool designed to cover the first three to six months. The flash appeal indicates needs, priorities and needed funds. This is the basis of a further Multi-Cluster/Sector Initial Rapid Assessment (MIRA)[6] is carried out for joint analysis of information for response planning.

30 days after the flash appeal: A response plan is then developed based on the joint analysis. This serves as the framework for actions to be taken by various parties.

60 days after the humanitarian response plan: A periodic monitoring report is conducted to measure progress made against the objectives of the response plan. The report may also indicate a need to prepare / update a humanitarian needs overview or revise the humanitarian response plan.

By day 90 (for L3 Responses): During this period, recommendations for any need of humanitarian coordination adjustments in the response are given by peers from the inter-agency group.

Between months 9 to 12 (for L3 Responses): Evaluation is being conducted by an inter-agency team to assess whether response plans have been implemented and achieved intended goals and objectives.

Information management for humanitarian response is done and coordinated by United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA)[7]. UNOCHA consolidates and publishes information used by local and international agencies as basis for their policies, plans and humanitarian response actions. UNOCHA offices collect and analyze information to provide an overview of protracted and acute emergencies. To help their partners make better-informed decisions and ensure a more predictable approach to preparedness and response, OCHA also maintain a score of information products and services including maps, graphics, situation reports, humanitarian bulletins and websites. With advancement of technologies, UNOCHA also continues to invest in digitizing data and information management tools and reports.

National governments, also have a very important role in management of information for preparedness and response. National governments in Asia Pacific have set up structures to monitor and respond to disasters. Many countries have established their National Disaster Management Office (NDMO) or National Emergency Management Office (NEMO) that oversees the preparedness of the country and to respond to disasters. Governments are leading

5 IASC (2015). IASC Reference Module for the Implementation of the Humanitarian Programme Cycle Version 2. Available at *https://www.humanitarianresponse.info/en/system/files/documents/files/hpc_reference_module_2015_final_.pdf*

6 MIRA Guidance outlines an approach to undertaking a joint multi-sector assessment in the earliest days of a crisis or change in the context. It guides subsequent in-depth sectoral assessments and provides decision-makers with timely, adequate, sufficiently accurate and reliable information to collectively identify strategic humanitarian priorities.

7 UNOCHA (2013). Disaster Response in Asia and the Pacific: A Guide to International Tools and Services. Available from *http://reliefweb.int/sites/reliefweb.int/files/resources/Disaster%20Response%20in%20Asia%20Pacific_A%20Guide%20to%20Intl%20Tools%20Services.pdf*

TABLE 2. Roles and Responsibilities for Humanitarian Response[8]

Main steps	Preparation/pre-planning	Needs Analysis
Content	Planning for a needs based strategic response planning including time frame Establishing the broad parameters of the process Considering options for consulting the affected population Agreeing on roles & responsibilities	Joint needs analysis/overview • Key problem statements • Impact of the following on the crisis: › Drivers/underlying factors › Scope/scale and demographic profile › Population status › Impact of the crisis on critical markets › Information gaps (assessment planning in SRP)
Modalities	HCT planning meeting in consultation with the Inter-Cluster Coordination Group	Analysis team, supported by OCHA, responsible for the development of humanitarian needs overview
Main actors	Humanitarian Coordinator (HC)/HCT/ ICCG	HCT/ ICCG, Clusters, OCHA analysis team assigned by HCT/ICCG comprising cluster representatives and technical experts
Roles and responsibilities	HC/HCT: Decision on the HC/HCT: overall process from joint needs analysis to strategic response planning Cluster coordinators: Planning in consultation with the ICC	Custodians of the process, responsible for initiating and validating joint analysis Analysis team: Conducts consultations and develops humanitarian needs overview OCHA: Convenes analysis team and supports data compilation, consultations, caseload estimation, joint analysis, production of needs overview document and dissemination as appropriate, maintains assessment registry of Common Operational Datasets (CODs) and Fundamental Operational Datasets (FODs) Cluster coordinators: coordinate member inputs, participate in consultations identification of needs and gaps, validate findings NGOs, agencies: participate in consultations, provide expert inputs, validate findings
Timeline	A meeting ahead of the start of the process	4-6 weeks before SRP development

emergency responses and are coordinating with UN agencies and other stakeholders who are active in the response. Government usually have different levels of response mechanism including township, district, state and region and national levels. Different levels have designated officials to handle the coordination of the response.

In addition to UNOCHA and governments, it is also important that various actors work together for more effective assistance to communities affected by disasters. Various organizations, under the leadership of government NDMO/NEMOs work in clusters[9] in preparing for and responding to disasters. Table 2 presents for instance the roles and responsibilities of various parties for humanitarian response according to stages of program cycle as can be seen in Figure 4.

8 IASC (2015). IASC Reference Module for the Implementation of the Humanitarian Programme Cycle Version 2 Available at *https://www.humanitarianresponse.info/en/system/files/documents/files/Overview%20HPC%20process_2015_Final.pdf*

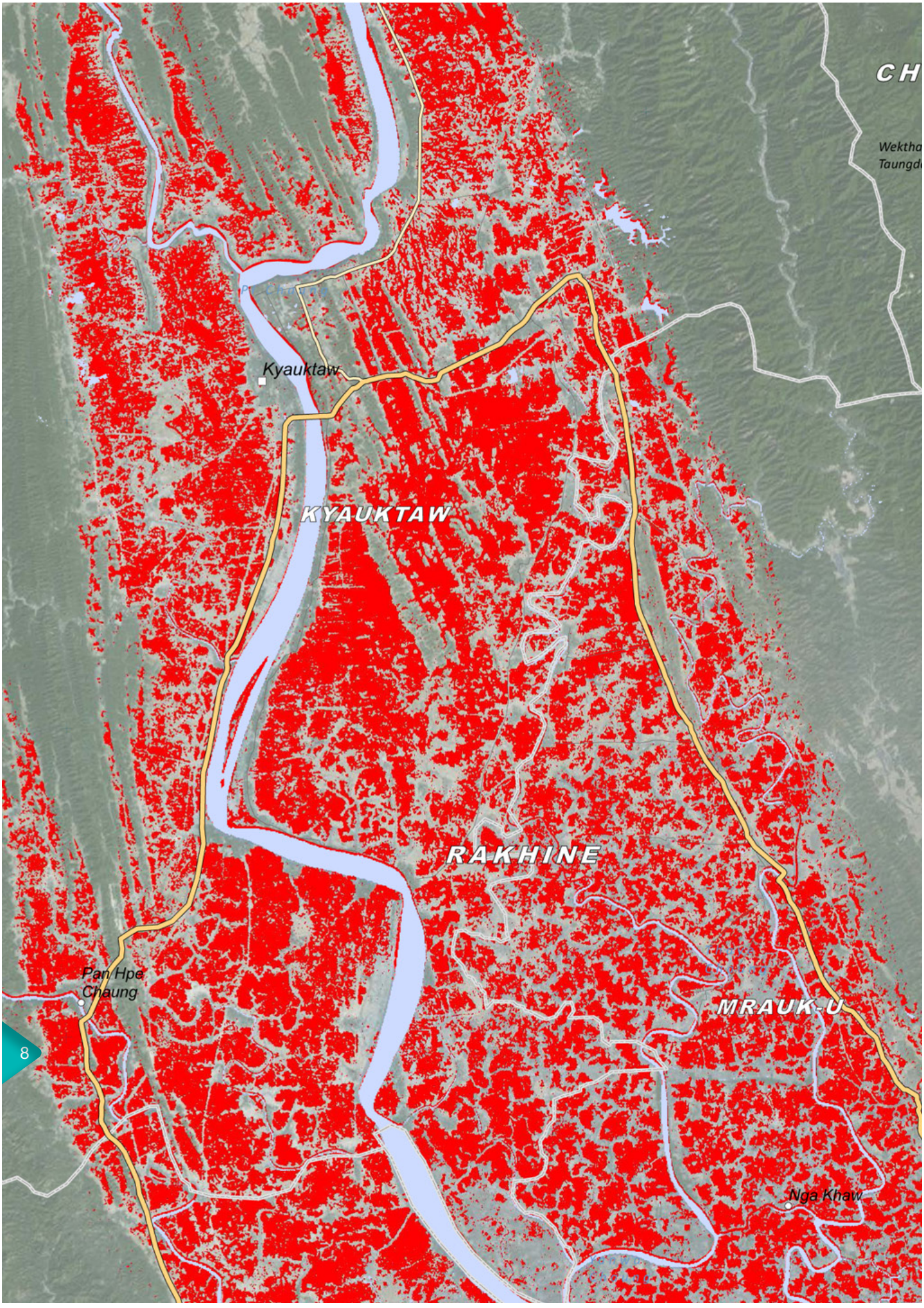
9 Sectoral coordination that uses the 'cluster approach' introduced after 2005 as part of humanitarian reform. Clusters have been established in countries.

HCT: Humanitarian Country Team HC: Humanitarian coordinator

	Strategic planning			Response Monitoring
	Response Analysis	**Country strategy**	**Cluster plans**	**Periodic Monitoring report**
	Components for response analysis: 1. Needs analysis (HNO) 2. Operational environment: › Capacity › Community concerns › Access constraints › Security constraints › Political considerations › Seasonal cycles › Market capacity › Country specifics	Country strategy • Parameters: boundaries; assumptions; results of response analysis • Strategic objectives • Strategic indicators, baselines and targets • Assessment planning	Cluster strategies • Cluster objectives Log frames • Cluster activities, locations, indicators, baselines and targets	Overview • Changes in context • Needs analysis • Response capacity • Strategic Objectives • Achievements to date • Analysis • Funding analysis • Cluster Performance and achievements • Challenges • Contingency/Preparedness Plans Recommendations
	Response analysis during strategic planning workshop based on needs analysis and operational environment	Workshop Wider consultations/ reviews	Intra-cluster work validation by HCT	Through processes, responsibilities and reporting format outlined in monitoring framework
	HCT ICCG Humanitarian stakeholders	HC/HCT ICCG	Cluster coordinators and members	Clusters, ICCG, HC/HCT
	HC/HCT: custodians of the process Analysis team: present and ensure availability of needs overview Cluster coordinators: prepare and ensure availability of information for response analysis OCHA: facilitates response analysis process and discussion NGOs, agencies: participate in consultations, provide expert inputs	HC/HCT: Leads planning process, defines overall vision Cluster coordinators: participate in planning, engage with cluster members, provide HCT with inputs for the strategy, ensure cross-sectoral collaboration OCHA: Facilitates planning process, coordinates caseload planning, prepares draft country strategy, finalises response plan NGOs, agencies: participate in consultations, provide expert inputs	Cluster coordinators: Prepare internal division of labour and establish peer review panel for projects Cluster members Contribute to cluster plans, elaborate projects including requirements in line with cluster objectives	Cluster: reviews compiled core and supplemental information and synthesises challenges faced in reaching objectives and making recommendations for cluster/HCT action OCHA: facilitates compilation of core and supplemental information for inter-cluster analysis and reporting ICCG: analyses compiled information and synthesises challenges faced in reaching objectives, makes recommendations for HCT HC/HCT: deliberates on findings and recommendations makes evidence-based decisions to address major constraints. Optionally, endorses report for public release
	One meeting /session (ideally at SRP workshop)	4 weeks including workshop	4 weeks	As agreed in the Monitoring Framework

◂ Key Message

Time, resources and strategies are important in disaster response. Therefore, it is imperative to manage information in order to prepare, understand and strategize for disaster response.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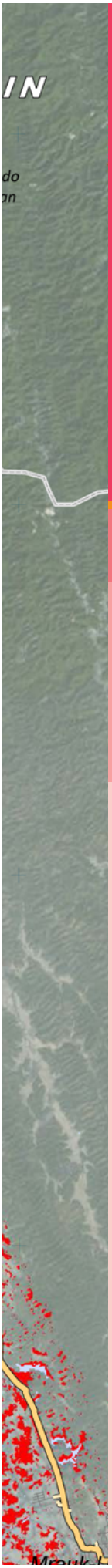


Chapter 1
DATA SOURCES

This chapter contains the following types of information and its sources:

- Information types, collection techniques and tools
- Census
- CRVS
- Geospatial information
- Geoportals and other sources of information

Chapter objective

to present what types of information exists, where their sources are, and how they can be used for disaster response planning and decision making.

Information is essential to disaster management. It provides indications of what people need before, during and after the impact of disasters. Information, when carefully analyzed, results in strategies that governments, organizations or individuals can implement in order to reduce the risks of vulnerable communities under threat of impending hazards. The objective of this chapter is to present the types of information available, the sources for this information, and how can they be used for disaster response planning and decision making – all with the aim of equipping stakeholders with an understanding of different reliable sources of data and information that can be used for disaster preparedness and response. This chapter also mentions in general, some, if not all data collection techniques and tools for primary and secondary data collection.

Figure 6 shows the interdependency of information for disaster management. Various kinds of information such as population data and other information from census, civil registration and vital statistics (CRVS), and geospatial information that can be used and interpreted for disaster preparedness and response are presented below. Information from census and CRVS can be processed to produce geospatial information such as maps, which are presented in a more visual and informative manner. From the maps, information such as the location and extent of damages and population affected due to disasters are presented. In using hazard maps for instance, vulnerable communities can be identified, hence, the basis for preparing and planning for possible disasters that may occur. There are also existing mechanisms of information processing and sharing that can facilitate access of information. All these information are either primary or secondary depending on their sources.

FIGURE 6. Interdependency of Information in Disaster Management

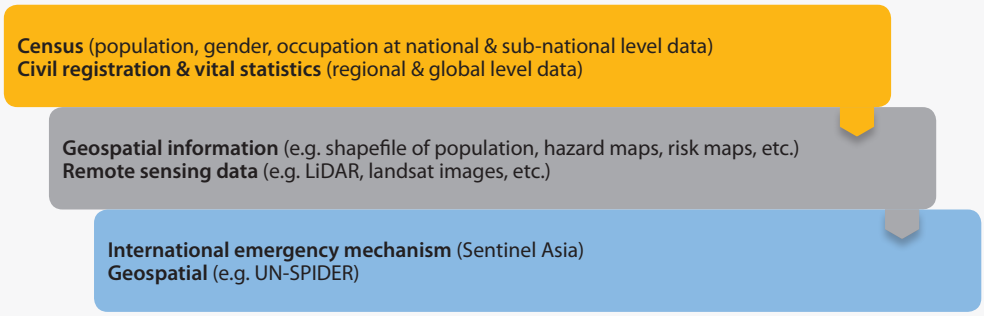


TABLE 3. Data Collection Techniques and Tools[10,11]

Techniques	Tools/Means of observation	Factors to consider	Sample resources that can be used
Key informant interviews (KII)	(Semi) structured questionnaire adapted to data collection technique, expected respondent knowledge	Identify individuals with prior and specific knowledge of certain aspects of the community (e.g. community leaders, health workers)	*https://docs.unocha.org/sites/dms/Somalia/Somalia%20Rapid%20Key%20Informant%20Questionnaire.pdf*
Direct observation (DO)	Structured and unstructured observation	Information through sounds, smells, visual impressions, taste, touch	Direct Observation and Key Informant interview Techniques for primary data collection during rapid assessments. *file:///C:/Users/Asus/Downloads/111013_tb_kido_techniques_final%20(2).pdf*
Community group discussions (CGD)	Interview of a group of individual to gain information on conditions, situations, experience or perceptions through group interaction	Identify small population groups sharing certain characteristics (e.g. age, sex)	*http://link.springer.com/chapter/10.1007/978-3-319-19515-5_1*
Use of mobile technology	Use of smartphones, tablets, field computers	Mobile phone/data coverage, access to electricity	Poimapper: used by Plan International More info from *http://www.poimapper.com/plan-international-mobile-data-collection-programs/*

Secondary data is the main source of information from the time disaster strikes up to days after a disaster. It is during these periods that field data collection is limited access and resources. Secondary data provides more detailed information and serves as baseline with which to compare primary data[12]. Primary data becomes available after some time as access to affected areas and populations becomes more available. When more primary data becomes available, it becomes the main source of information, and used to validate and complement the secondary data[13]. Pre-crisis secondary data provides background information as it identifies preexisting problems, vulnerabilities and risks. Historical data helps identify patterns in priority needs. Past interventions provide evidence on how different groups might be affected differently. Historical data helps identify patterns in priority needs. Past interventions provide evidence on how different groups might be affected differently. Provides a baseline for assessing the impact of the disaster and helps differentiate between the impact

10 IASC (2015). MIRA Guidance. Available at *https://interagencystandingcommittee.org/system/files/mira_2015_final.pdf*

11 ACAPS (2014). Technical brief: secondary data review. Available at *https://www.acaps.org/sites/acaps/files/resources/files/secondary_data_review-sudden_onset_natural_disasters_may_2014.pdf*

12 IASC (2015). MIRA Guidance. Available at *https://interagencystandingcommittee.org/system/files/mira_2015_final.pdf*

13 ACAPS (2014). Technical brief: secondary data revi ew. Available at *https://www.acaps.org/sites/acaps/files/resources/files/secondary_data_review-sudden_onset_natural_disasters_may_2014.pdf*

of the crisis and pre-existing or chronic needs. In-crisis secondary data provides an understanding of the effects of the current crisis and, when compared with pre-crisis information, help assess the impact of the disaster[14].

However, this section does not cover details of data collection techniques. It leads readers to other specific resources that discuss in detail procedures and steps in using specified techniques in data collection. In designing what type techniques and tools for data collection, take into consideration the time, capacity and resources available, the level of access to the field, the safety of respondents and information already available. Table 3 summarizes some collection techniques and tools that can be utilized for primary data collection. It is important to consider some factors depending on what type of techniques and tools are decided to be used. The use of mobile technology such as smartphones, tablets) for collecting data is increasingly useful. These method can help reduce errors in data entry, needed time and resources to prepare data for analysis, and helps for a more flexible design of tools.

The following sections describe sources of various information and international mechanisms for access and sharing of information.

14 ACAPS (2014). Technical brief: secondary data review. Available at *https://www.acaps.org/sites/acaps/files/resources/files/secondary_data_review-sudden_onset_natural_disasters_may_2014.pdf*

Census

The population census is being conducted by countries on a regular basis. It involves detailed information about a country citizen. Information on basic demographic characteristics, such as age and sex by specific areas of residence, in addition to socioeconomic and sociocultural characteristics of that citizen as well as household characteristics are collected. This data can help identify specific characteristics of affected populations that can be important in decision-making. For instance, poverty data from a national census can help us to understand the potential magnitude of impact of a disaster on a population. An area which has a greater number of people living below the poverty line is probably going to have more difficulty recovering than an area with a more wealthy population, hence may require greater resources than the wealthier area. Demographic details of a population at risk of impending hazard and its spatial distribution is important in assessing who are the population at risk, how many of them, and what to prepare. This information is also helpful to identify who and how many are affected after a disaster strikes. Population distribution maps can also be developed from the population data for easier reference in identifying how many people are there in a specific area. When conducting analysis of risks, specific information on the location of residents helps estimate the probability of risks to human life. This helps in planning for appropriate measures that can be done to minimize loss of lives during a disaster.

Table 4 presents information on country population data and other related information. It also indicates where the information can be found and the kind of information that can be sourced out from the country's statistical offices. In most countries, census can be found within government ministries, or designated department in charge of Statistics/ finance. This varies from country to country. In Table 4, the government office indicated are the official and central agencies designated for the collection, consolidation, processing, analysis, publication and dissemination of data and statistics. They conduct regular surveys to collect information not only on population and socio-demographic information, but also on other sectors of the economy such as agriculture, housing, transportation, etc. They analyze the data of which are made available to the public and private institutions as well. Information is either primary data or secondary data. More details can be found in the indicated websites.

TABLE 4. Selected Countries and Existing Socio-Demographic Information[15]

Country	Government department	Website
Countries in Asia		
Cambodia	National Institute of Statistics	*http://www.nis.gov.kh/index.php/en/*
India	Central Statistics Office	*http://mospi.nic.in/Mospi_New/Site/home.aspx*
Indonesia	Badan Pusat Statistik (BPS-Statistics Indonesia)	*https://www.bps.go.id/*
Lao PDR	Laos Statistics Bureau	*http://lsb.gov.la/en/index.php*
Mongolia	National Registration and Statistics Office	*http://www.en.nso.mn/index.php*
Myanmar	Myanmar Information Management Unit (MIMU)	*http://www.themimu.info/*
Nepal	Central Bureau of Statistics (CBS), National Planning Commission	*http://cbs.gov.np/*
People's Republic of China	National Bureau of Statistics China	*http://www.stats.gov.cn/english/*
Thailand	National Statistics Office	*http://web.nso.go.th/*
The Philippines	The Philippines Statistics Authority (PSA)	*http://psa.gov.ph/*
Viet Nam	General Statistics Office of Viet Nam	*http://www.gso.gov.vn/Default_en.aspx?tabid=491*
Pacific Countries		
Fiji	Fiji Bureau of Statistics	*http://www.statsfiji.gov.fj/*
Papua New Guinea	National Statistics Office	*https://www.nso.gov.pg/*
Samoa	Samoa Bureau of Statistics	*http://www.sbs.gov.ws/*
Solomon Islands	National Statistics Office	*http://www.statistics.gov.sb/*
Timor Lesté	Direcção Nacional de Estatística	*dne.mof.gov.tl*
Vanuatu	Vanuatu National Statistics Office	*http://www.vnso.gov.vu/*

Emergency response actors primarily relies on Census data from the disaster affected country. It is essential to have accurate/most recent data census information. Census in some countries may not be updated. In this case, census data needs to be triangulated with other data sources (data source at international, regional and local levels), to ensure that there is accuracy of information.

Table 5 indicates some other key international websites where census data can be obtained.

TABLE 5. Other Key Information Sources

Organization/Countries	Weblink
United Nations Statistics Division	*http://unstats.un.org/unsd/default.htm*
Pacific Countries	*https://prism.spc.int/*

15 Information for other countries are available at country statistical offices. Available at *https://en.wikipedia.org/wiki/List_of_national_and_international_statistical_services*

	Some data/information available that can be useful for disaster management
	• Number of households and population by province and by Sex • Growth rate of population during 1998-2008 • Population by age, sex and Province from 1998 and 2008
	• Socio-demographic information and other economic indicators and economic indicators
	• Population data and other attributes of population by areas • Economic indicators
	• Statistical yearbook • Census and population survey reports • Interactive maps showing population by province • Population and socio-demographic information • National social and economic situation statistics • Population and socio-demographic information
	• Population by geographic location and maps • Hazard and risk maps, satellite images, assessment and mapping tools • Capacity building information such as training in QGIS, ArcGIS, collecting GPS coordinates • Multi-sector Initial Rapid Assessment processed data and reports • Situation updates during disasters • Digitized and translated damage and loss data from different government departments • Contact lists and updates on who, where and what organizations are doing
	• Population information according to gender and area • Population atlas 2014 • GIS & interactive maps • Sectoral statistics • National data archive
	• Socio-economic population information • Census • Economic indicators
	• Economic and financial data • Population characteristics statistical yearbook • Core environment indicator • Core social indicator
	• Statistical indicators of Philippines development • Census and population • Tabulated information on population socio-demography • Civil registration
	• Statistical yearbook 2011, 2012, 2013, 2014 • Population and census • Social and economic indicators
	• Population GIS maps • Social, economic and environment indicators • Census and surveys
	• Population information • Demographic and economic indicators • National reports on census, migration
	• Economic, environment, social, sector statistics • Population and demography • Birth registration • Metadata and maps
	• Population • Economic indicators
	• Census surveys • Economic indicators • Socio-economic atlas • Household information

	Data that can be accessed
	• UN member countries statistical offices • Census data can be obtained
	• Population and economic statistics • Social statistics including CRVS • Regional data and • POPGIS online mapping • National Minimum Development Indicator (NMDI) database

Civil Registration and Vital Statistics

Civil Registration and Vital Statistics (CRVS) is defined by the United Nations as the "Universal, continuous, permanent and compulsory recording of vital events provided through decree or regulation in accordance with the legal requirements of each country"[16]. It is the act of recording and documenting of vital events in a person's life including birth, marriage, divorce,

16 United Nations (2001). Principles and recommendations for a vital statistics system, Revision 2. Available at *http://www.emro.who.int/civil-registration-statistics/about/*

adoption, and death. It is a fundamental function of governments. The lack of civil registration during crisis or natural disasters can lead to statelessness or denial of service due to not having proper identity. It is important for access the civil registry be enabled as it provides individuals with the documentary evidence required to secure recognition of their legal identity, their family relationships, their nationality and their ensuing rights, such as to social protection and inheritance. The civil registry can help facilitate access to essential services, such as health, education, and social welfare and can contribute to activities such as gaining formal employment, exercising electoral rights, transferring property, and opening bank accounts. The full value of data from civil registries comes when they are properly integrated within government systems – for example with the statistical institutions, population registers, national ID systems, and voter registration systems. Vital Statistics drive informed policy development and planning, while Civil Registration is vital for the regular recording of births and deaths. CRVS[17] systems are composed of various system parts including systems for registration of vital events, production of certified copies of these documents, providing information that allows issuing of passports and national identification documents, and production and dissemination of vital statistics (World Bank, WHO 2014)[18].

At its most fundamental, CRVS is essential for population data as a denominator for all population-based targets and indicators. For instance, example of the role of CRVS in helping attain SDG Goal Number 1 can be found in detail[19].

How is CRVs Essential or Potentially Utilized in the Context of Disasters?

CRVS Response to Emergencies[20]:

- Civil Registration (CR) component of CRVS services are critically important in providing much needed legal documentation (e.g. birth/death certificates, marriage/divorce certificate, ID cards, passports, driving licenses, family register). It can provide information on what happens during natural disasters at the individual level, in terms of the living, injured, dead, missing, damage/loss of property, and loss of legal documentation.

- Vital Statistics (VS) component of CRVS statistics are used to estimate numbers of population in affected areas by age, sex and location. According to "UN Principles and Recommendations of Vital Statistics" events are recorded mainly by place of occurrence. Information collected includes but not limited to the following:

  - Name of person, father and mother
  - Date of birth/deaths
  - Occupation/education level of father/mother
  - Usual place of residence/address

To obtain critically important information in emergencies in a timely manner, the following steps should be done:

- Identify affected area physically or using satellite images or helicopter
- Identify corresponding addresses of these areas as entire provinces, districts, zip codes, street names, etc.
- Query the database and obtain all kind of required population reports (mostly electronic registration systems)

Information that can be obtained include the following:

- Total affected population and their names
- Population < 1 year (Infants)

17 Data from CRVS systems permit the production of statistics on population dynamics, health, and inequities in service delivery on a continuous basis for the country as a whole and for local administrative subdivisions, that provides more accurate information and the 'denominator' for assessing progress with plans across sectors for improving economic growth and reducing poverty. Accurate vital statistics and the ability to monitor and respond to causes of death and disability underpin many global targets, including new commitments to universal health coverage and tackling the global epidemic of non-communicable diseases.

18 World Bank, WHO (2014). Global Civil Registration and Vital Statistics Scaling up Investment Plan 2015–2024. Available at *http://www.worldbank.org/content/dam/Worldbank/document/HDN/Health/CRVS%20Scaling-up%20plan%20final%205-28-14web.pdf*

19 Civil Registration and Vital Statistics (CRVS) and the Sustainable Development Goals (SDGs). Available at *https://spccfpstore1.blob.core.windows.net/digitallibrary-docs/files/43/430871ae3e4b33cb74b6f29b1ec19967.pdf?sv=2015-04-05&sr=b&sig=pilAzLeR5FAUugcgxu08cNU1neeoUcLD%2FAQfl0cJsYw%3D&se=2016-10-11T02%3A19%3A46Z&sp=r&rscc=public%2C%20max-age%3D864000%2C%20max-stale%3D86400&rsct=application%2Fpdf&rscd=inline%3B%20filename%3D%22CRVS_and_the_SDGs_2016.pdf%22*

20 Badr, A. (2016). Importance of functional CRVS systems in preparedness, response and recovery from emergencies caused by natural disasters. A presentation made during the workshop on "Information management for Disaster Management" held in Naypyitaw, Myanmar, 7-9 Sept 2016.

BOX 1. CRVS in the Philippines Used After a Major Disaster

Typhoon Haiyan, known as Super Typhoon Yolanda in the Philippines, was one of the strongest tropical cyclones ever recorded. It devastated portions of Southeast Asia, particularly the Philippines, on November 8, 2013. It is the deadliest Philippine typhoon on record, killing at least 6,300 people in that country alone. Haiyan is also the strongest storm recorded at landfall. After the disaster, civil registration in the Philippines aimed to deliver 83,790 civil registration records to survivors. It also aimed to provide legal services to some 8,000 individuals who needed legal documents such as affidavits in order to reconstruct their identities. This was done by forging partnerships with UNHCR, CSOs, Department of Social Welfare and Development, Local Civil Registrars, Local Government Units. Resources from LGUs were also mobilized, and waived registration fees for civil registration by enacted ordinances. Mobile Civil Registration and Conduct of Legal Mission was conducted with around 200 community facilitators and lawyers mobilized to reach out to remote areas.

Source: Badr, A. (2016). Importance of functional CRVS systems in preparedness, response and recovery from emergencies caused by natural disasters. A presentation made during the workshop on "Information management for Disaster Management" held in Naypyitaw, Myanmar, 7-9 Sept 2016.

- Population below 5 years
- Population < 15 (children)
- Adult male/female population
- Pop >65 years (elderly population)
- Population >80 years
- Pregnant women
- Others that can help identify response and recovery methods: socioeconomic status of the community
- Calculated morbidity/mortality rates by case and by cause

How can Civil Registration Benefit Individuals, Families and Communities in Post-emergency Setting?

Information from CR can facilitate family reunification if dispersed after a disaster. It also protects orphans against loss of identity. It helps replace lost or damaged certificates. It also serves as proof of identity which enables access to rights, entitlements, benefits, social protection, among others. The CR also helps sort out problems on proof of birthplace and parentage, which reduces vulnerability to statelessness. For people that lost their lives, identity can be easily traced and burial arrangements can be made. Survivors of the dead can also claim benefits.

Geospatial Information System and Remote Sensing Data

Geospatial information is valuable for assessing a number of hazards. In order to link spatial data to non-spatial data to better enable the collection, management, analysis and visualization of information, a geographic information system (GIS) is used. A GIS consists of hardware, software, data and the people and processes required make them useful. In terms of disaster management, a GIS helps to:

- map and analyze hazards and hazardous conditions
- locate and characterize assets, analyze the geospatial relationship between hazards and assets and their characteristics
- estimate potential exposure and impact
- visualize and communicate risks

TABLE 6. Examples of GIS Data References

Emergency Agency/ Resource Host	Details	Website/URL
Gridded population of the world (GPW)	Socioeconomic Data SEDAC is one of the Distributed Active Archive Centers (DAACs) in the Earth Observing System Data and Information System (EOSDIS) of NASA. Its mission is to develop and operate applications that support the integration of socioeconomic and Earth science data and to serve as an "Information Gateway" between the Earth and social sciences.	*https://urs.earthdata.nasa.gov/users* *http://sedac.ciesin.columbia.edu/theme/population*
NCAR GIS Climate Change Scenarios	Climate Data	*http://gisclimatechange.ucar.edu/*
GSMaP	Precipitation data	*http://sharaku.eorc.jaxa.jp/GSMaP_crest /*
OpenStreetMap	Crowdsourced data	*http://www.openstreetmap.org/#map=5/51.500/-0.100*

Response managers can now use GIS to create models to help in simulation exercises, providing a realistic environment to learn and test an organization's response systems and mechanisms. In terms of actual response, rapid mapping and high-resolution imaging have become important support tools in emergency relief operations. Satellite maps and GIS are now regularly used in emergency response and humanitarian relief, including for logistics, staff security, distribution, transport and the setting up of telecommunication networks and refugee camps. Table 6 shows some agencies hosting GIS database with weblinks of where these can be accessed.

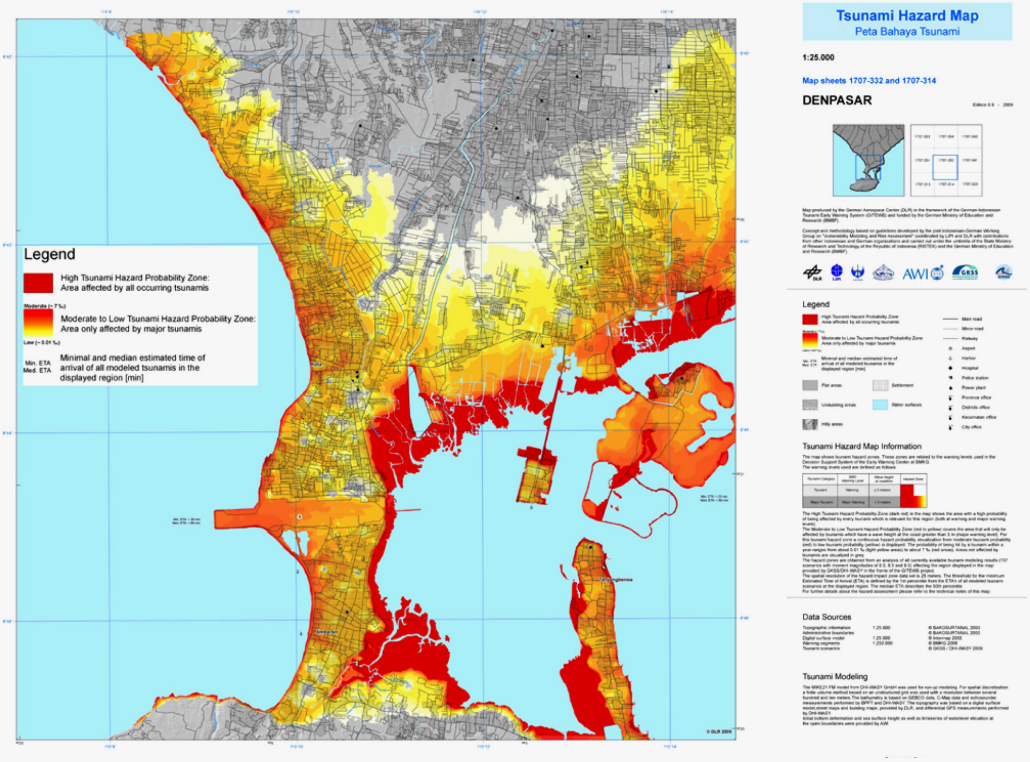
Satellite-based emergency mapping is the creation of maps, spatial data products and geo-information to provide crisis information and situational awareness using pre- and post-event imagery from satellites. Pre-disaster satellite imagery helps as a baseline to compare to imagery acquired just after the event, and to create maps of the area for those working on the ground. It can also help to identify further hazards caused by the initial disaster, such as potential areas of landsliding after an earthquake or volcanic eruption, or areas where prolonged inundation due to flooding may lead to new disease vectors. In the medium to longer term, satellite imagery can be used to identify internally displaced persons (IDP) camps, temporary shelters, and to carry out extensive damage assessments (of both the intensity and type of damage in an area), to help to plan for recovery and rehabilitation.

Satellite data and maps can provide an objective means of disaster assessment, and delineate the extent and intensity of a hazard much more rapidly than field investigations. Satellite systems and image analysis techniques have developed to an extent where emergency operation instruments can effectively contribute to the management of both natural and man-made disasters. The following subsections present some of the types of maps that can be developed to clearly represent population, their area/location, their vulnerabilities and risks. The maps presented here were developed through advance technologies such as GIS and from satellite imagery. It should be noted that there are also some other ways of presenting such information such as community prepared hazard, vulnerability maps (developed by community people). There are also existing networks such as UNESCAP Regional Space Applications Programme for Sustainable Development (RESAP) that help access satellite images for free. Details on RESAP are mentioned in Box 2.

Hazard, Vulnerability and Risk Maps

In recent years the space community has set up several regional and global Emergency Mechanisms to support disaster response operations through the provision of maps derived from satellite imagery. In addition, the United Nations Institute for Training and Research (UNITAR) has set up a programme that also facilitates access to such products. These emergency mechanisms are included in the UN-SPIDER Knowledge Portal and include the following: International Charter Space and Major Disaster, the Copernicus GIO-EMS Mapping Service, Sentinel Asia, SERVIR and UNOSAT. Table 8 summarizes how these mechanisms can be accessed by eligible users, and the process of requesting data and information.

FIGURE 7. An example of hazard map in Indonesia[21]



Hazard Maps: Hazards can be represented through maps. Hazard maps are typically created for natural hazards such as earthquake, volcanoes, landslides, flooding and tsunamis. Flood hazard maps represent areas which could be flooded. In the case of earthquakes, seismic hazard is represented on maps depicting the geographic areas which could be impacted by earthquakes with periods of return of 500 years and using contours presenting the expected values of the peak-ground acceleration (PGA).

In other cases,where the historic catalogue is not complete or is not yet elaborated, hazard maps usually depict the areas which could be exposed to such hazards but without referencing to a period of return. Figure 7 shows the tsunami hazard map in Indonesia. Figure 8 is an example of seismic hazard map showing levels of potential intensities in the Philippines islands. Hazard maps used in preparedness planning help prevent serious damages and deaths, and can help decision makers identify potential areas of risks through historical data mapped by the location. Such maps are useful to inform preparedness and planning. Due considerations given to hazard potentials can help planners either avoid or build the capacity to withstand the level of hazards recorded.

Vulnerability Maps: Vulnerability is quantified using socio-cultural, economic, physical, and environmental parameters. It also takes into account the regulatory and institutional capacities of local governments, as well as the effectiveness of early warning systems, vocational education system, and mitigation and preparedness systems. Vulnerability maps of areas are prepared for instance to develop risk indices. One example is the Indonesia Disaster Risk Index (Figure 9). In 2011 to assess vulnerability in each region, Indonesia's national disaster mitigation agency (PNPB) developed the Indonesia disaster risk index (IRBI). This is based on an inventory of hazards and vulnerabilities, taking into account the frequency and intensity of hazards, including floods, landslides, earthquakes and tsunamis.

21 UN-SPIDER (2016). Knowledge Portal: Information management for disaster risk reduction. Available at *http://www.un-spider.org/risks-and-disasters/disaster-risk-management/information-management*

FIGURE 8. Earthquake prone Areas in the Philippines[22]

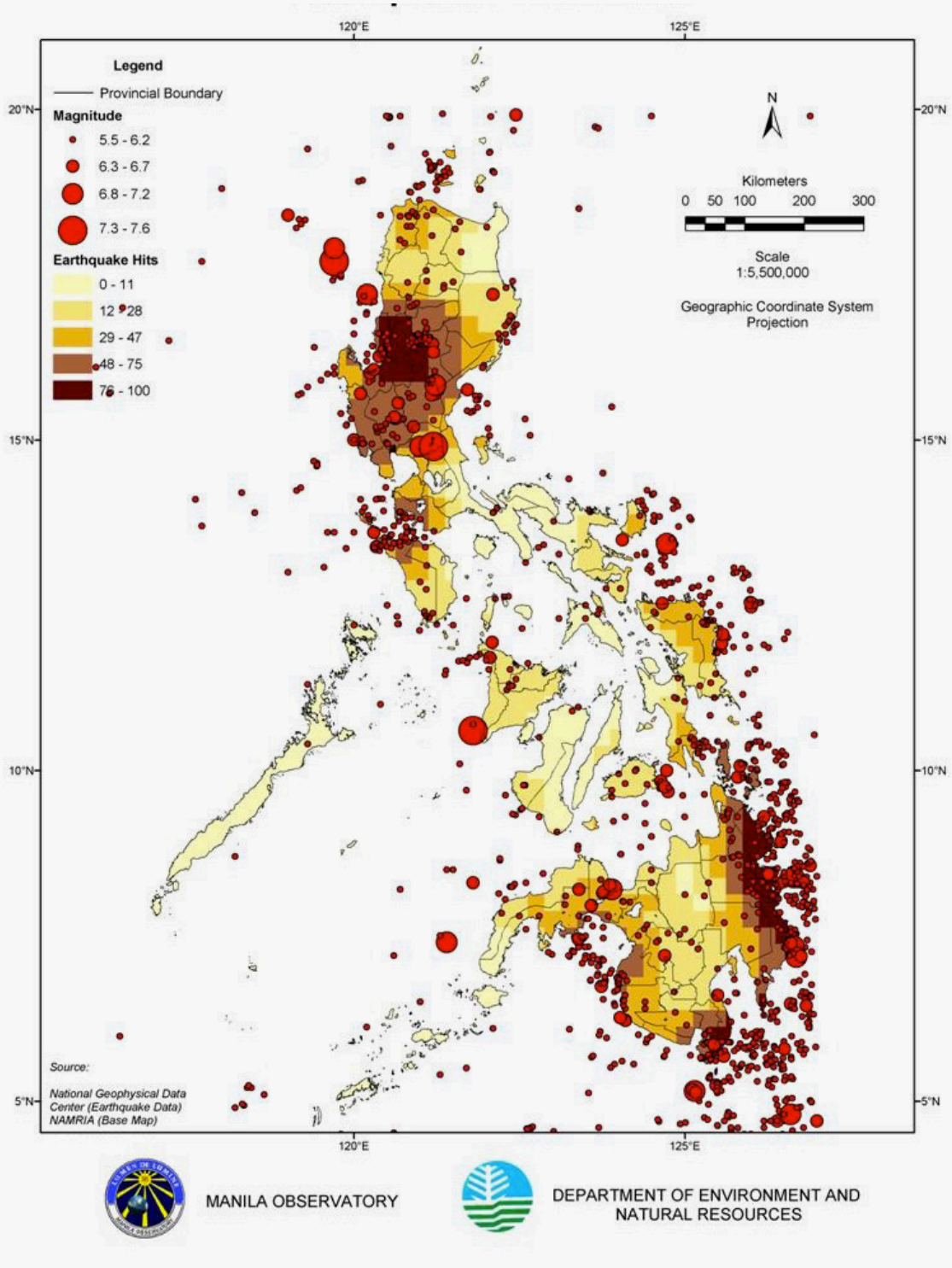


FIGURE 9. Disaster Risk Index in Indonesia[23]

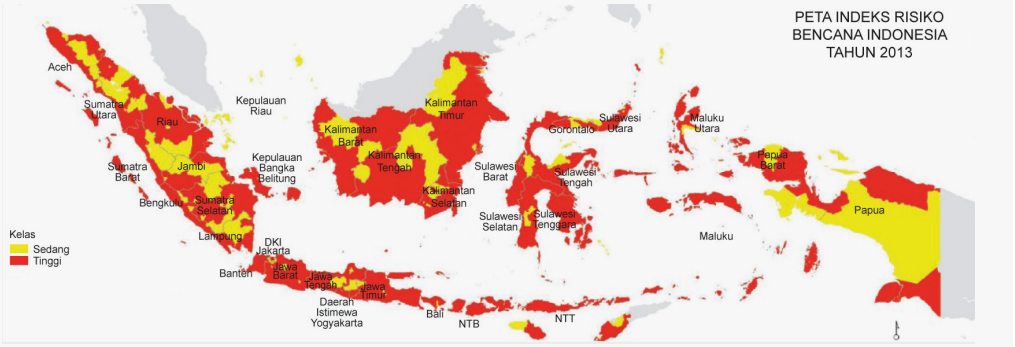


TABLE 7. Risk Database

Database Name	Brief Information	Weblink to Access
The Emergency Events Database	Administered by the Centre for Research on the Epidemiology of Disasters, EM-DAT, records disasters based on threshold criteria: at least 10 fatalities; 100 or more people affected; a declaration of emergency; or a call for external assistance.	*http://www.emdat.be/database*
GLIDEnumber	Each disaster is assigned a unique identifier and a number of relevant attributes so the agencies can access disaster information.	*http://glidenumber.net/glide/public/search/search.jsp?*
DesInventar	Disaster loss database that allows local authorities, communities, and NGOs to collect disaster information at the local level to feed into and access from online database. Initiative of UNISDR, European Commission and UNDP	*https://online.desinventar.org/*
Index for Risk Management (INFORM)	Global, open-source risk assessment for humanitarian crises and disasters. Collaboration of the Inter-Agency Standing Committee Task Team for Preparedness and Resilience and the European Commission.	*http://www.inform-index.org* See Figure 10 for the risk indices for countries in 2016 and more of INFORM in Box 3.

Risk Maps are produced by combining the information on hazard and vulnerability. Once the map is elaborated, it will be easy to detect which vulnerable elements or assets are exposed to hazards. In addition, it can be used by decision makers to identify the types of measures that need to be implemented to minimize the risks and to improve disaster preparedness efforts. Figure 10 shows a tsunami risk map of Denpasar.

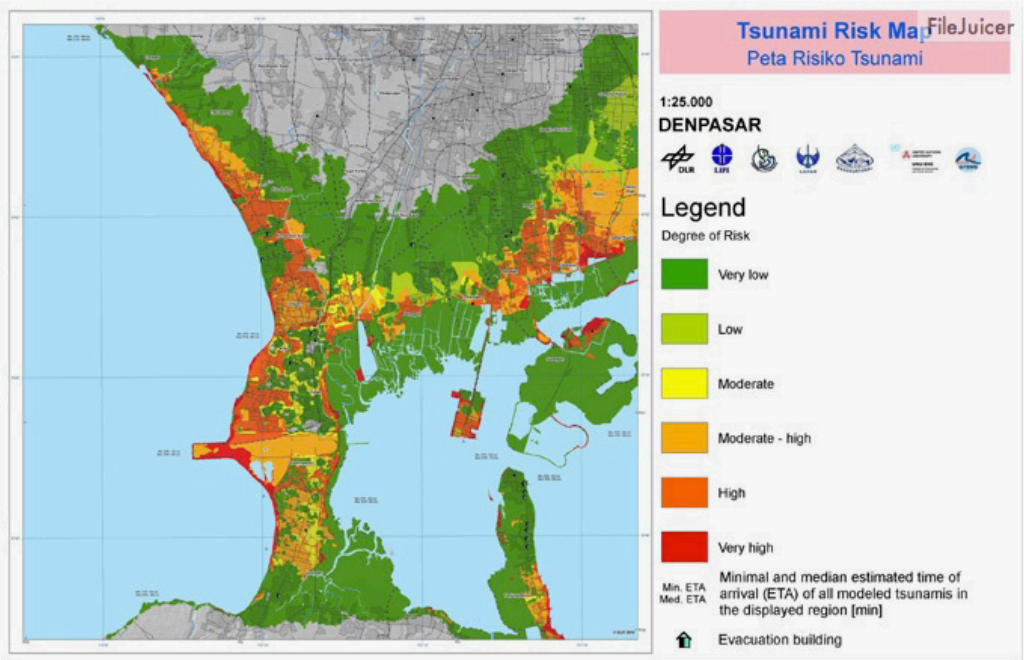
There are also existing databases where information on risk levels and other disaster related ones can be obtained.

A multi-hazard map puts together in one map, the various hazard information in a specific area of concern. It conveys a picture of hazards with different magnitude, frequency, and area of effect. Figure 12 shows the multi hazard risk map for Vanuatu, which has combined data on earthquakes and tropical cyclones with information on exposure and vulnerability and then used a probabilistic risk assessment model to estimate total average annual losses. This was used to identify high-risk areas, for appropriate development plans and interventions.

22 DENR, Manila Observatory, NAMRIA (2005). Earthquake prone areas in the Philippines. Available at *http://vm.observatory.ph/images/Geophys_hires/eq_prone_areas.jpg*

23 UNESCAP (2015). Disasters Without Borders: Regional Resilience for Sustainable Development. Chapter 4: Right information, right people, right time. Available at *http://www.unescap.org/sites/default/files/Chapter%204.pdf*

FIGURE 10. Tsunami Risk Map[24]



Source: UNESCAP (2015). Disasters Without Borders: Regional Resilience for Sustainable Development. Chapter 4: Right information, right people, right time. Available at *http://www.unescap.org/sites/default/files/Chapter%204.pdf*; *http://www.unescap.org/sites/default/files/Chapter%204%20.pdf*

BOX 2. UNESCAP RESAP

ESCAP, through its Regional Space Applications Programme for sustainable development (RESAP) network, helps provide satellite imagery to disaster-affected countries, at no cost. For example, during the 2015 Nepal earthquakes, RESAP received multiple images of sites in and around Nepal from different satellites administered by the region's spacefaring member countries. Materials included raw images that officials within the Ministry of Home Affairs and other relevant national institutions could use to perform their own analysis and create mapping products. RESAP is a regional cooperative platform, which has been running for 20 years, calls on all national space agencies in the Asia-Pacific region to work together to help disaster affected countries. RESAP provides support for the use of satellite-derived data, products and services and enables countries without their own space programmes to have cost-effective access to space derived data, products and services for disaster risk management.

In 2015, RESAP mobilized 150 satellite images and maps including the aftermath of the Nepal earthquakes and the typhoon that struck Vanuatu. These images were provided free of charge by RESAP members and UNOSAT, and had an estimated monetary value of more than $600,000 USD. This service is of particular benefit to the least developed countries and small island developing countries (SIDS) who could not have access due mainly to non advancement in technology.

24 UN-SPIDER (2016). Knowledge Portal: Information management for disaster risk reduction. Available at *http://www.un-spider.org/risks-and-disasters/disaster-risk-management/information-management*

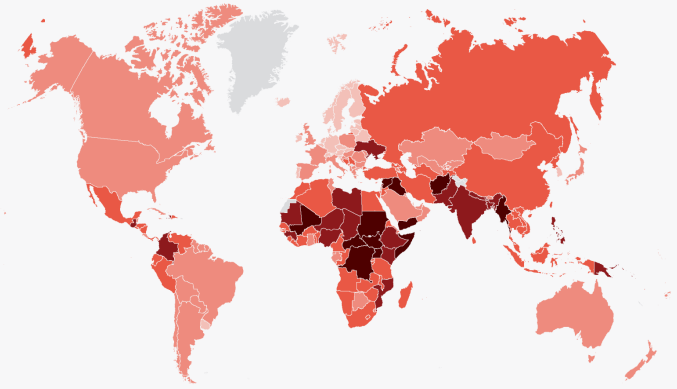
25 Index for Risk Management Results (2016). Available at *http://www.inform-index.org/Portals/0/InfoRM/2016/INFORM%20Results%20Report%202016%20WEB.pdf*

BOX 3.INFORM

INFORM is a collaboration of the Inter-Agency Standing Committee Task Team for Preparedness and Resilience and the European Commission. The INFORM model adopts the three aspects of vulnerability reflected in the UNISDR definition. The aspects of physical exposure and physical vulnerability are integrated in the hazard and exposure dimension, the aspect of fragility of the socio-economic system becomes INFORM's vulnerability dimension, while lack of resilience to cope and recover is treated under the lack of coping capacity dimension.

INFORM is a global, open-source risk assessment for humanitarian crises and disasters. It can support decisions about prevention, preparedness and response, and is a way to simply large amounts of information so it can be easily used for decision-making. INFORM is the first global, objective and transparent tool for understanding the risk of humanitarian crises and disasters. It can help identify where and why a crisis might occur, which means we can reduce the risk, build peoples' resilience and prepare better for when crises do happen. When all those involved in crisis prevention, preparedness and response use a shared risk assessment, they can work more effectively together.

FIGURE 11. INFORM Measures Risk for 191 Countries in 2016[25]



The depiction and use of boundaries are not warranted to be error free nor do they necessarily imply official endorsement or acceptance by the United nations or European Union.

Country	Risk	3 yr trend
Malawi	4.2	↗
Malaysia	3.5	↗
Maldives	2.4	→
Mali	6.6	↘
Malta	1.7	→
Marshall Islands	4.2	↗
Mauritania	5.1	↘
Mauritius	2.2	→
Mexico	4.9	→
Micronesia	4.0	→
Moldova Republic of	3.3	→
Mongolia	3.1	→
Montenegro	2.7	→
Morocco	3.5	↗
Mozambique	5.9	→
Myanmar	6.8	↗
Nambia	3.7	→
Nauru	2.6	↗
Nepal	5.1	↗
Netherlands	1.4	→
New Zealand	2.0	→
Nicaragua	4.1	→
Nigeria	6.3	→
Norway	1.0	→
Oman	2.9	→
Pakistan	6.4	→
Palau	2.7	→
Palenstine	6.1	↗
Panama	3.7	↗
Papua New Guinea	5.1	→
Paraguay	2.5	→
Peru	4.4	→
Philippines	5.2	→
Poland	2.1	→
Portugal	1.9	→
Qatar	1.3	→
Romania	2.9	→
Russian Federation	4.7	↗
Rwanda	4.4	→
Saint Kitts & Nevis	2.4	→
Saint Lucia	2.4	→
Saint Vincent & the Grenadines	2.1	→
Samoa	2.3	→
Sao Tome & Principe	1.3	↗
Saudi Arabia	2.4	↘
Senegal	4.3	→
Serbita	4.0	→
Seychelles	2.3	→
Sierra Leone	4.3	→
Singapore	0.4	↗
Slovenia	1.4	→
Solomon Islands	5.6	↗
Somalia	8.7	↘
South Africa	3.8	→
South Sudan	7.9	↗
Spain	2.1	→
Sri Lanka	4.3	↗
Sudan	7.2	→
Suriname	2.6	→
Switzerland	3.1	↗
Sweden	1.1	→
Switzerland	1.4	→
Syria	6.6	↗
Tajikistan	4.0	→
Tanzania	4.6	→
Thailand	4.3	→
Timor Léste	4.1	→
Togo	3.9	→
Tonga	3.3	→
Trinidad & Tobago	2.0	→
Tunisia	2.8	↘
Turkey	4.7	→
Turkmenistan	3.6	↗
Tuvalu	3.1	→
Uganda	6.5	→
Ukraine	5.4	↗
United Arab Emirates	2.0	→
United Kingdom	2.0	→
United States of America	3.2	→
Uzbekistan	3.3	→
Vanuatu	4.6	↗
Venezuela	3.8	→
Viet Nam	3.7	→
Yemen	7.5	↗
Zambia	4.2	→
Zimbabwe	4.2	

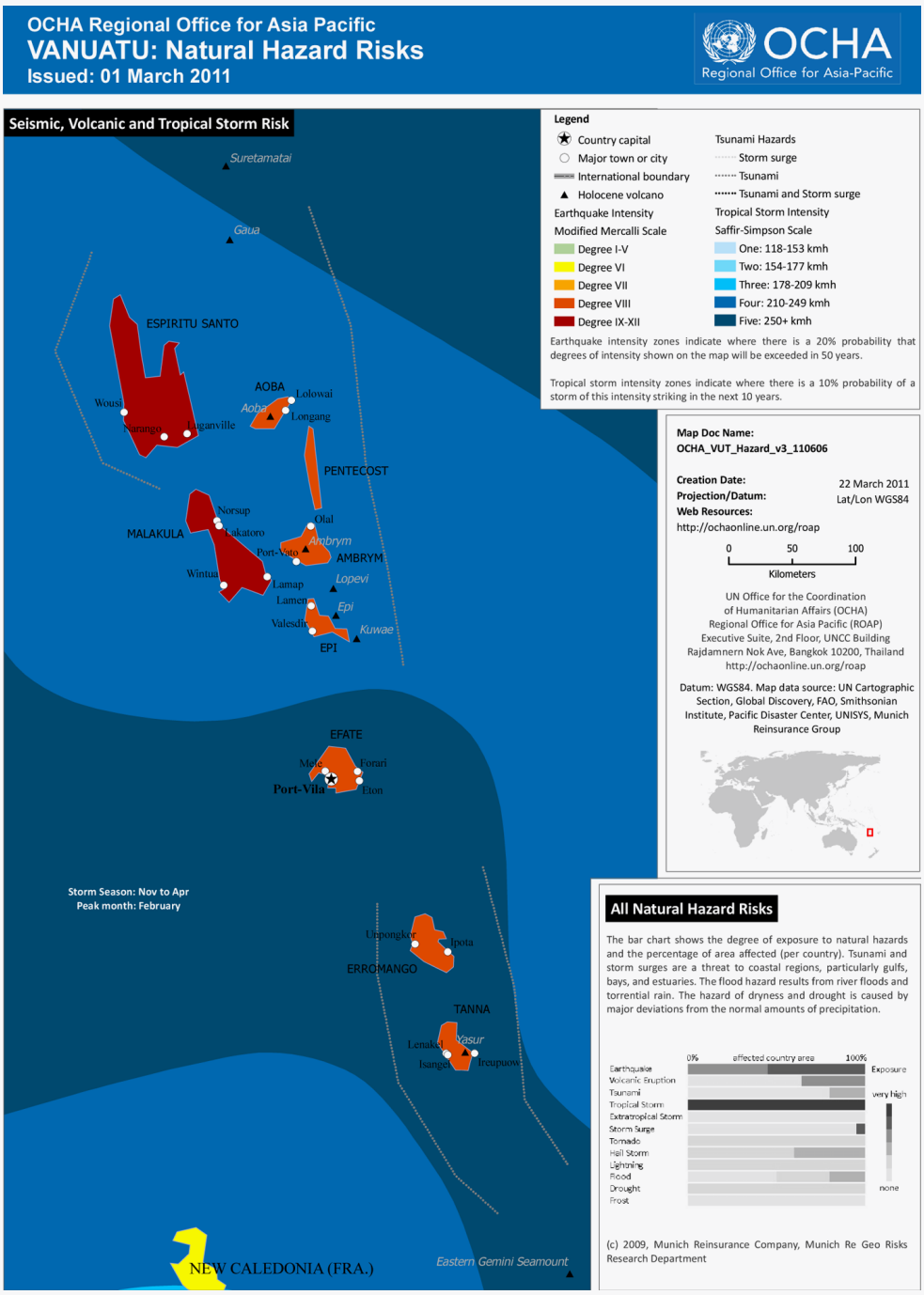
INFORM RISK INDEX

very low	0
low	2.0
medium	3.5
high	5.0
very high	6.5
not included in INFORM	10

KEY

Increasing risk	↗
Stable	→
Decreasing risk	↘

FIGURE 12. Vanuatu natural hazards risk map[26]



26 UNOCHA (2011).Vanuatu, Natural Hazard Risks. Available at *http://www.preventionweb.net/files/4202_ochavuthazardv3110606.pdf*


World Vision

TABLE 8. Summary of information on emergency mechanisms, eligible users and how products are activated

Country	Product information	Eligible users
UNOSAT[27]	• Maps, reports, GIS compatible data layers at no cost • Products are shared with the humanitarian system coordinated by UNOCHA • Shelter cluster benefits from a dedicated web-supported platform named REACH, to improve rapid assessment after conflict and disasters	Entities of the United Nations systems such as UNOCHA, UNHCR, UNICEF, WFP, UNDP, WHO, IFRC, ICRC; International and national NGOs and the Governments of affected countries
SENTINELASIA[28]	• Satellite imagery and value added maps highlighting the affected areas as well as on-site digital photos of the disaster area • Data on wildfire hotspot and rainfall information derived from satellite data, meteorological satellite information and data are shared • Data is shared via the web or satellite communication	Eligible requestors are Asian Disaster Reduction Centre (ADRC) member organizations and representative organizations of the JPT[29].
SERVIR	The final product in the form of geospatial information, science applications or interactive maps is made available to the user as a download or a print or via SERVIR's interactive mapper application.	The program supports national governments, universities, NGOs, and the private sector. Users of SERVIR are government officials, disaster managers, scientists/researcher, students and the general public.
INTERNATIONAL CHARTER SPACE AND MAJOR DISASTERS[30]	User receives one or several maps from the Project Manager free of charge. These maps delineate the affected area and may include other features. Maps are also made available to the public on the International Charter's website.	Authorised users are typically disaster management authorities belonging to Charter member countries. UNOOSA and UNITAR/UNOSAT can also request the activation of the mechanism on behalf of UN organizations in countries experiencing large disasters. NDMA can submit requests for emergency response support.
COPERNICUS EMERGENCY MANAGEMENT SERVICE (EMS)	Authorized User will receive satellite-derived information that is GIS compatible. For Rush Mode there are three categories of products offered: Reference Maps, Delineation Maps and Grading Maps. For Non-rush Mode there are three broad product categories: Reference Maps, Pre-disaster Situation Maps and Post-disaster Situation Maps.	Authorized users: entities and organizations at national, regional, European and international level which are active in the field of crisis management, and international humanitarian aid organizations.

27 United Nations Institute of Training and Research. Information available at *http://www.unitar.org/unosat/*

28 Website available at *https://sentinel.tksc.jaxa.jp/sentinel2/topControl.jsp*

29 Membership of the JPT is open to all APRSAF member countries, disaster prevention organizations and regional / international organizations prepared to contribute their experience and technical capabilities and who wish to participate in disaster information sharing activities.

30 International Charter Space and Major Disasters. Available at *https://www.disasterscharter.org/web/guest/about-the-charter*

	Conditions for activation	Point of contact	Process
	• Can be requested in the case of disasters provoked by natural hazards, complex emergency situations or conflict crises • Services involve very rapid acquisition and processing of satellite imagery to generate geospatial information and analytical reports in addition to GIS layers in support of humanitarian relief agencies	Email: *unosat@unitar.org* Operations telephone line: +41 22 767 4020) 24/7 hotline: +41 76 487 4998	• Imagery is purchased by UNOSAT from commercial providers/ provided as in-kind support to UNOSAT from (members of the International Charter Space and Major Disasters and from the US Department of State) • Imagery is processed by UNOSAT
	Geo-spatial information derived from earth observation satellites is shared upon request in case of major disasters, wildfire monitoring, flood monitoring and glacier lake outburst flood monitoring	• Email: *z-sentinel.asia@jaxa.jp* • telephone: +81-50-3362-7838	• Sentinel Asia acquires and analyzes the satellite data and discloses the information through its website • Data used are those from the following satellites: › ALOS (JAXA) › IRS (ISRO) › THEOS (GISTDA) › KOMPSAT (KARI)
	SERVIR serves as a source for satellite imagery and information provider during extreme events. It is intended to respond to needs for satellite-based geo-information in Mesoamerica, Africa or the Himalaya	• Mesoamerica: *www.servirglobal.net/Mesoamerica.aspx* • Africa: *www.servirglobal.net/Africa.aspx* • Himalaya: *www.servirglobal.net/Himalaya.aspx*	SERVIR gathers images from a constellation of geosynchronous and satellites such as Advanced Land Observing Satellite (ALOS), Aqua, Aura, EO-1, Landsat 7, Terra, and the Tropical Rain Forest Measurement Mission (TRMM) It also relies on NASA datasets or imagery provided by others such as the Canadian, Argentinean, Japanese, German, French, European Space Agencies.
	The Charter can only be activated in case of fast-onset disasters of natural or technological origin. The request for activation can only be made and accepted within the emergency response phase (up to 10 days after the disaster has occurred).	Authorized users call a confidential telephone number, available 24 hours a day, 365 days a year by filling up a form. The On-Duty Operator checks the identity of the requestor and the request form and passes on the information to the Emergency.	The Emergency On-Call Officer analyzes the request and the scope of the disaster with the Authorized User, and prepares an archive and acquisition plan using available satellite resources. Charter members may also collaborate on the analysis and interpretation of the images to contribute to damage assessment.
	Only large scale emergency situations and humanitarian crises are within the scope of GIO EMS-Mapping. The request has to reflect the definition of the services as defined in the product portfolio and has to fall within the GIO-EMS Mapping scope (e.g. the request to map an entire continent will be rejected).	• Authorized users activate the service by sending Service Request Form directly to Emergency Response Centre • E-service/email (*echo-mic@ec.europa.eu*). • Rush-mode activations: submit to *http://emergency.copernicus.eu/* • Every request must be followed by a telephone call to the ERC/MIC (+32-2-292-2222)	Products are available to the requesting Authorized User free of charge. The generation of space-based information is carried out by framework contract partners

Geoportals

Users of this handbook can also access information from geoportals. Information such as socio-economic data with satellite imagery which can be used for pre and post disaster planning and programming. One of the most useful ways of sharing information is through web-based geoportals. These can collect information from diverse sources and other customized presentation for specific types of user. Customization is organized according to 'access control' and 'workflow'. Access control means that different groups of users can be given privilege or limited access to certain areas of the system. Workflow involves managing the flow of data between certain groups of users, depending on who needs to take action, who needs to stay informed, and who needs specific information. Another important issue is the aspect of time. Within geoportal systems timing can be managed through the use of alerts, notifications, and scheduled and automated updates and outputs. The following presents some of the existing geoportals. Some established open source geoportals with the help of UNESCP is mentioned in Box 4.

TABLE 9. Geoportals at Various Levels

Developer	Website
Indian Space Research Organization	*http://bhuvan.nrsc.gov.in*
Humanitarian Response	*humanitarianresponse.info*
Humanitarian Data exchange	*https://data.humdata.org*
Pacific Disaster Center	*http://www.pdc.org*
International Centre for Integrated Mountain Development	*http://geoportal.icimod.org*
Global Disaster Alert and Coordination System	*http://www.gdacs.org*
ReliefWeb	*http://reliefweb.int*

BOX 4. UNESCAP Open Source Geo-Portals

ESCAP has helped countries share geo-referenced information over the internet using the open source tools GeoNode (*http://geonode.org/*) and GeoNetwork (*http://geonetwork-opensource.org/*). These are single platform used to access location-based information, from archived and up-to-date infrastructure, socioeconomic, meteorological, disaster and satellite-derived data. Responding to an ESCAP survey, national authorities and agencies agrees that Geo-DRM portals are important tools for using satellite imagery received from national, regional and international providers.

To control access, manage data, and maintain the consistency and authenticity of information, it is important that such systems be centrally managed by a national focal point, preferably a national disaster management authority. The focal point can work closely with national survey departments census departments and meteorological departments to upload and maintain data in their respective domains. For this reason, the Geo-DRMs have been positioned within the appropriate national authorities. During these tasks, ESCAP has also linked up with ministries and agencies working in similar fields and coordinated with on-going national efforts through existing United Nations and inter-agency initiatives.

- Mongolia National Management Agency has established a geo-DRM portal which is used for mapping resources, groundwater, land use, ecosystems, provincial borders, forests, soil, grasslands and special protected areas. Mongolia is currently utilizing natural and man-made disaster data and will connect the portal to the emergency operation and early warning centre.
- Nepal Ministry of Home Affairs has formally launched their portal and all stakeholders are using the system and continuously uploading disaster-related data. The geoportal (Figure 10) was also used during the 2015 earthquakes as a repository for GIS and mapping data (*http://drm.moha.gov.np/*).

ESCAP has also launched an online learning platform for disaster risk management. The site provides instructions on how to set up and maintain such Geo-DRM portals, perform geospatial analysis and flood risk modelling. It also offers information on other disaster-related GIS skills and techniques (*http://drmlearning.unescap.org/*).

Source: UNESCAP (2015). Disasters Without Borders: Regional Resilience for Sustainable Development. Chapter 4: Right information, right people, right time. Available at *http://www.unescap.org/sites/default/files/Chapter%204.pdf*

- **Geo-referenced information systems for disaster risk management** (Geo-DRM)[31]. These portals, which have now been established in Bangladesh, Cook Islands, Fiji, Kyrgyzstan, Mongolia and Nepal, combine socioeconomic data with satellite imagery and other disaster-related data – providing the right information to the right people, at the right time. Countries that wish to implement their own geoportal can take advantage of open-source options.

The Asia-Pacific region has access to a variety of advanced sub-regional, regional and global geoportals as below. These are excellent resources for accessing data sets, maps and qualitative data, and should be referenced somewhere in this document, if here is not appropriate.

Regional and International Platforms

ADPIM: One of ESCAP's specialized regional institutions, the Asian and Pacific Centre for development of disaster information management (APDIM), is helping countries address critical gaps and strengthening the region's capacity for pre and post-disaster risk assessment. APDIM takes a multi-hazard approach – focusing on earthquakes, tsunamis, floods, cyclones/typhoons and droughts. In this way it can address information gaps and promote South-South and regional cooperation.

THE UN-Spider[32]**:** United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) builds capacities in developing countries to access and use space technologies, jointly with its network of international partners. The UN-SPIDER was established in 2006

31 UNESCAP, in collaboration with UNOSAT, the Asian Institute of Technology, and the Applied Geoscience and Technology Division of the Secretariat of the Pacific Community has worked with Countries with Special Needs to establish cost-effective, easy-to-maintain portals.

32 The UN-SPIDER website can be located at *http://www.unoosa.org/oosa/en/ourwork/un-spider/index.html*

under the United Nations Office for Outer Space Affairs (UNOOSA). UN-SPIDER develops solutions to address the limited access of developing countries on specialized technologies that can be essential in the management of disasters and the reducing of disaster risks. It is UN-SPIDER's mandate to enable developing countries to use all types of space-based information in all phases of the disaster management cycle including prevention, preparedness, early warning, response and reconstruction. Some support that can be sought from UNSPIDER are detailed in Box 5.

BOX 5. Solomon Islands Mission and Recommendations for Training Needs

Solomon Islands' National Disaster Management Office (NDMO), invited a UN-SPIDER to do a Technical Advisory Mission in 2012. The mission team consisted of two experts from UN-SPIDER and others from UNEP, UNDP, the German Aerospace Centre (DLR), York University, Planet Action, the China National Space Administration and the Regional Centre for Mapping and Resources Development (RCMRD). Various Stakeholders from policy making, those dealing with disaster management and geospatial technologies, were consulted during the mission.

1. NDMO acknowledges their training needs
2. Contact UN-SPIDER Technical Advisory Group
3. UN-SPIDER Goes for Technical Advisory Mission in the Country
4. Experts assess and provide key recommendations for furthering capacity building in the country
5. Country develops detailed plan and implement in parnership with UN-SPIDER

During the mission, a National Workshop on "Application of Space Technology for Disaster Risk Reduction" was organized at Honiara. With more than 20 participants, the workshop assessed and presented the status of applications of space based technology in disaster management in Solomon Islands. Then, areas where space based system can be augmented for different phases of disaster management, was proposed. The assessments were conducted and recommendations were put forward by experts as follows:

- NDMO to work out initiatives to promote an amenable, flexible and policy driven development to geospatial management
- NDMO to develop an institutional framework partnering with other relevant agencies develop a GIS spatial database
- A Data Coordinating working group to be established and a general Data Sharing Policy for GIS are developed
- Cataloguing of existing data sets to determine what GIS data sets are available and who the primary custodian
- Each data set should have a designated Primary Custodian who remains responsible for its quality and updating
- A standardized data sharing agreement is developed to enable the rules for sharing within the Working group consistent.
- An immediate capacity development plan needs to be sketched out for short term, medium term and long term including NDMO discuss with all the stakeholders their priorities, needs and their interests towards building the respective geospatial capacity and come up with a comprehensive plan
- NDMO recruit an International GIS/RS advisor level position at the Country office for at least one year who has practical experience in Disaster Management and technical skills in geospatial technologies

More details are available at *http://www.un-spider.org/advisory-support/advisory-missions/technical-advisory-missions/solomon-islands-technical-advisory-mission*

BOX 6. The UN SPIDER Support

UN-SPIDER aims at improving actions to reduce disaster risk or support disaster response operations through knowledge sharing and the strengthening of institutions in the use of space technologies. It also facilitates cooperation between satellite data and information providers and the different groups of users of such data, such as policymakers, disaster risk managers or emergency responders. The objective is a better flow of information on disaster risks or disaster impacts between all stakeholders and affected populations. UN-SPIDER implements the web-based Knowledge Portal that centralizes content material on space-based information and solutions to support disaster risk management and emergency response. UN-SPIDER also organizes workshops and expert meetings to promote the use of space-based information for the full disaster management cycle as well as providing technical advisory supports to ensure that countries receive systematic and continuous technical advisory assistance for using space-based solutions in their disaster management plans and policies and in the implementation of risk reduction activities.

The international COSPAS-SARSAT satellite system provides distress alert and location information to search and rescue services throughout the world for maritime, aviation and land users in distress. The system comprises emergency beacons which send distress alert signals and location information via satellites that then transmit the information to search and rescue teams.

The NEWSLETTER: The UN-SPIDER Newsletter is published periodically with the aim of highlighting specific topics relevant to UN-SPIDER's field of work. In addition to the online publication, it is distributed in hard copy at conferences, workshops, and various UN-SPIDER events.

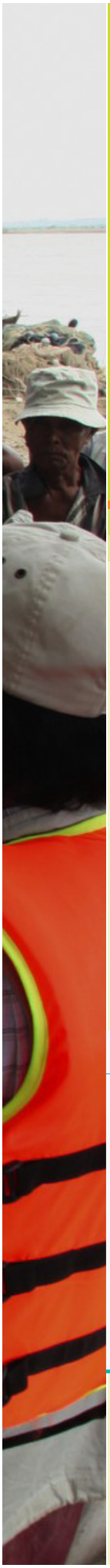
Knowledge Portal: is a hub for pertinent information, links and resources. Through its tailor-made technical advisory support, UN-SPIDER assesses the individual potential of a country, makes specific recommendations and carries out specialized training courses for government staff. Additionally, through its conferences, workshops and expert meetings, UN-SPIDER brings together relevant stakeholders from both the space and the disaster communities in order to foster an exchange of innovations and experiences.

TRAINING SUPPORT: Training support available within UN-SPIDER and its network are also regularly posted in the Knowledge Portal.

MONTHLY UPDATES: The UN-SPIDER monthly updates are compiled at the end of each month and sent out by e-mail to all subscribers. The aim is to update subscribers on the latest UN-SPIDER and community news, and about upcoming events organized or supported by UNOOSA/UN-SPIDER. The updates present the reader with an overview or summary of the news and provides him/her with a link to the full online version.

◂ Key Message

Information has different types and forms and they can be found in various places. There are existing platforms where people can have ease of access for disaster management purposes.



Chapter 2

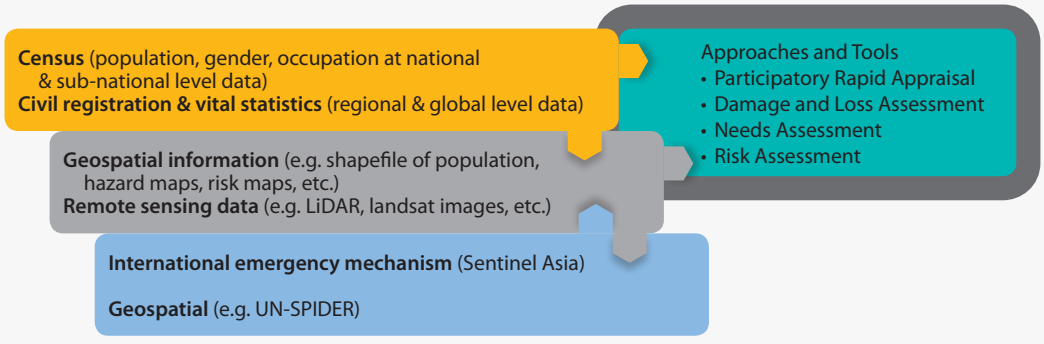
APPROACHES AND TOOLS, AND THEIR APPLICATION IN DISASTER PREPAREDNESS AND RESPONSE

Chapter objective

to describe useful data analysis approach and tools for disaster management

Information becomes more useful whenever it is treated or analyzed in a logical and scientific manner. In disaster management, particularly in preparedness and response, a number of approaches make use of information that produces valuable results which aids decision making processes. These are participatory rapid appraisal; damage and loss assessment; needs assessment; and risk assessment (including hazard identification, vulnerability and capacity assessments) to name a few. This chapter attempts to describe and give important details on these approaches, together with the tools that complement them, such as historical profiles, mapping, ranking, and matrices, among others. Under each approach, data needs, processes and tools that can be used, as well as the process outputs, are mentioned and briefly described. Further references on existing tools and processes of each of the approaches mentioned here are detailed in Appendix B.

FIGURE 13. Flow of information for disaster management



Hazard Identification

This involves the identification of the hazards or threats which may occur in the area or community. It is important to identify the different potential hazards present in the area. Two hazard categories includes natural and human-made hazard. These categories and the types of hazard and quantitative data for hazards are presented in Appendix B.1.

Data Needs: Nature, location, intensity and likelihood (probability or frequency) and behavior of the threat are studied and specified.

Process:

- Potential hazards existing in the area in question are listed
- Characteristics of each hazard are identified
- The probability of occurrence, level of severity, period of the hazard and area affected by the hazard are identified.

Several sources of spatial data can be used for the analysis, such as the hazard maps presented in the previous chapter. In some cases, communities also draw hazard maps using the participatory approach. Examples of hazard maps that are used depending on the type of hazard are geological hazard maps showing fault lines or unstable slopes liable to cause landslides; hydrological maps of flood-prone areas; recording of seismic activity from monitoring stations or local rainfall and flood level. Appendix B.2 presents some examples of geospatial maps for different kinds of hazards that can be accessed either free of charge or through special request channels.

Outputs:

- table showing list of hazards, its characteristics
- hazard maps (either manually made by communities or prepared through the use of GIS).

A sample output of hazard assessment conducted in Kota Palu[33] is presented in Table 10. Hazard characteristics and elements are identified accordingly.

Vulnerability Assessment

A process to identify what "elements are at risk" per hazard type, and to analyze the causes and root causes for why these can be damaged or why these elements are at risk.

Data Needs:

- elements at risk (e.g. people, crops, buildings and services, etc.)
- population socio-demographic information such as age, gender, income, disability, physical health condition, etc.

Process:

- Identify the elements at risk.
- Identify the damage or loss people or elements at risk suffer/incur such as physical damage, deaths, injuries, disruption to economy, social disruption, environmental impacts, needs for emergency responses, among others.
- Know and identify how people survived and responded to disasters in the past.
- Identify and list down existing resources, strengths, local knowledge and practices (in the case of communities) can be used for disaster preparedness, or to quickly recover from a disaster

Output:

- Table presenting number of affected families in past disasters according to type of hazards, degree of loss/damages to all at risk elements

Capacity Assessment

A study to understand how people cope with and survive in times of emergency and to identify resources which can be used to prepare for prevent and/or reduce damaging effects of hazards.

Data Needs: Existing resources, coping mechanism and strategies, strengths, local knowledge and practices in the area, among others

33 This is an output from the hazard assessment stage of a participatory disaster risk assessment conducted in a focus area of World Vision in Kota Palu conducted in 2012. This is in the case of flood hazard only. It should be noted that other types of hazards existing in the area should also be identified for the purpose of preparing for such hazards.

TABLE 10. Example Output on Hazard Assessment[34]

Hazard Element	Information/Guide Questions	Sample Answers
Hazard*	Name and briefly describe the hazard(s) affecting or threatening the community.	Flood
Location	Where are the specific locations in the community that the hazards affect or threaten?	Liku – 2003, 2006, 2009 Lekatu – 2002, 2003 Kintabaru – 1998, 1999, 2001, 2003, 2005 Mangu – 2005 (No impacts indicated here)
History and future	Identify the years in which the hazard affected the community, and its impacts (number of deaths, number of affected families)	Floods occur annually
Frequency	What is the likelihood of the hazard event? How often does it occur?	Not identified by community
Intensity	What was the magnitude, scale of the hazard? (e.g. Richter scale, MMI scale, Beaufort scale or wind speed, flood depth)	Not identified by community
Duration	Length of time of occurrence	Community starts observing the duration of heavy rain to anticipate possible flooding.
Forewarning	What is the time gap between warning and impact? What are the warning signs and signals for each hazard affecting the community?	Lekatu – flood occurs after 3 hours of heavy rain North Palu – flood occurs after 3 continuous days of heavy rain
Speed of onset	Find out the rapidity of hazard arrival and impact. Indicate the length of time between warning and arrival of hazard.	Lekatu – flood occurs after 3 hours of heavy rain North Palu – flood occurs after 3 continuous days of heavy rain
Secondary Hazard	What secondary impacts of the hazard have the community experienced?	Diseases after long duration of inundation, e.g. gastro-enteritis, upper respiratory tract, skin

Process:

- Identify existing coping strategies and mechanism during times of emergencies.
- Know and identify how people survived and responded to disasters in the past?
- Identify existing resources, strengths, local knowledge and practices (in case of communities) that can be used for disaster preparedness, or to quickly recover from a disaster.

An example of a template used for capacity assessment is presented in Appendix B.3. The template takes into account the areas that should be considered including the laws/regulations/policies that supports disaster management, presence of projects and activities and organizations working on and the institutions/organizations managing resources.

Risk Assessment Analysis

This focuses on how often specified events may occur and the magnitude of their consequences. Risk analysis use quantitative or qualitative data, or both. The results of hazard, vulnerability and capacity analysis are used to qualitatively assess the risk in the area. Results are used to estimate the probability of their occurrence, and the consequences in the light of the conditions. These estimates are then compared with a standard or criterion (see Table 11 for an example) in order to decide whether or not action is desirable, to reduce the probability of the risk occurring or to protect people, property, or environment. Through this analysis, we get to know the possible disaster situation and predict the severity of possible future hazards, its damaging effects, the needs and available resources at a certain location.

34 World Vision (2012). Disaster Risk Reduction Toolkit. Risk Assessment for Design Phase. Retrieved online on 1 January 2017 at *http://www.wvi.org/disaster-risk-reduction-and-community-resilience/publication/disaster-risk-reduction-toolkit*

TABLE 11. Example Output on Hazard Assessment[35]

Problem/ Issue/ Hazard	Potential Risk	Vulnerabilities	Capacities	Immediate Needs	Mitigation Actions
Flood	• The river floods over the banks affecting homes in the vicinity • Homes become water-logged at ground level • Household equipment is damaged • Children lost their lives • More mosquitoes can breed in the area where river is blocked, increasing risk of malaria • Flooding in homes results in drinking-water sources becoming contaminated • Drinking contaminated water results in diarrhea in young children	• Poor Infrastructure • Poor agricultural practices • Poor drainage Poor sanitation • Lack of agricultural supplies	• Training • Skilled personnel • Storage facilities • Evacuation plan	• Food • Housing • Sanitation facilities	• Retention walls • Cleaning up rubbish

TABLE 12. Open Source Risk Assessment Tools

Risk Assessment Tools	Description	Weblink
Risk Assessment Tools for Diagnosis of Urban Areas against Seismic Disasters (RADIUS)	This allows users to perform aggregated loss estimation using a mesh grid.	*http://www.alnap.org/resource/7557*
Central American Probabilistic Risk Assessment (CAPRA)	The initiative utilizes geographic information systems, Web-GIS and catastrophe models for disaster risk assessment within an open platform. CAPRA's main product is the software tool CAPRA-SIG, which combines hazard scenarios, and exposure and vulnerability data to calculate loss exceedance curves.	*http://www.ecapra.org/*
RiskScape methodology for multi-Additional methodologies and tools	Include Vulnerability and Capacity Assessment by the International Federation of the Red Cross and Red Crescent Societies, Community based disaster risk Management	*https://riskscape.niwa.co.nz/*

Process:

- Risk assessments conducted before disaster strikes will involve both qualitative and quantitative methods.
- The qualitative approach is useful as an initial screening process.
- Combine hazard maps with qualitative judgments of vulnerability and exposure to build a simple risk matrix.
- Quantitative methods combine data from multiple layers of geospatial data including satellite images, with socioeconomic indicators and detailed census and survey data to create a more comprehensive assessment.

Output:

- Risk matrix

The Risk Matrix (an example shown in Appendix B.6) can be quite simple to make. From the result of the probability matrix, indicate the level of risk faced by the community. An example from IFRC (2008) shows a summary of the hazard, vulnerability and capacity assessment in the Caribbean. Some tools for risk assessment have been developed by the private sector, usually by insurance by governments and international agencies and are mentioned in Table 12.

35 IFRC (2008).

Damage and Loss Assessment

Damage and Loss Assessment is a flexible tool that can be adapted to specific disaster types and government ownership requirements. The tool bases its assessments on the overall economy of the affected country. It uses the national accounts and statistics of the country government as baseline data to assess damage and loss. It also factors in the impact of disasters on individual livelihoods and incomes to fully define the needs for recovery and reconstruction. A subsequent use of the results of the assessment is to estimate the requirements or needs of financial resources to undertake recovery and reconstruction of the affected areas. The value and the spatial, time and by-sector distribution of losses are used to estimate the requirements of economic recovery, while the value and geographical and by-sector distribution of damage is used to estimate the requirements of reconstruction[36].

Process:

- Define a pre-disaster baseline
- Develop a post-disaster situation
- Estimate damage and losses on a sector-by-sector fashion
- Estimate overall amount of disaster effects
- Estimate macro-economic impact
- Estimate impact on personal/household employment and income

Output:

- Quantitative estimates of losses (can be in terms of direct costs for repair and replacement of damaged buildings and lifeline infrastructures; casualties; people displaced from residence; economic impacts.
- Functionality losses (can be in terms of loss-of-function and restoration times for critical facilities such as hospitals, and components of transportation and utility lifeline systems and simplified analyses of loss-of-system-function for electrical distribution and potable water systems).
- Extent of induced hazards (can be in terms of fire ignitions/spread, exposed population and building value due to potential flooding)

Following are some of the tools for assessing damage and losses that have been developed and validated. Figure 14 shows an example of a model to measure the damage from an earthquake in Nepal. It was validated during an actual earthquake. The model shows some deviation on the damage shown. But the model can be improved to predict future damage from a disaster. Outputs will be helpful for future planning and programming.

36 Guidance notes on post-disaster damage and loss assessment. Available at h*ttp://www.pdf.ph/downloads/PDNA/Materials/DaLA%20TOOLKIT/GUIDANCE%20NOTES/006%20Guidance%20Notes%202%20Text%206%20September%2009%20RJ.pdf*

TABLE 13. Tools for assessing damage and losses

Tool	Description	Resource link/s
Damage and Loss Assessment (DaLA)	Methodology covers consequences of disasters at the household, provincial and national levels, including those to livelihoods, economic growth, a government's fiscal position, the balance of payments and levels of poverty.	*https://www.gfdrr.org/damage-loss-and-needs-assessment-tools-and-methodology*
InaSAFE	InaSAFE is a free and open source software that produces realistic natural hazard impact scenarios for better planning, preparedness and response activities	*http://inasafe.org/* *http://docs.inasafe.org/en/training/index.html*
Seismic Loss Estimation model (SELENA)	Provides local, state and regional officials with a state-of-the-art decision support tool for estimating possible losses from future earthquakes	Methodologies: *http://selena.sourceforge.net* User Manual: *http://selena.sourceforge.net/selenamanual.pdf*

FIGURE 14. Modelled and Actual Earthquake Damage in Nepal 2015[37]

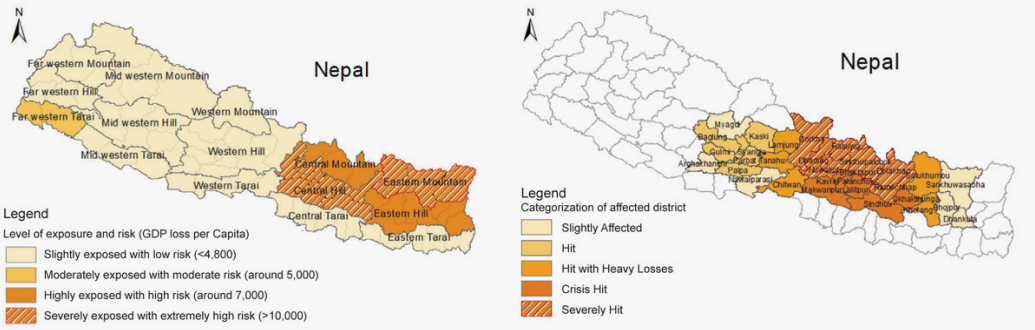


TABLE 14. Tools for assessing damage and losses

Tool	Description	Resource link/s
Post Disaster Needs Assessment (PDNA)	Guide for governments that provides technical support as they plan for and implement the needs assessment and design the recovery framework	PDNA Guidelines: *http://www.undp.org/content/undp/en/home/librarypage/crisis-prevention-and-recovery/pdna.html*
Human Recovery Needs Assessment (HRNA)	Qualitative aggregation of the cluster effects of the disaster and identification of early recovery interventions as well as long-term recovery needs at the household and community levels	Sample Prepared for Samoa: *http://unesdoc.unesco.org/images/0021/002194/219411E.pdf*
UNESCAP Rapid Assessment Manual: Rapid assessment for resilient recovery	The rapid assessment manual takes into account the damage and losses for selected sectors such as housing, infrastructure and agriculture, with disaster risk reduction as a cross cutting sector.	Example for Thailand *https://www.gfdrr.org/sites/gfdrr/files/publication/Thai_Flood_2011_2.pdf*
Multi-cluster initial rapid assessment (MIRA)	• MIRA can appraise the disaster situation, and consolidate information that is often scarce and incomplete. • along with other situation reports and rapid impact assessments tools, can serve as the basis for quickly dispersing funds for relief and emergency responses • An example is a 'UN flash appeal', which is an initial inter-agency humanitarian response strategy and resource mobilization tool designed to cover the first three to six months.	MIRA Guidance Manual: *https://interagencystandingcommittee.org/system/files/mira_2015_final.pdf* MIRA Framework *https://www.humanitarianresponse.info/programme-cycle/space/document/mira-framework*
Initial Rapid Assessment tool (IRA)	Is a multi-sector assessment methodology carried out by key humanitarian stakeholders during the first two weeks following a sudden-onset disaster. It aims to provide fundamental information on the needs of affected people and the priorities for international support.	IRA Resources: *http://www.ennonline.net/iratool* Sample Field Assessment Form: *http://www.who.int/hac/network/global_health_cluster/ira_form_v2_7_eng.pdf*
UN Post-Conflict Needs Assessment (PCNA)	PCNA is a guide to conducting complex analytical process led by the national authorities and supported by the international community and carried out by multilateral agencies on their behalf, with the closest possible collaboration of national stakeholders and civil society	Practical Guide: *https://undg.org/wp-content/uploads/2014/07/4937-PCNA_-_Practical_Guide_to_Multilateral_Needs_Assessments_in_Post-Conflict_situations.pdf*
Situation Reports (Sitreps)	Sitreps include elements of rapid assessment and situation analysis to establish what has happened, the nature of the existing response, and the people and areas in need of emergency aid and relief.	Example of Situation Report: Emergency appeal operations update Philippines: *Typhoon Nock-Ten http://reliefweb.int/sites/reliefweb.int/files/resources/MDRPH023_OU1.pdf*
Flas Environment Assessment Tool (FEAT)	Used in identifying acute environmental issues immediately following a disaster	*https://docs.unocha.org/sites/dms/Documents/FEAT_Version_1.1.pdf*

Needs Assessment

Needs assessment are conducted to identify the humanitarian and resources needed before or after a disaster strikes. Pre-disaster (before) and post disaster (after) needs assessment, respectively identifies the humanitarian needs in target communities either before or after a disaster occurs. Rapid needs assessments enable faster and more accurate decision making by response managers, and as a result, the provision of targeted humanitarian assistance which meets the identified needs of target communities. They also facilitate better coordination between humanitarian agencies responding in a disaster.

Data Needs: Socio-economic aspects of damages, effects (economic losses, impact of the disaster on service delivery to affected communities, effect on governance and risk), impacts and needs, as well as highlights recovery priorities from a human recovery perspective.

Process:

- A team of assessment experts is formed and planning and coordination for the assessment process is conducted.
- Assess the damages and losses to people, physical infrastructure, productive sectors and the economy, including an assessment of macro-economic consequences;
- Identify all relief, recovery and reconstruction needs while addressing underlying risks and vulnerabilities so as to reduce risk and build back better
- Contribute to a relief, recovery strategy, outlining priority needs, recovery interventions, expected outputs and the cost of recovery and reconstruction;
- Provide a basis for resource mobilization and prioritization (including sectoral and geographical prioritization).
- Impacts of a disaster assessed and assessment reports from different sectors are consolidated.
- Strategy for disaster recovery is defined including with estimates of financial resources needed.

There has also been more emphasis on rapid assessments that are technology-based in order to support decision making processes. These use satellite remote sensing, GIS, crowdsourcing and ICT applications. This was the case in the Uttarakhand flash floods in 2013, typhoon Haiyan in 2013, cyclones Phailin and Hudhud in 2014 and cyclone Pam and the Nepal earthquakes in 2015.

Output/s: Depending on the type of assessment being done, the following are possible outputs

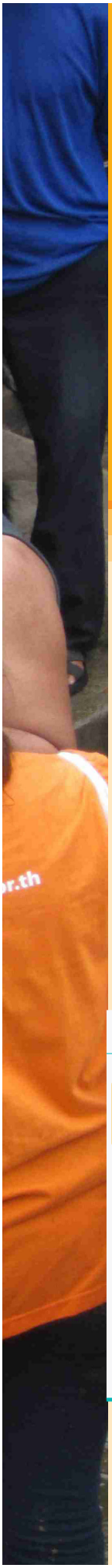
- Consolidated needs assessment reports.
- Identified needs which will be the basis for developing a relief and recovery strategy. Some of the tools that are being used are indicated in Table 14.

◂ Key Message

Existing information become useful when they are processed with the right tools for the right approach resulting to information that will be used for the right reasons.

37 UNESCAP (2015). Disasters Without Borders: Regional Resilience for Sustainable Development. Chapter 4: Right information, right people, right time. Available at *http://www.unescap.org/sites/default/files/Chapter%204.pdf*


don't think over
www.worldvision.c



Chapter 3
EVIDENCE-BASED PROGRAMMING

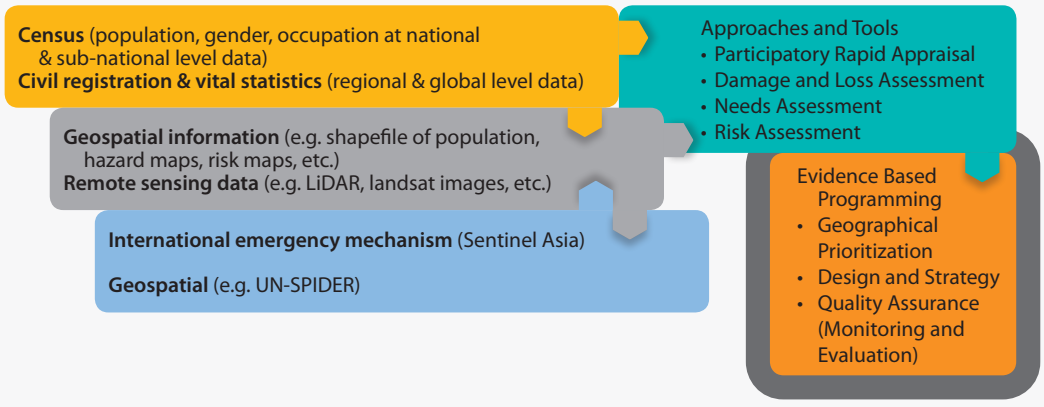
Chapter objective

to utilize information for geographical prioritization, design and strategy and quality assurance

Results of data analysis are outputs according to approaches and tools which analytically treated information that can be used to prioritize communities affected by a disaster, identifying immediate and long-term needs; and designing programs and/or strategies to address certain needs during response/relief, rehabilitation and reconstruction. Evidence-based programming follows a common principle that makes use of outputs of established approaches and tools for programming and/or decision making purposes. This chapter describes a simple process on what and how to makes use of the information in order to design a disaster management program such as response management plan.

Figure 15 shows the process flow on how information is treated in a number of approaches and tools that produce output such as level of risk, level of damage and losses among others. The outputs are used in prioritizing beneficiaries of DM programs.

FIGURE 15. Process of evidence-based programming



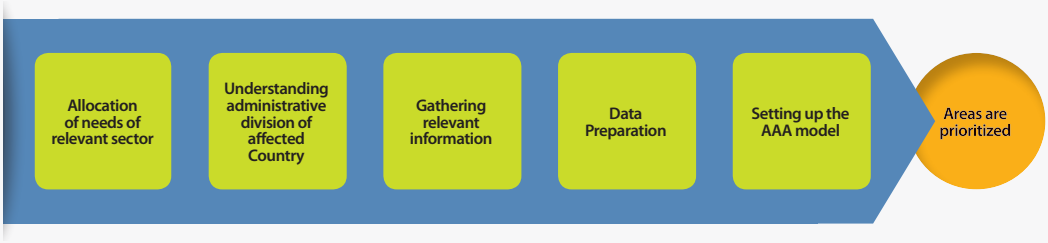
Geographical Prioritization

Everyone agree that resources are limited. For this reason, an organization needs to identify the areas where they can invest their time, technical and material resources that will yield to a significant impact to the societies that were affected by a disaster. Figure 16 illustrates a basic process model on how geographical area of recipients are prioritized. The process flow follows a global framework for humanitarian response as well as a local level implementation is done. The basis for the analysis is normally indicated in the UN Appeal. The UN Appeal includes the proportion of level of assistance needed by the country that is experiencing the impact of disaster. The process steps are repeated if the organization needs to reprioritize areas especially when there is a change in administrative division.

The process steps include:

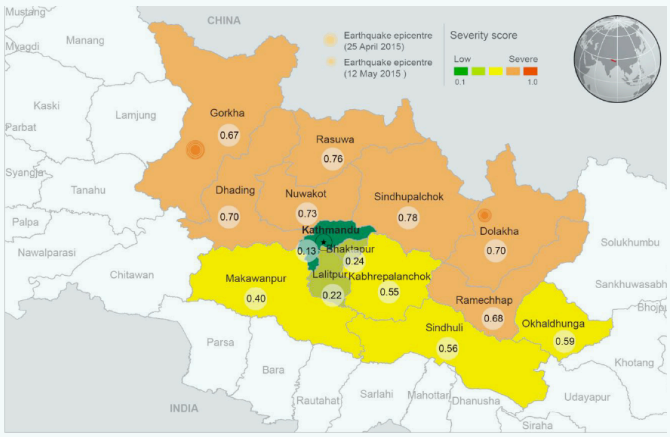
1. Allocation of needs of relevant sector.
   - What are the sectors that are relevant to your organizations strategy?
   - Where will you get the information that covers the sectors identified in your organizations strategy?
2. Understanding administrative division of affected Country
   - What level of analysis will the organization require? For example, regional, provincial, municipal level.
   - Where will you access accurate information regarding administrative boundaries that are broadly accepted?
3. Gathering relevant information
   - What kind of information is needed to satisfy the objectives of the strategic plan?
   - Where are the sources of information? Are they reliable?
   - Is the information available online or in hard copies?
   - Is it possible to acquire the data? Is any particular government approval required to access this required data?
   - What is the methodology, including sampling and statistical design, the organization will use to analyze this information and transform it into a product that can be used for effective decision making?
4. Data Preparation
   - What kind of information was collected? Is it quantitative or qualitative data, or both?
   - Is the methodology to be used applicable with the kind of data being collected?
   - Can the methodology be adjusted to suit the kinds of information at hand?
5. Setting up the Geographical Prioritization Model
   - What are the available models to prioritize geographical areas for response? Which model is most appropriate for the needs of your organization?
   - Is the model simple enough that it can be used by the organization and for training?
   - Is the model acceptable to other organizations?
   - Has the model undergone validation?
   - Does the model satisfy the priority areas (e.g. children, elderly, etc.) of the organization?
   - Do the model results sufficient enough to aid decision making?
6. Areas are prioritized
   - Do the areas prioritized align with the priorities of the organization?
   - Does the size of population align with the available resources of the organization for response?
   - Is the geographical area accessible when basic goods and services are transported?
   - What are the possible opportunities and challenges in the area?
   - What is the presence of other humanitarian actors in the prioritized areas? Is there sufficient humanitarian space in the prioritized areas for the organization to operate? Will access be granted to the communities in the areas prioritized?

FIGURE 16. Geographical Prioritization Process Framework



BOX 7.Geographic Prioritization using the Affected Area Analysis Tool: Case of Nepal Earthquake 2015

In 25 April 2015, Nepal was struck with an earthquake of magnitude 7.6. The Government of Nepal (GoN) requested emergency assistance within two hours of the earthquake, and World Vision International declared its Nepal response a Category III Global Response on 26 April 2015. The Response goal was to meet the emergency needs and strengthen the resilience and self-recovery of earthquake-affected children and their communities'. First of all, disaster impacts to the whole country population and identified crisis-hit districts was identified from different sources such as the PDNA report by GoN and the UNOCHA situation reports. Then priority needs are aligned with WVI's own priority sectors based on PDNA and other cluster specific assessments. Of WVI priority sectors, shelter ranks highest in terms of the estimated total damage and losses (49.62%), followed by Education (4.43%), Agriculture (4.02%), WASH (1.61%) and Health (1.07%). Funding needs allocation from the PDNA were also known in addition to details indicated in the UN FLASH Appeal (more information can be found at …).



In order to decide which interventions to contribute to humanitarian response needs and which areas to support, WVI did a geographic prioritization and needs analysis using the Affected Area Analysis (AAA) tool. By using the excel-based AAA tool, first, an analysis to rank the severity of disaster impacts in the 14 crisis-hit districts was conducted per sector. For instance in the shelter sector, severity ranking identified the Nuwakot district in top most rank, followed by Dolakha and Sindhupalchok districts. For the health and nutrition sector, as well as for the education sector, the severity ranking identified Sindhupalchok in top most priority. Next was to assess that in each geographic areas targeted, based on the strategic priorities, a rating system was designed to provide comparable score for each districts along with each VDC/Municipality in the district. The ranking and overall proportion of humanitarian need in each area and the district and village was determined based on available data before and after the earthquake. Then, the overall ranking of humanitarian need per district was calculated based on the proportional weightage of Shelter, Education and Health. At the end, according to District level geographic prioritization tool; Sindhupalchok is in highest humanitarian need followed by Nuwakot, Gorkha, Dhading and Dolakha districts. According to these results, programmes implemented to achieve humanitarian response goal have focused on providing immediate relief and services in shelter/non-food items (NFI), water, sanitation and hygiene (WASH), education, health, child protection and food. About 100,000 people was served. While funds received for the response was over US$26 million.

Design and Strategy

Design and strategy is an exercise that addresses the root causes of a problem, in this case the impacts of a disaster on a community. Design and strategy is first done to develop a programme to meet the needs of the target communities, and then used to mobilise resources to fund those plans – without the programme design in place to meet community needs, funding can't be sourced. The design and strategy criteria can depend on a number of factors, and may include the following:

- The stage of disaster management that the organization needs to address e.g. relief/response
- The priorities of the implementing organization e.g. children affected by disasters
- The priorities of the sources of funding e.g. food and shelter

General questions that need to be satisfied as part of the program design and strategy process may include the following:

- What stage of disaster management will you consider in your program design? For example, preparedness, response, recovery etc.
- What are the goals and objectives of the program?
- What are the sectors that will be covered in the program?

A typical way of designing a program follows the steps in Figure 17. The process starts by identifying priority problems through a needs assessment in one form or another. It's all well and good for an organization to have certain priorities, but if they don't match up with community priorities there is a problem. In most cases, organizations have a number of assessment tools such as rapid assessments in order for them to identify the root causes of a disaster and their obvious and/or possible effects and the resulting needs.

The basic components of a strategy include goal, objectives, outcomes, outputs and the corresponding activities, schedule and budget.

Goal

Goal is normally a broad statement stating the aspiration of the program beyond the project implementation timeline. It is a broad statement that addressed the ultimate effect of a problem e.g. loss of lives, property damage among other impacts of disaster.

The following shows an example of a programme goal.

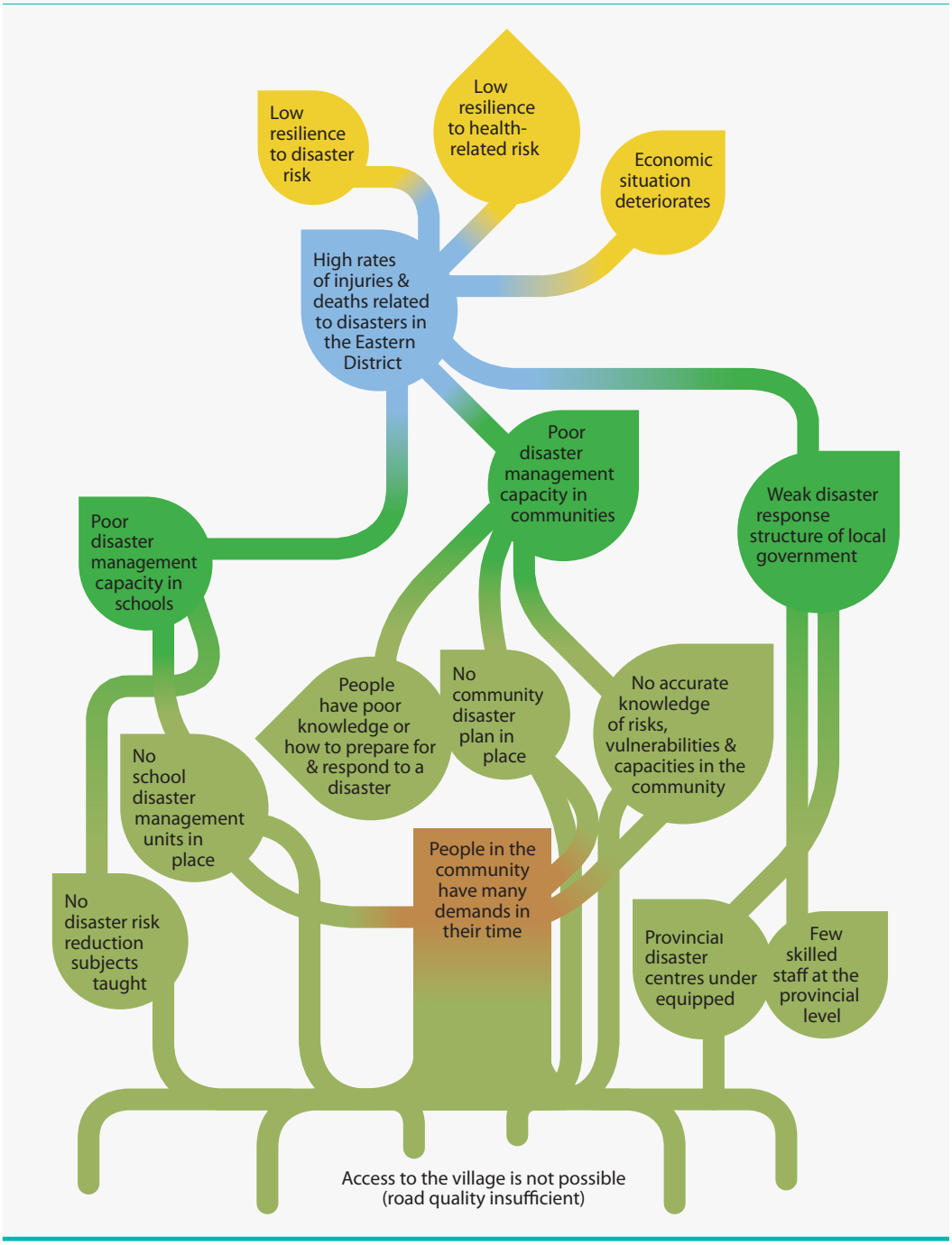
Programme Goal: To strengthen the resilience and self-recovery of typhoon-affected communities and children.

Objectives

In some cases, either goal or objective is not indicated in the design and strategy. Objective however, is a must and should be specific, measurable, attainable, realistic and time bound.

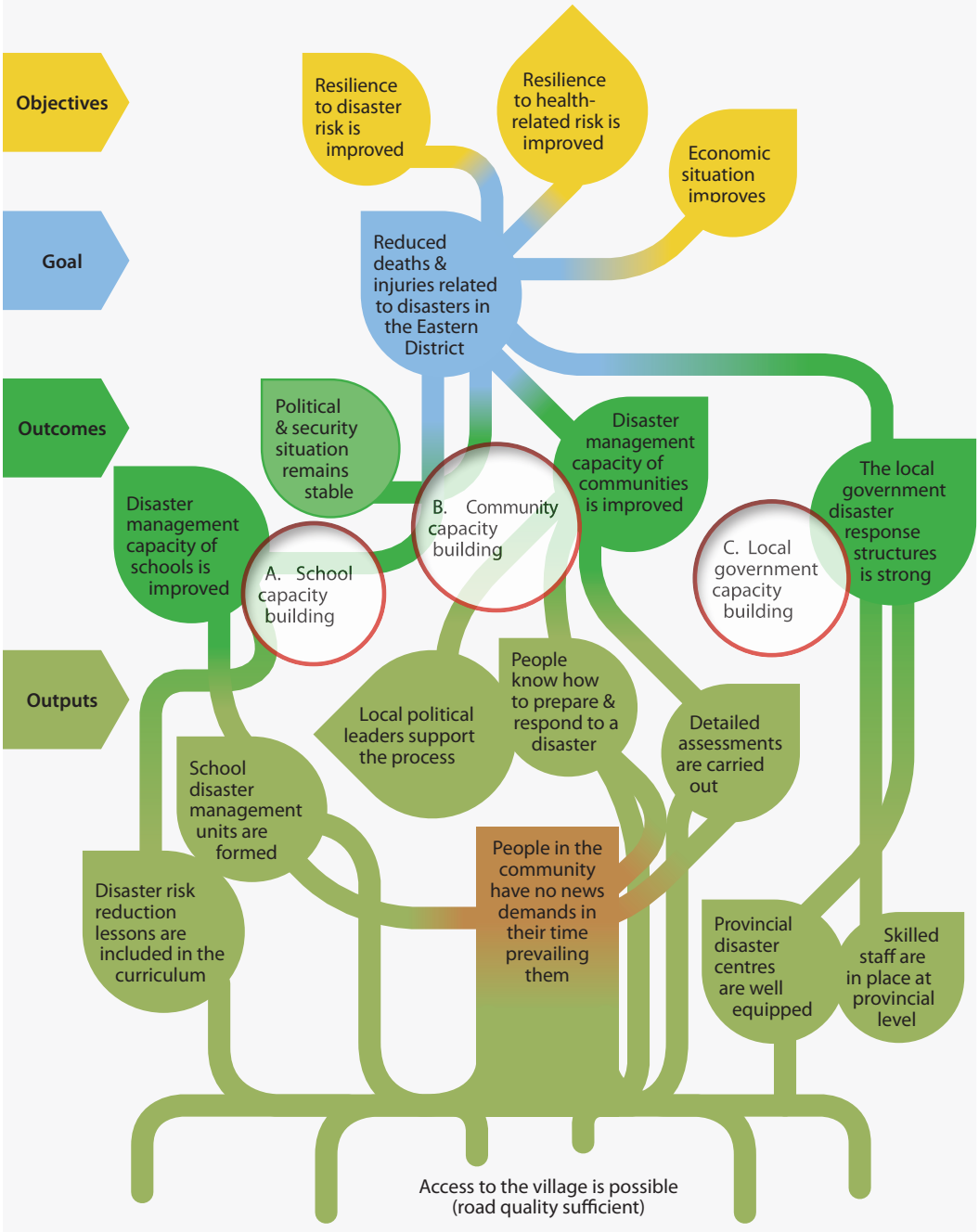
FIGURE 17. Geographical Prioritization Process Framework

FIGURE 18. Example of Simplified Problem Tree[38]



38 IFRC (2010, p22). Project/programme Planning Guidance Manual. Available at *http://www.ifrc.org/Global/Publications/monitoring/PPP-Guidance-Manual-English.pdf*

FIGURE 19. Corresponding objectives selected for Problem Tree Developed in Figure 18[39]



39 IFRC (2010, p22). Project/programme Planning Guidance Manual. Available at *http://www.ifrc.org/Global/Publications/monitoring/PPP-Guidance-Manual-English.pdf*

The program objective is often based on the result of a problem analysis[40] done in a participatory manner that may result to a problem tree. A problem tree includes a number of root causes and their effects. Figure 18 illustrates an example of a problem tree. The result of a problem tree is then converted to objectives that address the indicated problems in the problem tree. A problem tree usually consists of several levels, a hierarchy of interlinked problems. In this hierarchy, a problem at a lower lever (in conjunction with other problems at that level) leads to the problem positioned one level above it.

Connecting lines indicate cause-effect relationships. Another diagram is then formulated where every cause-effect relationship between problems becomes a positive means-end relationship between objectives. This diagram represents an ideal future situation where the desired conditions are fulfilled. Attainment of an objective at a lower lever (together with other objectives at that level) leads to realization of an objective one level higher. The validity, both of the objectives and their means-ends relationships must be checked. Objectives so derived might not always be realistic, in which case other solutions should be sought. However, "product diversification" or "further processing of timber" might be other solutions to the same problem. Each of the branches in the objective tree represents an alternative strategy for the future project. The diagram therefore becomes a useful tool when comparing and assessing the alternative ways of tackling the problems. One or more of the alternative strategies are included in the project plan.

40 In the problem analysis, problems should be stated as a situation which needs to be improved, and not in a form which expresses the absence of a solution. For example, rather than saying "a lack of hospitals", the problem should be "high infant mortality". Listing of possible solutions at an early planning stage easily hampers objective and open-minded problem analysis.

TABLE 15. Example of Response Strategy's Outcomes and Outputs

Outcome 1. **Typhoon-affected families and communities have improved living conditions and access to basic services**
Output 1.1 Provided support for shelter rehabilitation for families in target areas
Output 1.2 Improved community access to safe water sources and appropriate sanitation facilities
Output 1.3 Improved access to safe and child-friendly learning environments for children
Output 1.4 Improved access to adequate and appropriate health facilities and services for communities
Output 1.5 Increased community engagement in the rehabilitation of basic services
Output 1.6 Food and cash are distributed to affected families for food security
Outcome 2. **Typhoon-affected families and communities have restored affected livelihoods and increased capital and asset base**
Output 2.1 Increased productivity and income-generation capacity for typhoon-affected households involved in agriculture, including farm labourers
Output 2.2 Increased productivity and income-generation capacity for typhoon-affected households involved in fisheries
Output 2.3 Facilitated creation of alternative livelihoods - especially in construction - through the provision of supplies and opportunities for skills training in coordination with government, private sector and educational institutions
Output 2.4 Rehabilitated community livelihood infrastructure to stimulate economic recovery
Outcome 3. Local government capacity in disaster preparedness, coordination and management is strengthened
Output 3.1 Engaged multi-sector stakeholders to coordinate recovery efforts
Output 3.2 Provided support for LGUs to adopt disaster management mechanisms
Output 2.3 Facilitated creation of alternative livelihoods - especially in construction - through the provision of supplies and opportunities for skills training in coordination with government, private sector and educational institutions

FIGURE 20. Context Analysis Process Framework

Program Outcomes and Outputs

Program outcomes are loftier compared to outputs. They may or may not be achieved during the period of the program. Outputs should be more specific than the outcomes. These should be achieved within the period of the program. Outcomes are dependent on the outputs that needs to be achieved.

Program Activities

Figure 20 shows the process framework for preparation of project activities. In order to guide the process steps, questions to be answered are indicated for each process step below.

Guide questions for the process steps:

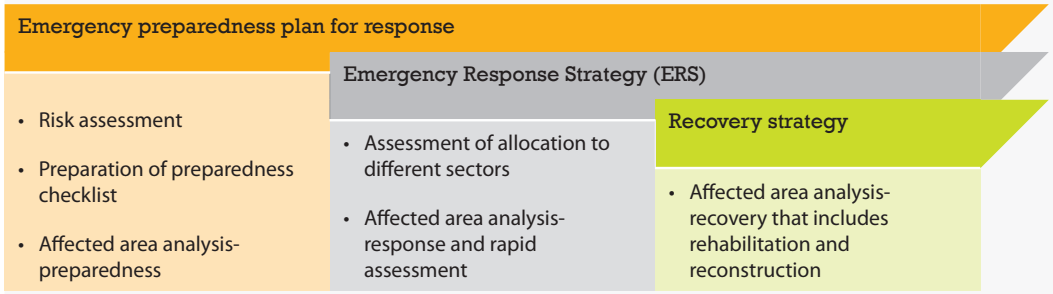
1. Preparation of resource catalogue
   - What are the resources needed for the analysis?
   - Are these resources needed for the analysis?
   - Are the sources of information reliable?
2. Identification of remaining needs
   - What has been done in the sector (shelter, WASH, livelihood etc.) being considered?
   - Which organization(s) has/have done these milestones?
   - Are there any other things to do in the communities/areas being considered?
3. Identification of risk factors and challenges
   - What are the challenges that the organizations are facing in addressing the needs of the community?
   - What steps can be taken to mitigate identified risks and challenges?
4. Implications of the unaddressed gaps
   - What are the impacts of unaddressed gaps to the affected area?
   - What do these mean in terms of achieving the goal of the project?
5. Prioritization of actions
   - What activities are most important in order to meet the needs of the affected people?
   - What are activities aligned to the organizations priority areas?
6. Aligning the priority actions with government policies
   - Are activities aligned with the government's goals?
7. Actions are identified to be implemented in the affected area
   - What activities can be done to complement programs/activities of the government?
   - What are the resources needed for implementation of such actions?

An example for activities developed under outcome 1 and outputs from Table 15 above is detailed in Table 16.

TABLE 16. Example of Activities Under Outcome 1 and Output 1.1

Outcome 1. Typhoon-affected families and communities have improved living conditions and access to basic services
Output 1.1 Provided support for shelter rehabilitation for families in target areas
Activity 1.1.1 Identify number and location of families in need
Activity 1.1.2 Distribute financial support and needed materials for shelter rehabilitation
Output 1.2 Improved community access to safe water sources and appropriate sanitation facilities
Activity 1.2.1 Construct water system and provided water tanks to the communities
Activity 1.2.2 Construct community toilets
Output 1.3 Improved access to safe and child-friendly learning environments for children
Activity 1.3.1 Provided and constructed learning development centres in the community
Activity 1.3.2 Distributed books and school materials to children in the community
Output 1.4 Improved access to adequate and appropriate health facilities and services for communities
Activity 1.4.1 Reconstruct the health centre and provide medicines and other needed infrastructure for medical care
Activity 1.4.2 Designate a health care provider in the community

FIGURE 21. Plans and strategies as a result of information management



Types of programming and strategy needed to for humanitarian actions for DM.

Each stage will result to different programs and/or plans. Emergency preparedness plan for pre-disaster; emergency response strategy at the early stage of post disaster followed by the recovery strategy.

These plan and strategies are products of rigorous quantitative and qualitative analysis. The quantitative analysis used a tools such as area affected analysis (AAA) while the qualitative analysis is done using context analysis. Other examples of organizational or country strategies that were developed from rigorous analysis are indicated in Table 18.

Overall, developing project strategy consists of processes on the development of the project purpose and the overall objectives, corresponding project outcomes and outputs, activities and means of implementing that include needed resources. The project purpose states the specific objective of the project, while the overall objective(s) describe(s) the long-term development goals to which the project makes a contribution. The outcomes and outputs are derived from the objectives which, together, lead to the project purpose. Then, activities are derived from the lower level objectives which, combined, produce the results. When these activities are carried out, the means are transformed into results that together will achieve the project purpose. In the project document, activities should be expressed as processes which will be then broken down into more detailed tasks in workplans. The resources can be either human resources and material inputs required to carry out planned activities and manage the project.

The logical framework method is one tool used to improve project planning and implementation. It is a systematic method for setting and analyzing the objectives of a development project and the assumptions behind it. The logical framework stresses the causal relationships between key elements and provides a standard model for their presentation. It includes an assessment of the project environment; external factors have a major influence on success or failure. The identification and analysis of these external factors therefore constitute a crucial task. The logical framework matrix, shown in Table 17 with the definitions used, shows indicators and sources of verifications from project purpose down to the activities.

Some resources for development of project design and strategy which can be referred to are indicated in Table 18.

TABLE 17. Logical Framework Matrix and Term Definitions[10,11]

Objectives (What we want to achieve)	Indicators (How to measure change)	Means of verification (Where/how to get information)	Assumptions (What else to be aware of)
Goal The long-term results that an intervention seeks to achieve, which may be contributed to by factors outside the intervention	Impact indicators Quantitative and/or qualitative criteria to measure progress against the goa	How the information on the indicator(s) will be collected (can include who will collect it and how often)	External factors beyond the control of the intervention, necessary for the goal to contribute to higher-level results
Outcome(s) The primary result(s) that an intervention seeks to achieve, most commonly in terms of the knowledge, attitudes or practices of the target group	Outcome indicators Quantitative and/or qualitative criteria to measure progress against the outcomes	As above	External factors beyond the control of the intervention, necessary for the outcomes to contribute to achieving the goal.
Outputs The tangible products, goods and services and other immediate results that lead to the achievement of outcomes	Output indicators Quantitative and/or qualitative criteria to measure progress against the outputs	As above	External factors beyond the control of the intervention, necessary if outputs are to lead to the achievement of the outcomes
Activities The collection of tasks to be carried out in order to achieve the outputs	Inputs The materials and resources needed to implement activities	Costs (and sources) The summary costs for each of the identified resources/ activities; sources of income can also be specified	External factors beyond the control of the intervention, necessary for the activities to achieve the outputs

TABLE 18. Resources for Project Design and Strategy

Organization Source	Title	Resource Weblink
USAID	Project Design Guidance 2011	*http://pdf.usaid.gov/pdf_docs/Pdacs686.pdf*
Nigeria Country Humanitarian Response Plan: January-December 2017	Country Example for a Response Strategy	*Sample Prepared for Samoa: http://unesdoc.unesco.org/images/0021/002194/219411E.pdf*
Ukraine Country Humanitarian Response Plan: January-December 2017	Country Example for a Response Strategy	*http://reliefweb.int/sites/reliefweb.int/files/resources/humanitarian_response_plan_2017_eng.pdf*
IFRC	Project/Programme Planning	*http://www.ifrc.org/Global/Publications/monitoring/PPP-Guidance-Manual-English.pdf*
World Vision	Planning Tool: Participatory scenario planning for community resilience	*http://cdn.worldvision.org.uk/files/9813/7871/8703/Planning_For_Community_Resilience.pdf*

Quality Assurance (Monitoring and Evaluation)

In order to see if the project goals and the logical framework is effectively implemented, monitoring and evaluation (M&E) is important. Monitoring is performed to track the progress of activities against the strategies developed in the stage detailed in 3.2. Evaluation is performed to determine the relevance and fulfillment of objectives, developmental efficiency, effectiveness, impact and sustainability. An evaluation, with the use of reliable and credible data and information, results into lessons learned that can further assist decision making process.

The following are some guide questions[41] while monitoring a preparedness or response project being implemented.

- Are outputs leading to the achievement of the outcomes?
- How do beneficiaries feel about the work?
- Are activities leading to the expected outputs?
- Are activities being implemented on schedule and within the budget?
- Are finance, personnel, and materials available on time and in the right quantities and quality? If there are delays, what are causing these?
- Is there anything happening that should lead to revision of the implementation plan?

In terms of evaluation, the following guides[42] an organization towards analyzing if the project has obtained expected goals.

- What changes did the project bring about? Were there any unexpected changes?
- Were the project objectives achieved? Did the outputs lead to intended outcomes?
- Are the benefits likely to be maintained for a certain period of time after assistance ends?
- Were the operations consistent with beneficiaries and the organization's policies?

41 IFRC (2011). What is Monitoring? Monitoring and Evaluation Concepts and Considerations, p 11. Available at *http://www.ifrc.org/Global/Publications/monitoring/IFRC-ME-Guide-8-2011.pdf*

42 IFRC (2011). What is Evaluation Monitoring and Evaluation Concepts and Considerations, p 14. Available at *http://www.ifrc.org/Global/Publications/monitoring/IFRC-ME-Guide-8-2011.pdf*

Project monitoring and evaluation takes a system to be setup and a support to actually implement the system. The following gives an overall guidance on the steps in setting up a M&E system.

Guide questions for each step of the response monitoring and evaluation:

1. Identify the purpose and scope of the M&E system.
   - › Why do we need M&E and how comprehensive should it be?
2. Plan for data collection and management
   - › When and how do we collect a data?
   - › What data are available and which are not?
   - › Is the source of data reliable?
3. Plan for data analysis
   - › How do we analyze the data collected?
4. Plan for information reporting and utilization
   - › How do we present the results of our data analysis?
   - › What are conclusions and lessons learned?
   - › Based from the findings, what further actions are recommended?
5. Plan for M&E human resources and capacity building
   - › Are the M&E team capable of doing the tasks?
   - › Who will be involved and what capacity building support do they need in order to effectively perform the tasks?
6. Prepare the M&E budget
   - › How much is needed for the M&E?
   - › Are existing resources enough? If not, where do we source out additional resources?

Further guidance on setting up and actually implementing an M&E system are available elsewhere for instances as indicated in Table 19.

FIGURE 22. Response Monitoring Process

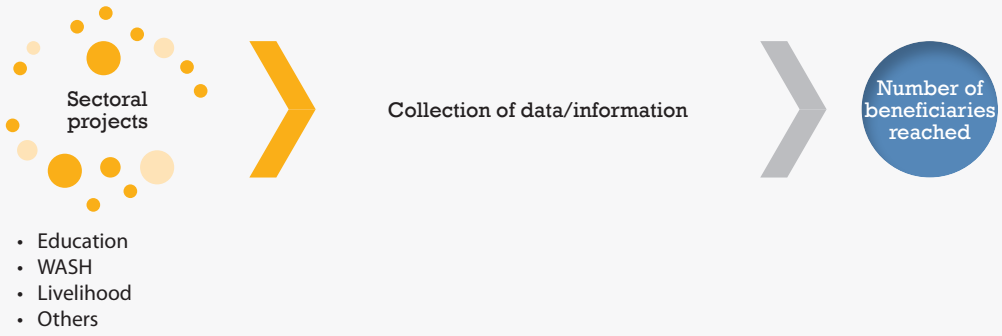


TABLE 19. Resources for Project Monitoring and Evaluation

Title	Description	Resource Weblink
American Red Cross, Catholic Relief Services, USAID	Monitoring and evaluation Planning	*https://www.k4health.org/sites/default/files/MEmodule_planning.pdf*
World Bank	Ten steps to a results-based monitoring and evaluation system	*https://www.oecd.org/derec/worldbankgroup/35281194.pdf*
The World Bank	Monitoring and Evaluation: Some Tools Methods and Approaches	*http://siteresources.worldbank.org/EXTEVACAPDEV/Resources/4585672-1251481378590/MandE_tools_methods_approaches.pdf*
IFRC	Project/Programme Monitoring and Evaluation Guide	*http://www.ifrc.org/Global/Publications/monitoring/IFRC-ME-Guide-8-2011.pdf*
IFRC	Handbook for Monitoring and Evaluation (2002)	*https://www.measureevaluation.org/resources/training/materials/basic-me-concepts-portuguese/IFRC_Monitoring%20and%20Evaluation%20handbook.pdf*
IFRC	Framework For Evaluation	*http://www.ifrc.org/Global/Publications/monitoring/IFRC-Framework-for-Evaluation.pdf*
WHO, World Bank, USAID	Monitoring and Evaluation for Human Resources for Health: with special applications for low and middle income countries	*http://www.euro.who.int/__data/assets/pdf_file/0011/200009/Handbook-on-monitoring-and-evaluation-of-human-resources-Eng.pdf* or *http://apps.who.int/iris/bitstream/10665/44097/1/9789241547703_eng.pdf*
UNDP	Handbook on Planning, Monitoring and Evaluating for Development Results	*http://web.undp.org/evaluation/evaluations/handbook/english/documents/pme-handbook.pdf*
Sphere Project	Core Humanitarian Standard on Quality and Accountability: describes the essential elements of principled, accountable and quality humanitarian action	Interim Guidance: *https://corehumanitarianstandard.org/files/files/Core%20Humanitarian%20Standard%20-%20English.pdf*
UN World Food Programme	Monitoring and Evaluation Guidelines	*http://seachangecop.org/sites/default/files/documents/2-WFP%20-%20How%20to%20design_EMOPs%20and%20PRROs.pdf*
Active Learning Network for Accountability and Performance (ALNAP)	Evaluation of Humanitarian Action Guide	*http://www.alnap.org/resource/23592.aspx*

◂ Key Message

Results of information that has been processed and analyzed, helps enhance the quality of projects, plans, programs of an organization. It allows the organization to deliver the right services, to the right beneficiaries at the right time for the right reasons.


SUPER
MADE IN KOREA

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

Information Management *is the systematic process of collecting, collating, storing, processing, verifying, and analyzing data and information, and disseminating it to humanitarian stakeholders. Data must be shared and collected in a timely manner to inform decision-making and analysis. Sufficient information management capacity and the use of common tools – are critical elements to the successful implementation of the programme cycle. (UNOCHA)*

This guidebook presented in general, the available information, where these can be found and how these be utilized by using different approaches and tools to obtain results for geographical prioritization, design of strategies, programs and plans for preparedness and response. However, as information management for disaster preparedness and response is a very broad topic, this guidebook does not cover all detailed aspects of information management. It serves as as general guideline from the process of identifying what information is needed, collecting it, analyzing for use in designing strategy, programs and developing plans for implementation, then monitoring and evaluating its implementation. It presented the overall picture of the process on information management and leads readers to other resources for more detailed information and processes. This guidebook can serve as a basis for developing guide that can be utilized for specific contexts.

Information is inherently important in all stages of disaster management. Much more so if they are processed resulting to more valuable information that can be used in designing strategies that serves as a blue print for implementation. Data and information is crucial for planning for and responding to disasters. It is important that real-time data and information are used for more accurate projection of resources needed for humanitarian responses. When a disaster occurs, awareness on the situation is important in decision making for response and emergency support. Information is needed on the scale of damage in an area and the location of the affected population, along with logistical information such as the location of hospitals, undamaged roads and bridges and communication infrastructure. In the days and weeks following a disaster, information concerning the international agencies and NGOs operating in the area and the distribution of resources is needed to ensure aid reaches those who need it most and efforts are not duplicated, wasting precious time. Disaster managers and responders require timely and accurate information to understand and communicate the situation on the ground to others.

Figure 23 shows the fundamental process where information management is implemented in the operations of preparednness and response managers and other actors. The process follows the stages of disaster management process which is subdivided to pre-disaster, disaster, and post-disaster.

In planning for and responding to disasters, it is also important that key stakeholders are knowledgeable of the sources of data and information as well as on how to use information for better preparedness and planning for future disasters.

1. Evidence-based programming results in good prioritization of sectors and/or geographic areas based on:

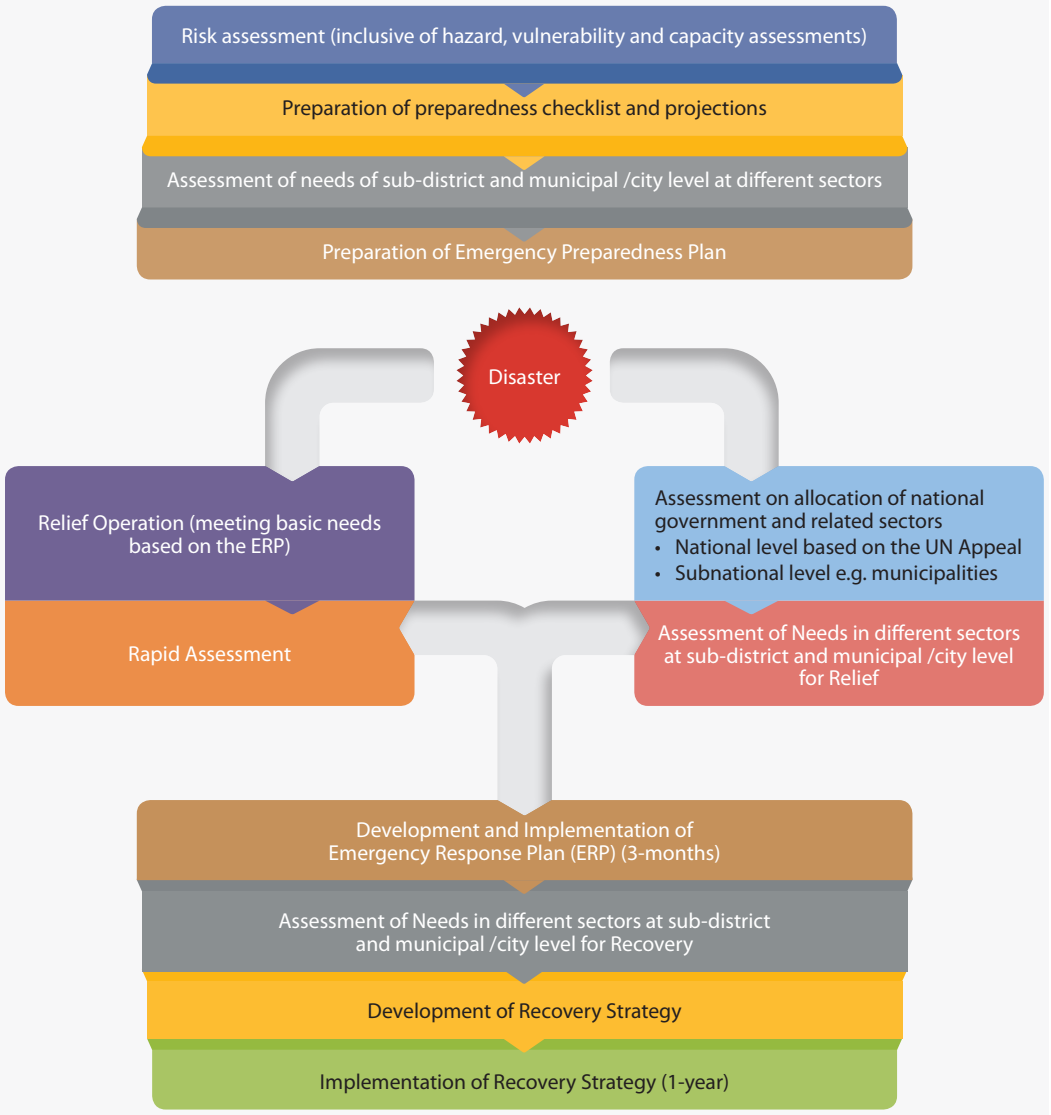
    › Decisions are made based on community needs and priorities

- Damage and losses
- Organizational priorities and capacities

2. Good Information management practices are cultivated by:
   - Type of competencies
   - Types of behavior to cultivate and promote
3. Adequately communicating disaster risks

The communication of information regarding hazard, vulnerability and risk needs to be handled carefully. The aim should be to inform the public, but minimizing the negative consequences regarding the interpretation of such information. In some countries, the dissemination of hazard maps has led to a reduction in the price of land in areas exposed to such hazards. Nevertheless, experts recognize the need to make communities aware of the level of risk they are facing, in particular to make them aware of the notion of vulnerability so as to generate greater acceptance of government measures to reduce it.

FIGURE 23. Fundamental Information Management Flow



Recommendations

Quality information, reaching more humanitarian actors, will result in better coordination and better decision-making, thus improving the response to beneficiaries as well as accountability to donors.

Among the challenges and recommendations for improvement of information management are as follows:

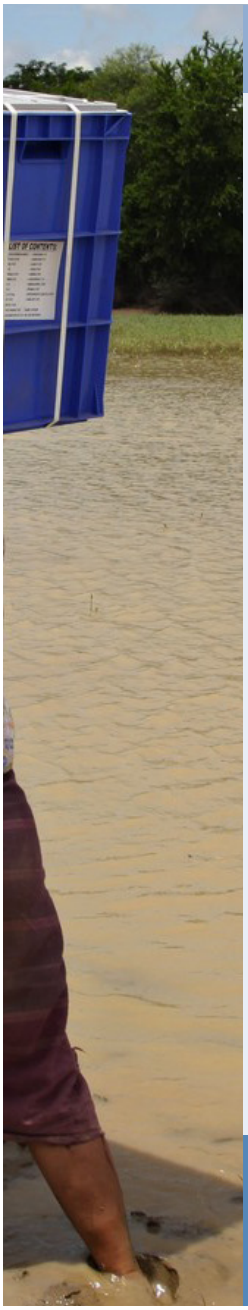
Gaining access to up to date and quality information. Information is still an expensive commodity in disaster management. This is well understood due to the tedious to gather, collate and analyze; it requires a sizable investment that includes manpower, technology and expertise. Although progress have been done on setting up mechanisms for access and sharing of information, it is still inadequate for a wide range of actors.

Improving mechanisms in information sharing. Although there are global, regional and national mechanisms that are in place, enhancing its functionality and integration among all existing mechanisms will help further improve data sharing. A mechanism to encourage countries and all actors to contribute information to database system will be helpful.

Better coordination between government and non-government institutions in providing reliable information. Each organization involved in disaster preparedness and response tend to have their own programs and strategies on handling information. Due to factors such as meeting the goals of donors, and other actors in their organization,

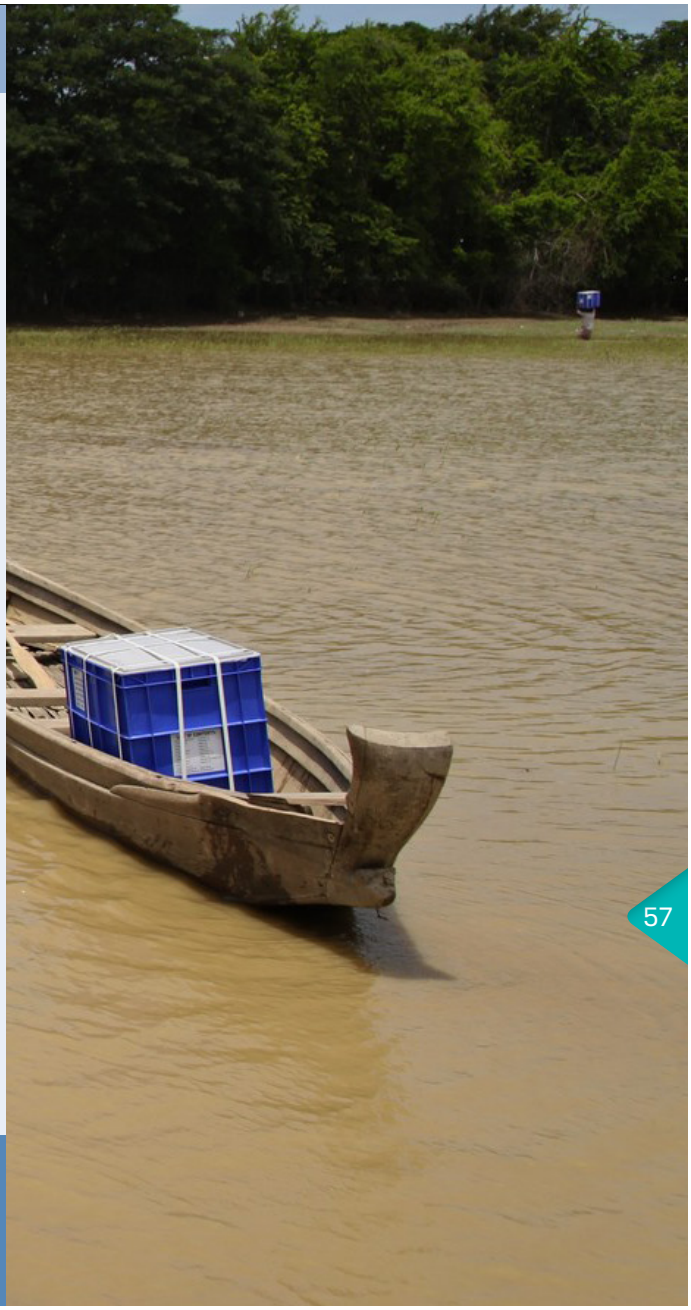
Building local capacity in gathering, analyzing and utilizing information. As country NDMO is usually responsible for managing data and disseminating it to humanitarian actors, it is important that personnel be trained in collecting, processing, analyzing and communicating information. Other organizations who are also conducting their specific priority area information management needs to be trained.

End-to-end approach in handling information. This approach involves community in the overall process of information management. Communities know their situation better, they are the source of primary information which can be more reliable. Teaching them to process and analyze information and communicating to them the results of such information, involve them in developing strategies and plans for implementation. This will be beneficial to both humanitarian actors and the affected community.



◂ Key Message

Information is a vital commodity for any action in disaster management. Being guided with the right information will help organizations deliver basic services during response and relief and avoid inappropriate assistance. However, several areas needs to be improved in the future to gain access to up to date and quality information such as improved mechanisms in information sharing; better coordination between government and non-government institutions; building local capacity in gathering, analyzing and utilizing information; and end-to-end approach in handling information.



APPENDICES

APPENDIX A. GLOSSARY

Hazard	potential threat, which can cause loss of life, injury, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage when it occurs
Vulnerability	condition or sets of condition that impose on a community to live in disaster prone areas. There are certain underlying causes which impose communities to live in fragile environment. There are many aspects of vulnerability, arising from various physical, social, economic, and environmental factors. Examples may include poor design and construction of buildings, inadequate protection of assets, lack of public information and awareness, limited official recognition of risks and preparedness measures, and disregard for wise environmental management
Capacities	strengths and resources, which communities use to withstand or face such kind of disasters. Capacity may include infrastructure and physical means, institutions, societal coping abilities, as well as human knowledge, skills and collective attributes such as social relationships, leadership and management
Risk	the probability of occurrence that a community will be affected if a hazard occurs and it will cause negative consequences Risk = (Hazard x Vulnerability)/Capacity
Elements at Risk (EAR)	persons, buildings, crops or other societal components exposed to known hazard, which are likely to be adversely affected by the impact of the hazard. For risk assessment, it is essential to collect data about such elements as it will help to prioritize while the risk reduction measures have to be proposed
Disaster	a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources
Disaster Management	a comprehensive term which covers all three phases of the disaster management cycle and these are pre, during and after the disasters. Therefore all activities like response, recovery, reconstruction, preparedness, mitigation and preventions are included in disaster management cycle
Disaster Risk Management	a systematic application of management policies, procedures and practices to identify, analyze, assess, treat, monitor and evaluate risks
Preparedness	knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions. The set of activities and precautions that a community collectively takes before a disaster occurs, in order to reduce the impact of a disaster, and to cope with it efficiently
Relief	a measure required in search and rescue of survivors, as well to meet the basic needs for shelter, water, food & health care. Intervention aimed at meeting the immediate needs of the victims of a disastrous event

Response	the provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected
Rehabilitation	the restoration of an entity to its normal or near-normal functional conditions after the occurrence of a disaster e.g. shelter house, temporary house, temporary school, re-establishing essential services
Reconstruction	permanent measures to repair or replace damaged dwellings and infrastructure and to set the economy back on course e.g. construction of new houses, schools and infrastructure according to the building code
Recovery	the restoration and improvement of facilities, livelihoods and living conditions of disaster-affected communities including efforts to reduce disaster risk factors
Risk Assessment	a methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend
Early Warning	a set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss
Capacity Building Activities	efforts aimed to develop human skills or societal infrastructures within a community or organization needed to reduce the level of risk
Public Awareness	a process of informing the general population, increasing levels of consciousness about risks and how people can act to reduce their exposure to hazards. This is particularly important to public officials in fulfilling their responsibilities to save lives and property in the event of disaster
Evaluation	An assessment that identifies, reflects upon and judges the worth of the effects of what has been done. The aim is to determine the relevance and fulfilment of objectives, developmental efficiency, effectiveness, impact and sustainability (OECD/DAC 2002)
Logical framework (logframe)	A table (matrix) summarizing a project/programme's operational design, including: the logical sequence of objectives to achieve the project/ programme's intended results (activities,outputs, outcomes and goal), the indicators and means of verification to measure these objectives, and any key assumptions.
Monitoring	The routine collection and analysis of information to track progress against set plans and check compliance to established standards. It helps identify trends and patterns, adapt strategies and inform decisions for project/ programme management
Qualitative data/methods.	Analyses and explains what is being studied with words (documented observations, representative case descriptions, perceptions, opinions of value, etc). Qualitative methods use semi-structured techniques (e.g. observations and interviews) to provide in-depth understanding of attitudes, beliefs, motives and behaviours. They tend to be more participatory and reflective in practice.
Quantitative data/methods	Measures and explains what is being studied with numbers (e.g. counts, ratios, percentages, proportions, average scores, etc.). Quantitative methods tend to use structured approaches (e.g. coded responses to surveys) that provide precise data that can be statistically analysed and replicated (copied) for comparison.

M&E plan	A written plan providing an overview of the specific activities and processes that will be performed for the monitoring and evaluation of a specific programme, project, or group of projects.
Objective	A summary statement detailing what the programme or project should achieve given its time frame and resources.
Triangulation	The use of three or more theories, sources or types of information, or types of analysis to verify and substantiate an assessment
Validation	The process of cross-checking to ensure that the data obtained from one monitoring method are confirmed by the data obtained from a different method.
Reliability	Consistency or dependability of data and evaluation judgements, with reference to the quality of the instruments, procedures and analyses used to collect and interpret evaluation data.
Qualitative Data	Narrative text-based information, collected systematically. Collected through: interviews, focus groups, participatory tools, semi-structured questionnaires, observation or document review.
Quantitative data	Numeric information that can be used for statistical analyses. Collected through: tests/assessments, secondary source/data review (ie, pre-existing data sources), surveys/questionnaires.
Impact	Positive or negative, primary or secondary long-term effect produced by a development intervention, directly or indirectly, intended or unintended.
Goal	A summary statement of what the programme or project is contributing towards in the longer-term achievement of a cause. The goal usually relates to the broader impact, or is often seen as the ideal situation, state or condition.
Focus group discussion	A purposeful, facilitated discussion between a group of participants with similar characteristics. Focus group discussions are usually carried out within a fixed time frame, and focus on a limited number of questions.
Effectiveness	The extent to which an intervention's objectives were achieved, or are expected to be achieved, taking into account their relative importance

APPENDIX B

Appendix B.1

Resources for Disaster Assessment, Training & Planning

Materials Developed by	Material Detail	Source/Available Online at
IFRC	How to do a VCA: A practical step-by-step guide for Red Cross Red Crescent staff and volunteers	*http://www.ifrc.org/Global/Publications/disasters/vca/how-to-do-vca-en.pdf*
World Vision	Disaster Risk Reduction Toolkit	*http://www.wvi.org/disaster-risk-reduction-and-community-resilience/publication/disaster-risk-reduction-toolkit*
American Red Cross	Tools and resources on preparing for any type of hazard such as chemical emergency, drought, earthquake, fire, landslide, storm, tsunami, etc. (available in Chinese)	*http://www.redcross.org/prepare/disaster-safety-library*
IFRC	Increasing Community Disaster Awareness: Disaster Preparedness Training Program	*http://www.ifrc.org/Global/Inccdp.pdf*

Appendix B.2

Different Types of Hazards

Natural hazards: natural process or phenomena occurring in the biosphere that may constitute a damaging event. Natural hazards can be classified by origin: geological, hydro-meteorological and biological. Geological hazards includes earthquake, tsunamis; Volcanic activity and emissions; Mass movement i.e. landslides, rock fall, liquefaction, submarine slides; Subsidence, surface collapse, geologic fault activity. Hydro-meteorological hazards includes Floods, debris and mudflows; Tropical cyclones, typhoon, storm surges, thunder; Drought, desertification, forest fires, heat waves, sand dust storms; Permafrost.

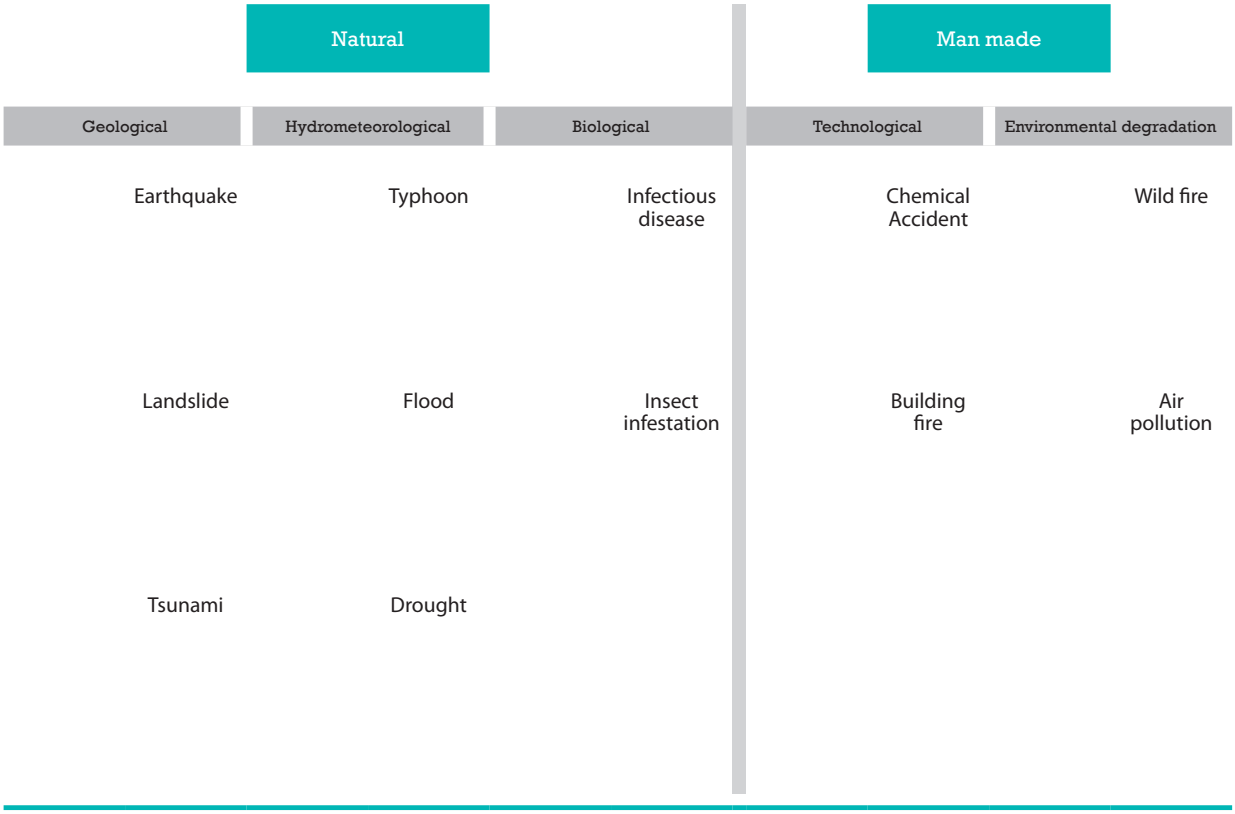
Biological hazards: processes or organic origin or those conveyed by biological vectors, including exposure to pathogenic micro-organisms, toxins, and bioactive substances. Outbreaks of epidemic diseases, plant or animal contagion, and extensive infestations.

Human-made hazards: divided into technological and environmental degradation. Technological hazards are danger originating from technological or industrial accidents, dangerous procedures, infrastructure failures or certain human activities, which may cause loss of life or injury, property damage, social and economic, disruption or environmental degradation. Sometimes referred to as anthropogenic hazards. Some examples: industrial accidents; chemical spills, structural collapses, explosions, gas leaks, poisoning, radiation, etc. and transport accidents by air, rail, road, water transport, etc.; and miscellaneous accidents such as collapse of non-industrial structures, explosions, fire, nuclear accidents etc. Environmental Degradation are processes induced by human behavior and activities (sometimes combined with natural hazards), that damage the natural resource base or adversely alter natural processes or ecosystems. Potential effects are vane and may contribute to an increase in vulnerability and the frequency and intensity of natural hazards.

Some examples are: land degradation, deforestation, desertification, wild land fires, loss of biodiversity; land, water and air pollution; climate change; sea level rise; ozone depletion.

Secondary Hazards and New Hazards: hazards that can cause secondary hazards. For example, earthquake causes landslides; drought might cause epidemics and pest infestation; floods might carry pollution and cause epidemics; and so on. In such instances, one should consider the main force of primary hazard. Although hazard assessment is based on past hazard patterns, new or just emerging threats should also be considered. Possible reasons for new hazards are as follows (a) natural: changes in the pattern of weather leading to new forms of drought and floods; (b) economic: fluctuations in the value of currency affecting livelihoods, trade related policy changes, structural adjustment measures; (c) social and political trends: changes in policies, subsidy programs, relocation of people; (d) structural changes: decentralization/centralization, conflicts; (e) industrial hazards: chemical accidents, poisoning and; (f) New forms of epidemics: SARS, Avian Influenza.

FIGURE 24. Classification of Hazards



Appendix B.2.1. Nature and Behavior of Hazards

Nature/ Behavior	Descriptions
Origin	The factors which create or result to a hazard. What disasters have been experienced in the past? What are other threats? What are emerging threats?
Force which can damage	Wind; water (heavy rain, flood, river overflow, storm surge, epidemic); land (slide, mudflow, lahar), seismic (ground shaking, ground rupture, liquefaction, tsunami), industrial/technological; conflicts; others.
Potential Strength of the Hazard	Intensity and magnitude of an earthquake.
Warning Signs & Signals	Scientific and indigenous (local) signs that a hazard event is likely to happen.
Forewarning	Time gap between warning signs and impact of the hazard.
Speed of Onset	Rapidity of arrival of a hazard and its impact (very slow such in 3-4 months in the case of drought; 3-4 days in the case of cyclone; very rapid for earthquake.
Frequency	How often is it likely to occur? Does the hazard occur seasonally, yearly, once every 10 years, once in a lifetime, etc.?
Seasonality	Occurrence of a hazard at particular time of the year (winter or summer season; in November to April).
Duration	How long the hazard impact could last or is felt (earthquake and aftershocks; days/weeks/months that area is flooded; length of period of military operations.

Appendix B.2.2. Some Quantitative Data in Specific Hazards

Natural Hazards	Event Parameters	Site Parameters
Drought	Affected Area (km2)	Rainfall, Access to water
Earthquake	Magnitude	Seismic intensity, peak ground acceleration (PGA), Soft soils
Flood	Flooded Area (km2) Volume of water (m3)	Depth of water (m), Altitudes of land
Landslide	Volume of dislocated material (m3)	Potential for ground failure, Location of houses, roads

Appendix B.3.

Examples of Data & Information Sources that can be accessed through the UN-SPIDER website[43]

Name of the dataset	Data Type	Costs
Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER Data Archive) (NASA)	satellite data or aerial image	free
Daily rainfall estimates (NOAA-CPC)	hazard specific data	free
Gridded Population of the World (NASA)	land use, land cover data	free
Active Fire Data MODIS FIRMS (NASA)	hazard specific data	free
Actual Evapotranspiration Anomaly (FEWS NET - USGS, USAID)	hazard specific data	free
Aerosol Profile (WDC-RSAT - DLR)		free
Agricultural Stress Index System (ASIS, FAO)	hazard specific data	free
Agrometeorological Data in SPIRITS format (JRC-IES)	hazard specific data	free
AIRS precipitation (NASA)	hazard specific data	free
Baseline data (WFP)	baseline data, elevation, hazard specific data	free
Bio-geophysical products of global land surface (Copernicus Global Land Service)	land use, land cover data	free
Burned Area Product (Copernicus Global Land Service)	hazard specific data, land use, land cover data	free
Cartographic Section of United Nations	hazard specific data, land use, land cover data	free
Central Asia Data Portal (FEWS NET - USGS, USAID)	hazard specific data	free
Climate Data Online (NOAA)	hazard specific data	free
Crisis Map (Google)	hazard specific data	free
Crop Explorer (USDA)	hazard specific data, satellite data or aerial image	free
Crop monitoring - GEOGLAM (GEO)	hazard specific data	free

43 UN-SPIDER Available at *http://www.un-spider.org/links-and-resources/data-sources*

The UN-SPIDER website provides many resources for disaster management and emergency such as data, GIS and Remote Sensing Software, external trainings, as well as different institutions and their roles on disaster management. Some of these are mentioned in the Table below.

	Hazard	Data accessibility
	Drought, Extreme Temperature, Severe Storm	export data, export map, statistical data (e.g. graphs)
	Drought, Flood, Severe Storm	export data
		export map, statistical data (e.g. graphs), visualization of data (e.g. web GIS or real time monitoring)
	Forest Fire	export data, export map, visualization of data (e.g. web GIS or real time monitoring)
	Drought	export data, visualization of data (e.g. web GIS or real time monitoring)
	Pollution, Volcanic Eruption	export data, export map, statistical data (e.g. graphs), visualization of data (e.g. web GIS or real time monitoring)
	Drought, Flood, Forest Fire	statistical data (e.g. graphs), visualization of data (e.g. web GIS or real time monitoring)
	Drought, Extreme Temperature, Flood	export data
	Drought, Flood, Severe Storm	export data, export map, visualization of data (e.g. web GIS or real time monitoring)
	Drought, Extreme Temperature, Flood, Severe Storm	export data, export map, visualization of data (e.g. web GIS or real time monitoring)
	Drought, Extreme Temperature, Flood, Forest Fire	export data, export map, visualization of data (e.g. web GIS or real time monitoring)
	Drought, Extreme Temperature, Forest Fire	export data, export map
		visualization of data (e.g. web GIS or real time monitoring)
	Drought, Flood, Forest Fire, Mass Movement	export data, visualization of data (e.g. web GIS or real time monitoring)
	Drought, Epidemic, Extreme Temperature, Flood, Pollution, Severe Storm	export data, export map, visualization of data (e.g. web GIS or real time monitoring)
	Drought, Earthquake, Extreme Temperature, Flood, Forest Fire, Pollution, Severe Storm	visualization of data (e.g. web GIS or real time monitoring)
	Drought, Flood	visualization of data (e.g. web GIS or real time monitoring)
	Drought	export data, visualization of data (e.g. web GIS or real time monitoring)

Cyclone breakpoints (NOAA-GTWO)	hazard specific data	free
Daily Georeferenced MODIS Images (USDA)	satellite data or aerial image	free
Data Discovery Portal (WASCAL)	baseline data, hazard specific data, land use, land cover data	free
DEWA/GRID-Geneva (UNEP)	land use, land cover data	free
Digital Elevation Model - SRTM 1 Arc-Second 30m (NASA, NGA)	elevation	free
Digital Elevation Model - SRTM 3 (NASA)	elevation	free
Digital Elevation Model - SRTM 4.1 (CGIAR-CSI)	elevation	free
Digital Elevation Model - SRTM X-band (DLR)	elevation	free
Drought Index Map for Vegetation-US Only (VegDRI - USGS)	hazard specific data, land use, land cover data	free
Drought Monitoring (EOSDIS Worldview - NASA)	hazard specific data	free
Dust Storm Monitoring, Air quality (EOSDIS Worldview - NASA)	hazard specific data	free
Earth Explorer(USGS)	baseline data, elevation, land use, land cover data, satellite data or aerial image	free
Earth System Data and Information Services Center (GES,NASA)	hazard specific data, land use, land cover data	free
Earthquake Maps (Real Time Earthquake Map - USGS)	hazard specific data	free
East View Geospatial Data (EVG)	baseline data, elevation, land use, land cover data, satellite data or aerial image	paid
eMODIS NDVI in SPIRITS format (JRC-IES)	hazard specific data	free
Enhanced Combined Drought Index in Southeast Asia - experimental version (TU Vienna)	hazard specific data	free
Envisat/ASAR imagery (ESA)	satellite data or aerial image	free with restrictions
EO Portal (EUMETSAT)	satellite data or aerial image	free
EO-1 Sensor Web	satellite data or aerial image	free
ETOPO1 Global Relief Model (NOAA)	elevation	free

	Flood, Severe Storm	export data, export map, visualization of data (e.g. web GIS or real time monitoring), web processing/cloud computing
		export data
	Drought, Epidemic, Extreme Temperature, Flood, Forest Fire, Insect Infestation, Pollution, Severe Storm	export data, export map, statistical data (e.g. graphs)
		export data, statistical data (e.g. graphs), visualization of data (e.g. web GIS or real time monitoring)
		export data
	Flood, Mass Movement	export data
	Flood, Mass Movement	export data
	Flood, Mass Movement	export data, export map
	Drought	export map, web processing/cloud computing
	Drought	export data, export map, visualization of data (e.g. web GIS or real time monitoring)
	Pollution, Volcanic Eruption	export data, visualization of data (e.g. web GIS or real time monitoring)
	Drought, Earthquake, Epidemic, Extreme Temperature, Flood, Forest Fire, Mass Movement, Pollution, Severe Storm, Tsunami, Volcanic Eruption	export data, export map, statistical data (e.g. graphs), visualization of data (e.g. web GIS or real time monitoring), web processing/cloud computing
	Drought, Flood, Pollution, Severe Storm	web processing/cloud computing
	Earthquake	export data, export map, visualization of data (e.g. web GIS or real time monitoring)
		export data, export map
	Drought	export data
		visualization of data (e.g. web GIS or real time monitoring), web processing/cloud computing
	Drought, Earthquake, Epidemic, Extreme Temperature, Flood, Forest Fire, Mass Movement, Pollution, Severe Storm, Tsunami, Volcanic Eruption	export data
		export data
		export data
		export data, export map

Appendix B.4

Tools

SEMI-STRUCTURED INTERVIEWS

Discussions in an informal and conversational way. They do not use a formal questionnaire but at the most a checklist of questions as a flexible guide. Various types of semi-structured interviews are group interview, individual interview, key-informant interview, and focused group discussion (FGD) with specific purposes mentioned below:

Group interview: to obtain community level information, to have access to a large body of knowledge, not useful for sensitive issues.

Individual interview: to obtain representative, personal information. May reveal differences/ conflicts within an area.

1. Key-informant interview: to obtain special knowledge about a particular topic; such as interviewing a Mayor about procedures and policies of the City.

2. Focus group discussion: to discuss specific topics in detail with a small group of persons who are knowledgeable or who are interested in the topic. People can also be grouped according to gender, age, owners of resources, responsibilities in disaster management, among others.

Process:

1. Prepare a team of 2 - 4 members.

2. Prepare issues to ask in advance.

3. Select one person to lead the interview.

4. Ask questions in an open-ended way (what, why, who, when, how, how do you mean, anything else?).

5. Ask for concrete information and examples.

6. Try to involve in different people (if present).

7. Pay attention to group dynamics.

8. Ask new (lines) of questions, arising from answers given.

9. Make notes in a discreet way.

HISTORICAL PROFILE

Gathering information about what happened in the past to get insight in past hazards, changes in their nature, intensity and behavior; understand present situation in the area (causal link between hazards and vulnerabilities); and to make people aware of changes.

Process:

1. Plan a group discussion and ensure that key-informants (old people, leaders, and teachers) are present. Invite as many people as possible, especially the young ones, for them to hear the history of their community.

2. Ask people if they can recall major events in the community, such as:

   - major hazards and their effects
   - changes in land use (crops, forest cover, etc.)
   - changes in land tenure
   - changes in food security and nutrition
   - changes in administration and organization
   - major political events

3. The facilitator can write the stories down on a blackboard or craft paper in chronological order.

SEASONAL CALENDAR

Making a calendar showing different events, experiences, activities, conditions throughout the annual cycle to identify periods of stress, hazards, diseases, hunger, vulnerability, etc.; identify what people do in these periods, how they diversify sources of livelihood, when do they have savings, what are their coping strategies; identify gender specific division of work, in times of disasters and in normal times.

Process:

1. Identify a team of area members.

2. Use "blackboard" or craft paper. Mark off the months of the year on the horizontal axis. Ask people to list sources of livelihood, events, conditions, etc., and arrange these along the vertical axis.

3. Ask people to enumerate all the work they do (e.g. plowing, planting, weeding, etc.) for each source of livelihood / income by marking months and duration, adding gender and age.

4. Facilitate analysis by linking the different aspects of the calendar: how do disasters affect sources of livelihood? When is workload heaviest? Ask for seasonal food intake; period of food shortage, out-migration, etc.

5. You can continue the discussion on coping strategies, change in gender roles and responsibilities during times of disasters, or other issues you think are relevant.

6. Contains information about seasonal changes and related hazards, diseases, community events and other information related to specific months of the year.

HAZARD AND SOCIAL MAPPING

Making a spatial overview of the area's main features to map, facilitate communication and stimulate discussions on important issues in the community. Maps can be drawn for many topics such as spatial arrangement of houses, fields, roads, rivers, and other land uses; social map (houses, social facilities and infrastructure, i.e. temple, stores, rice mills, school, pharmacy, trails and roads, water pumps, irrigation, recreational facilities, etc.); hazard map, elements at risk, safe areas, etc; resource map showing local capacities; accessibility map (route and condition of access to evacuation center or shelter); mobility map; and community risk assessment.

Process:

1. Decide what kind of map should be drawn.

2. Find men and women who know the area and are willing to share their experiences.

3. Choose a suitable place (ground, floor, paper) and medium (sticks, stones, seeds, pencils, chalk) for the map.

4. Help the people get started but let them draw the map by themselves.

TRANSECT WALK

Systematic walk with key-informants through the community to explore spatial differences or land use zones by observing, asking, listening and producing a transect diagram. Visualizes interactions between physical environment and human activities over space and time. Identifies danger zones, evacuation sites, local resources used during emergency periods, land use zones, etc; seeks problems and opportunities.

Process:

1. Based on map, select a transect line (can be more than one).

2. Select a group of six to ten people who represent the cross-section, and explain purpose.

3. During walk, take time for brief and informal interviews at different places in the transect.

4. Focus on issues like land use, proneness to particular disasters, land tenure, and even changes in the environment to draw a historical transect.

PROBLEM TREE

Flow diagram showing relations between different aspects. It identifies local major problems / vulnerabilities as well as root causes and effects

Process:

1. From other tools and interviews, various concerns and problems are identified.

2. Give all people small pieces of paper/card and ask them to write one major problem on each paper/card, and to put these on the wall (people can draw problems in case they do not know how to write and read).

3. Ask two or three volunteers to group the problems according to similarity or interrelationship.

4. Now the making of the problem tree can start: the trunk represents the problems; the roots are the causes; the leaves are the effects.

   › Ask why issues on the cards are problems. Ask "but why?" after each explanation to arrive at the root causes.

   › To arrive at the effects, ask for the consequences of each problem.

VENN DIAGRAM

Making a diagram that shows key-organizations, groups and individuals in a community, nature of relationship and level of importance. Identify organizations (local & outside), their role/importance, and perceptions that people have about them. Identify individuals, groups, organizations that play a role in disaster response and can support community.

Process:

1. Become familiar in advance with the names of the organizations.

2. Ask people to determine criteria for the importance of an organization and to rank them according to these criteria.

3. Ask people to what extent organizations are linked to each other; note kind of relationship.

4. Draw circles to represent each organization or group; size of circle indicates importance.

5. Continue focus group discussion on history of organizations; activities undertaken in community; how well do they function; how good is coordination; which organizations, groups, individuals are important in times of disasters, community level decision making mechanisms, etc.

RISK MATRIX (RANKING)

A matrix is a double entry grid that can be used to analyze two sets of variables such as occurrence of hazard over a given period and its impact resulting to the analysis of risk. This is done to identify the characteristics of hazard or risk; rank the hazard or risk based on their characteristics; identify differences in perceptions and reasons; encourage problem solving through discussion and ranking the problems and the solutions; for comparative studies.

Process:

1. Criteria or characteristics for comparing items are listed by the community members.

2. Criteria used are put on one side of the matrix or table (y-axis).

3. Items being compared are put on the x-axis.

4. Points are given by putting stones, seeds, etc.

5. Tools are used to prioritize hazards or disaster risks, needs or options. There are many variations of ranking. The example below uses a set of criteria to determine the impact of the disasters on people's lives. For example, beans could be used to rank the hazards. Ten beans are used to indicate the most significant indicator and 1 bean to indicate the least significant indicator.

RISK RANKING

A tool to facilitate prioritizing issues and concerns specific to the area in question. Problems, risks, solutions concerns might not be common for the entire community and perceptions differ according to class, gender, religion, ethnicity, etc.

Process:

1. Set up a matrix listing issues along horizontal & vertical axis.

2. Give each topic a letter or symbol.

3. Ask groups to compare urgency and issue A on the horizontal axis with issues B, C, D, E & F on the vertical.

4. Write in the body of the symbol, which corresponds to the most important between two issues.

5. After completing all boxes count the time each letter appears in the matrix.

6. The more times one letter appears, the higher its urgency.

7. Discuss similarities & differences in priorities of various groups.

Appendix B. 5.

Example of Template to Identify Capacities in an Area

Components for Analysis	Information/Guide Questions	Answers
Institutional Arrangements	Is there an institution that is in-charge of DM at the province/ district and community levels? What is it called? What is its composition? Describe its structures and functions, including working with other institutions to cascade policy, if relevant.	
	Describe the strengths and limitations of the institutions with regard to DRM (response/relief, rehabilitation, reconstruction, preparedness, prevention and mitigation).	
Laws, Policies, Regulations Disaster Risk Management (DRM) Plans	Are there existing laws, policies, and regulations governing disaster management, including DRM, from the national to the local (province/district, community)? Describe them.	
	Describe the level of implementation at the local (province/ district) and community level.	
	Are there disaster risk management and adaptation plans at the province/district and community levels?	
	Describe the DRM Plan. Is it a preparedness plan, a contingency plan, or a mitigation plan – or does it cover all these?	
	Describe the extent of the plans' coverage of hazards and vulnerabilities already identified and the level of implementation. Identify gaps and challenges in the implementation.	
Early Warning System	Is there an early warning system at the province/district and community level? Is it functional?	
	Do people understand the system? Why or why not?	
	Has the system helped decrease incidence of death due to disasters since its establishment? Why or why not?	
NGOs and CBOs	Are there NGOs and community-based organizations in the area? Name them.	
	What work do they do in the area? Do they integrate DRR and Climate Change Adaptation in their work	
	Do NGOs working in the area collaborate with one another? Identify the relationships	
Capacity Building	What capacity building initiatives have been provided to the government disaster management in-charge at the province/ district and community levels? What were these capacity building activities, and when were they held?	
	What capacity building initiatives have been provided to the CBOs? What were these capacity building activities, and when were they held? Who conducted them?	
	What DM activities have communities participated in? When were these held? Who conducted them?	

Appendix B.6

Example of Probability Matrix

Probability Rating	Probability in 50 years	Cycle of Occurrence Cycle of recurrence in years	Rating
High	82- 100%	1 -30	frequent
Medium	40 - 82%	30-100	medium
Low	0 - 40%	100-300	rare

Appendix C
MORE RESOURCES ON INFORMATION MANAGEMENT

Data Collection Tools		
Humanitarian Response	Kobo Toolbox	*https://www.humanitarianresponse.info/en/applications/kobotoolbox*
ACAPS	Qualitative and Quantitative Research Techniques for Humanitarian Needs Assessment An Introductory Brief	*http://www.parkdatabase.org/*
ACAPS	Technical Brief: Direct Observation and Key Informant Interview Techniques for primary data collection during rapid assessments	*http://www.parkdatabase.org/*
Data Manipulation		
UNOCHA	Mapping and Geospatial Analysis: tools and Examples	*https://www.humanitarianresponse.info/en/applications/tools/category/mapping-and-geospatial-analysis*
UNOCHA	Sattelite Imagery	*https://www.humanitarianresponse.info/en/applications/tools/category/satellite-imagery* *Open Street Maps* *http://www.openstreetmap.org/#map=5/51.500/-0.100* *MapAction:* *https://mapaction.org/* *Nepal Map Action:* *http://mapaction.org/component/mapcat/mapdetail/3891.html*
Humanitarian Response	Information Management Tools: Manual of Geospatial Data	*https://www.humanitarianresponse.info/system/files/documents/files/2014_ocha_geodata_manual_updated.pdf*
Assessments		

UNOCHA	Vulnerability Profile	Example: *https://www.humanitarianresponse.info/sites/www.humanitarianresponse.info/files/toolbox/files/In%20Focus%20Area%20C%20FQ2.pdf*
UNOCHA	Humanitarian Gap Analysis	*https://www.humanitarianresponse.info/en/applications/tools/category/humanitarian-gap-analysis*
UNOCHA	Assessment Design and Analysis	*https://www.humanitarianresponse.info/en/applications/tools/category/assessment-design-and-analysis*
UNOCHA	Most Affected Areas Maps and Tools	*https://www.humanitarianresponse.info/en/applications/tools/category/most-affected-areas-matrix-and-graphs*
UNOCHA	Myanmar Initial Flood Response Plan	*https://www.humanitarianresponse.info/system/files/documents/files/2015_aug-to-dec_myanmar_initial_flood_response_plan_en_0.pdf*
UNOCHA	Nepal Flash Appeal: Earthquake 2015	*https://www.humanitarianresponse.info/system/files/documents/files/nepal_earthquake_2015_revised_flash_appeal_draft_as_of_11june_10h.pdf*
UNOCHA	Fiji Flash Appeal: Tropical Cyclone Winston	*https://www.humanitarianresponse.info/system/files/documents/files/fiji_tc_winston_flash_appeal_final.pdf*
ESRI	ESRI training portal	*https://www.esri.com/training/*

World Vision

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