World Health Organization
Western Pacific Region

Western Pacific Regional Framework for Action for Disaster Risk Management for Health

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CONTENTS

ABBREVIATIONS

APSED   Asia Pacific Strategy for Emerging Diseases

DRM   disaster risk management

DRM-H   disaster risk management for health

IASC   Inter-Agency Standing Committee

IHR   International Health Regulations

ISO   International Organization for Standardization

NDMO   national disaster management office

FOREWORD

Disasters are increasing in frequency and intensity. They can be exacerbated by climate change, rapid urbanization and environmental degradation. Disasters impede sustainable development. This problem is particularly acute in the Western Pacific Region, which accounts for six of the top 10 countries most exposed to natural hazards, according to the 2014 *World Risk Report.*

The sixty-fifth session of the World Health Organization Regional Committee for the Western Pacific endorsed this *Regional Framework for Action for Disaster Risk Management for Health* in resolution WPR/RC65.R6 on Emergencies and Disasters.

The regional framework positions the health sector as a key actor in the broader disaster risk management agenda. This is of special significance considering the March 2015 United Nations World Conference on Disaster Risk Reduction, and upcoming meetings on the Sustainable Development Goals and the United Nations Framework Convention on Climate Change.

These three global events send a clear signal that world leaders are serious about scaling up efforts to manage disaster risks from all hazards. Leaders have committed to a multisectoral approach to build national and local resilience to disasters and are ready to mobilize the necessary resources.

The *Regional Framework for Action for Disaster Risk Management for Health* recommends health sector actions for each of the four phases of the disaster risk management cycle – prevention, preparedness, response and recovery. Governments should select priorities on which to focus according to their own national disaster risk management plans, as well as the local context and potential hazards.

The future of our children depends on actions we take now. We must improve capacities to mitigate, manage and cope with disasters and disaster risks related to any hazard – from typhoons to earthquakes and air pollution to chemical contamination.

If this undertaking is to be successful in the Western Pacific Region, we must identify and adopt innovative ways to undertake multisectoral actions. Governments must take the lead, working with the support of local communities, national and international partners, and the private sector.

Shin Young-soo, MD, Ph.D.
Regional Director

EXECUTIVE SUMMARY

The Western Pacific Region is the world's disaster epicenter. According to the 2014 *World Risk Report,* six of the top 10 countries most exposed to natural hazards such as earthquakes, floods, tsunamis and typhoons are in the Western Pacific Region. Furthermore, booming economies expose large geographical areas and dense populations to technological hazards, such as air pollution, structural collapses, transportation accidents and the contamination of agricultural crops by hazardous chemicals.

In recent years there has been a shift in emphasis from a reactive to a more proactive approach, encompassing the four phases of the disaster risk management (DRM) cycle: prevention, preparedness, response and recovery. Furthermore, the recognition of the central role of the health sector in managing risks related to all hazards has led to plans for disaster risk management for health (DRM-H). Responding to the World Health Assembly Resolution WHA64.10 calling on Member States to incorporate DRM-H programmes into their national and subnational health systems, and in consultation with Member States, experts and partners, this *Western Pacific Regional Framework for Action for Disaster Risk Management for Health* has been developed. The framework is designed to serve as a common regional tool to implement the health component of risk management across the four phases of the DRM cycle.

The framework identifies four key components

Governance, policy, planning and coordination

Policies and governance create a mechanism for accountability and a structure for decision-making during a disaster response. Even more importantly, these aspects help scale up the preventive and mitigation activities targeting hazards present in the different geographical areas of Member States. Equally, strong planning and coordination ensure that efforts are not duplicated and that there are no gaps in the response. Ministries of health must ensure that a national DRM-H policy is in place, take on a leadership role in health response during emergencies, and serve as a key member of their country's national disaster management authority because all disasters have consequences for health.

Information and knowledge management

The collection and analysis of existing information to document and map hazards and local vulnerabilities in various geographical areas, particularly for the health sector, are crucial functions to avoid new risks and mitigate existing risks. The availability of data is also key in the early phase of the response to large disasters. Sound and reliable information is absolutely necessary for effective decision-making across all the four phases of the DRM cycle.

Health and related services

Following a disaster, DRM-H must tackle a huge agenda that includes the dual challenge of meeting the population's new health needs caused by the disaster, and at the same time ensuring the regular delivery of preventive and curative services in spite of the new and difficult circumstances. Local capacity must be bolstered to link patients to care and ensure that health-care providers can continue to work and cope with an increased demand for health services following a disaster.

Resources

Human resources, supplies and finances are crucial to implement DRM-H. Each phase of an emergency response can require different materials, so it is important to pay particular attention to needs, especially as response operations are shifting to recovery.

This *Western Pacific Regional Framework for Action for Disaster Risk Management for Health* proposes a set of priority areas for actions to guide government decision-makers, stakeholders and international organizations in strategizing, planning and implementing health sector interventions across the DRM cycle. The framework aims to standardize DRM-H by creating a ubiquitous language; presenting recommended actions for the health sector; promoting interaction among regional, national and international DRM-H agreements and frameworks; facilitating multi-sectoral coordination; and advocating for sustainable investment and resource mobilization in DRM. Ultimately, the framework seeks to improve regional and national capacities to plan and implement DRM-H in order to contribute to regional health and human security.

1. Introduction

Four or five decades ago, disaster management was largely a reactive action launched during and after an event, directly addressing the needs of those affected. Signs of a more proactive approach emerged in the 1970s with a focus on managing risks related to various hazards, including specific activities for all four phases of the disaster risk management (DRM) cycle: prevention, preparedness, response and recovery. Indeed, since the declaration in 1990 by the United Nations General Assembly of the International Decade for Natural Disaster Reduction, there has been a greater emphasis on DRM.

In recent decades, disasters associated with hydrometeorological hazards are becoming more frequent and of higher intensity, with devastating effects especially among developing countries.*(1,2)* The world's poor are disproportionately affected by these events, and the most vulnerable and marginalized people in these countries bear the brunt.*(3,4)* Worldwide, loss of life from natural and technological disasters is far higher among less-developed countries than it is among developed countries. Within each country, the poor are most severely affected, even in developed countries.*(5,6)*

The increase in disaster risks has influenced the paradigm shift from a purely reactive to a more proactive approach. In fact, DRM focusing on risk reduction – both prevention and preparedness – has become a central element of the *Hyogo Framework for Action (2005–2015).(7)* Countries are now using a more comprehensive and long-term approach to identify hazards, assess vulnerabilities and prepare exposed communities for disasters before they occur. A new post-Hyogo agenda for disaster risk reduction has begun to emerge, intended to manage emerging risks and minimize existing risks. It is clear that the health sector must take a more active role in disaster risk reduction, with strong linkages to other sectors and an emphasis on enhancing partnership among governments, communities and organizations. DRM has emerged in recent years as a core element of sustainable development.*(8)*

Reducing risk requires long-term engagement in the national development process,*(9)* but the actual work of disaster risk reduction is largely a task for local actors.*(10)* These two aspects need to be considered and properly reconciled.

The shift to disaster risk management for health (DRM-H) is crucial to the 37 countries and areas of the Western Pacific Region. Droughts, earthquakes, floods, tsunamis and typhoons regularly impact these countries and over recent decades have claimed thousands of lives and caused hundreds of billions of dollars in damages and losses. These disasters also inhibit sustainable development. The occurrence of these events globally is expected to increase, largely due to climate change, environmental degradation and an increasing degree of human vulnerability to all hazards. (Annex 1 provides definitions for disasters and the classification of hazards.)

In responding to World Health Assembly Resolution WHA64.10 on *Strengthening national health emergency and disaster management capacities and resilience of health systems* and the increasing need of Member States to develop or update their own DRM-H plans, the *Western Pacific Regional Framework for Action for Disaster Risk Management for Health* was developed to guide national and regional efforts in strengthening DRM-H. The framework was informed by a series of consultations with Member States, technical experts and partners, including the first regional health cluster forum on humanitarian emergencies in 2011 in Kobe, Japan, the regional meeting on DRM-H in December 2012 in Manila, Philippines, and the Pacific workshop on DRM-H conducted in 2014. The framework outlines recommended actions on which to focus and proposes a set of related activities across its main components to guide governments, in particular ministries of health, in this effort, with the ultimate goal to enhance health and ultimately human security in the Region.

2. Disaster risks in the Western Pacific Region

The Western Pacific Region is the largest of the six WHO regions and home to more than 1.8 billion people, more than one quarter of the world's population. It stretches over a vast area, from China in the north and west, to New Zealand in the south, and French Polynesia in the east. The 37 countries and areas of the Region are also quite diverse, ranging from those that are large landmasses to others that are remote coral atolls, and include countries that range from the top to the bottom quartile of the Human Development Index.

The Western Pacific Region is the most disaster-prone area in the world. Six of the top 10 countries worldwide most exposed to disaster risks are located in the Region.*(11)*

More typhoons form in the tropical western regions of Pacific Ocean than anywhere else in the world. In the Western Pacific Region more than 25 tropical storms develop each year, and about 18 become typhoons.*(12,13)* Over the past 100 years, seven out of the 10 largest flood disasters in the world have occurred in the Western Pacific Region, and these seven events comprised 98.5% of all deaths for this same group.*(14)*

Some 90% of recorded tsunamis have occurred in the Pacific Ocean, which is bordered by the so-called "Ring of Fire", comprised of major geological subduction zones where 75% of the world's active and dormant volcanoes are located. Great trans-Pacific tsunamis are typically caused by massive earthquakes located in these subduction zones and occur at mean intervals of once a decade.*(15)* In the 100 years between 1895 and 1995, there were 454 tsunamis recorded in the Pacific Ocean, the deadliest 94 of which killed more than 51 000 people.*(16)* In 2004, a single tsunami caused by a 9.0 magnitude earthquake off the coast of Indonesia killed an estimated 240 000 people and displaced over 1 million.*(17)*

Until the 1970s, major chemical accidents occurred predominantly in industrialized countries, where there was a much higher concentration of industries. Since then, the number of accidents in developing nations has increased steadily, even though a far greater number of industries were still to be found in industrialized countries.*(14)* During the past 100 years, four out of the world's 10 deadliest technological disasters – involving 47.7% of deaths among this group of events – occurred in the Western Pacific Region.*(14)* (Annex 2 presents the occurrence and impact of geological and hydrometeorological disasters worldwide and in the Western Pacific Region.)

3. Global and regional developments

In May 2011, the World Health Assembly adopted Resolution WHA64.10 on *Strengthening national health emergency and disaster management capacities and resilience of health systems.* The resolution "urges Member States to strengthen all-hazards health emergency and disaster risk-management programmes (including disaster risk-reduction, emergency preparedness and response) as part of national and subnational health systems...to improve health outcomes, reduce mortality and morbidity, protect health infrastructure and strengthen the resilience of the health system and society at large...". The resolution also called upon the WHO Secretariat to "provide the necessary technical guidance and support to Member States and partners for developing health emergency and disaster risk-management programmes at national, subnational and local levels".

3.1 Global frameworks relevant to disaster risk management for health

Since the 1990s, disaster management has moved beyond simple emergency response to encompass a broader effort in disaster risk management (DRM), emphasizing prevention, preparedness, response and recovery. It also has become clear in recent years that the health sector needs to take a more active role in disaster risk reduction, with specific plans and programmes to manage and mitigate the health impact of disasters. In order to be effective, disaster risk management for health (DRM-H) needs to be incorporated into the plans and programmes of existing national disaster management agencies or similar agencies in individual countries.

Member States recognize the urgent need to move from simple emergency response to DRM-H and to make long-term investments in improving health system capacities

to contribute to the prevention of and the response related to natural and human-induced hazards.

Annex 1 presents a revised classification of hazards organized in two generic groups, natural and human-induced hazards.*(14,18,19)* Geological, hydrometeorological, biological and extraterrestrial hazards are groups of natural hazards, while technological and societal groups are those that are human induced. The classification then presents the main types, subtypes and some examples of sub-subtypes of hazards for each of these five groups.

The commitment of Member States to enhance national and global efforts in managing disaster risks is expressed in various international frameworks and treaties, such as the *Hyogo Framework for Action (2005–2015) (20)*, the *Sendai Framework for Disaster Risk Reduction 2015–2030,* the *International Health Regulations (2005) (21)*, the *United Nations Framework Convention on Climate Change (22)* and the *Kyoto Protocol* of 1998, which entered into force in 2005. *(23)* Other strategic documents such as the *Humanitarian Response Review (2005) (24),* provided the key analysis and considerations on which the humanitarian reform has been built.

3.2 Regional frameworks relevant to disaster risk management for health

In line with the requirements of the *International Health Regulations (2005)*, also known as IHR (2005), the *Asia Pacific Strategy for Emerging Diseases* (APSED) was developed in 2005 to meet the challenges of emerging diseases that pose serious threats to regional and global health security. APSED was updated in 2010 to expand its capacity development scope from the original five capacity areas (surveillance and response, laboratory, zoonoses, infection control, and risk communications) to also include public health emergency preparedness and regional preparedness, alert and response, and monitoring and evaluation. APSED drives the development of the generic core capacities that meet the obligations, spelled out in IHR (2005), for countries in the Region, including establishing event-based surveillance systems, building emergency operation centres within the ministry of health, and strengthening response logistics and risk communications. All of these capacities are relevant to DRM-H. The *Western Pacific Regional Framework for Action for Disaster Risk Management for Health* is crafted to contribute to an all-hazards approach in a step-by-step fashion, focusing on natural and human-induced hazards and gradually building strong synergies with in-country risk management capacities already in place to address emerging diseases and public health emergencies, as required under IHR (2005).

3.3   The regional consultation process

The WHO Regional Office for the Western Pacific, in close cooperation and collaboration with Member States, technical experts and partners, undertook a series of technical consultations to review lessons learnt in DRM-H and to identify common elements and priority areas for action. They included the first regional health cluster forum on humanitarian emergencies in 2011, as well as informal consultations on risk assessments, health service preparedness and safe hospitals. In 2012 there was a regional meeting on the draft *Western Pacific Regional Framework for Action for Disaster Risk Management for Health,* and in 2014 there were multi-country workshops on national planning on DRM-H, including a workshop on DRM-H in Pacific island countries and areas. The outcomes of this consultative process led directly to the development of the regional framework.

3.4   Disaster risk management for sustainable development

Countries and areas in the Western Pacific Region generally have strong government systems, with good health emergency and disaster management capacities. Many Member States have developed national plans for health sector preparedness and response, either as stand-alone plans or as part of a national disaster management plan. However, various challenges still exist in translating these national plans into strengthened capacities for DRM-H, especially at the local level.

In the Western Pacific Region, the need has been recognized and expressed by Member States and partners to shift from a reactive emergency response approach to a proactive DRM-H approach and to ensure sustainable investment in risk management.

4. The disaster risk management cycle

Risk management is activity directed towards assessing, preventing, controlling and monitoring risks. Strategies for risk management employ risk assessment, risk prevention and risk control measures that currently are widely used throughout many sectors of society, including administration, finance, industry and security. These measures are aimed at preventing new risks and reducing existing risks.

They may involve transferring the risk to another party, avoiding the risk, reducing the negative effect of the risk, or accepting some or all of the consequences of a particular risk. ISO 31000 is a set of international standards for risk management recently codified by the International Organization for Standardization (ISO).*(25)*

The framework is intended to guide capacity-building among all four phases of the DRM cycle: prevention, preparedness, response and recovery. These phases often overlap one another in time and in scope.

FIGURE 1.   The four phases of the disaster risk management cycle

PREVENTION   PREPAREDNESS

RECOVERY   RESPONSE

Disaster risk is defined as "the potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period". Disaster risk occurs as a result of the combination of:

- the population exposure to a hazard;

- conditions of susceptibility that are present; and

- insufficient capacity or measures to reduce or cope with the potential negative consequences.

The underlying drive of DRM is to reduce risk both to human life and to systems important to livelihood.*(9)* DRM-H is a comprehensive all-hazards approach that entails developing and implementing strategies for each phase of the DRM cycle, with an emphasis on the health sector's role in managing risks. DRM includes both pre-impact and post-impact disaster measures,*(10)* which encompass risk assessment, analysis and monitoring, as well as risk prevention, mitigation, control, reduction and transfer activities.*(27)*

4.1   Prevention

Prevention is the "outright avoidance of adverse impacts of hazards and related disasters". The prevention of disaster-related adverse health effects is largely accomplished by reducing exposures to and/or reducing human susceptibility to the hazards that may cause illness or injuries.

Exposures occur when people are located in close proximity to any hazard that may cause illness or injuries. For example, people exposed to floodwaters may be at risk for drowning or people exposed to chemical spills may be at risk for poisoning. Exposures may therefore be prevented by hazard avoidance (removing the hazard from those at risk) or exposure reduction (removing/protecting those at risk from the hazard).

Hazard avoidance can be considered a means of primary prevention because it seeks to eliminate the hazard altogether. One example of hazard avoidance is flood management, which seeks first to prevent the flood hazard from occurring. Alternatively, exposure reduction is considered a means of secondary prevention as it seeks to remove or protect people from the hazard that cannot be eliminated. One example of exposure reduction is population evacuation from an inundation, thereby protecting people from drowning.

However, not all people have the same risk when exposed to the same hazard. In other words, people may have differing susceptibility or vulnerabilities to the same hazard. For example, people who cannot swim are more susceptible to drowning when exposed to the same floodwaters, or children may be more susceptible to poisoning when exposed to the same dose as adults during a chemical spill.

4.2   Preparedness

Preparedness includes the knowledge and capacities to effectively anticipate, respond to and recover from the impacts of likely, imminent or current hazard events or conditions. Preparedness implies a behavioural approach focused on actions taken in advance of or during the early stages of a disaster in order to reduce its impact. In this sense, preparedness can be viewed as a means of secondary prevention. Effective preparedness increases the resilience of the population.

Preparedness measures most commonly include the following activities:

- monitoring of a hazard;
- development and use of early warning systems;
- emergency operations planning, including identification and preparation of critical health facilities;
- education and training;
- exercises and drills;
- procurement and storage of emergency equipment and supplies; and
- identification and preparation of evacuation sites.

4.3   Response

Response is 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 affected people. Response usually includes those actions immediately necessary to remove the affected population from ongoing exposure or risk of harm. Like preparedness, effective response increases the resilience of the population.

4.4 Recovery

Recovery is the restoration and improvement, where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors. As related to health systems, recovery includes not only restoration and rehabilitation of the health of individuals and the population, but also restoration of health services and systems, livelihoods and economies that support health. Recovery may also offer a unique opportunity to "build back better" in a manner that better serves to further reduce disaster risk as compared to pre-disaster levels, and at the same time addresses pre-disaster health inequalities or inequities.

The DRM-H cycle often presents different degrees of overlap across the four phases of the cycle, particularly across response and recovery phases, if the onset of the event is taken as a reference. While the prevention and preparedness phases have a daily dimension, both are fully part of the developmental agenda, are key in preventing new risks or mitigating existing risks, and are of fundamental importance in building communities resilient to disasters.

5. The core of the framework

5.1 Vision, mission and scope

VISION: Attain overall well-being of populations at risk of or affected by disasters due to any hazard and minimize the related death, injury, disease and disability.

MISSION: Strengthen regional, national and subnational capacities to address the health aspects of DRM, thus enhancing health and human security.

SCOPE: Encompass a strategic and systematic approach for strengthening the health sector contribution to DRM.

The scope of this framework is characterized by the following dimensions:

- **Multiple hazards:** the framework addresses the wide range of hazards that poses risks to the health of communities and has the potential to cause disasters.

- **Multi-level:** the framework includes actions at the local, subnational, national and regional levels.

- **Multisectoral:** the framework recognizes that DRM depends on the interaction of many different sectors and different societal systems and that the measures to manage the health risks related to natural and human-induced hazards are provided by many sectors, including the health sector, and by many disciplines within sectors.

The framework presents priority actions for the health sector to enhance risk management for natural and human-induced disasters. The framework provides a common language for common strategic approaches to be built across countries. It leverages existing national and regional capacities towards reducing disaster risks and also promotes synergies with existing national, regional, and international DRM-related agreements and frameworks.

5.2 Guiding principles

The framework is guided by the following principles:

- Adopt a whole-of-society, multisectoral and multi-institutional approach. This requires coordination, collaboration and partnerships in all phases of DRM-H implementation, reflecting the contribution of multiple sectors and disciplines to managing disaster risks to health and the mutual dependence of health on other sectors to deliver health services, for example, communications and logistics.

- Promoting an all-hazards approach through building ongoing core capacity development as required under IHR (2005) and further strengthening the capacities needed for DRM-H, considering that many key risk management activities are similar across various type of hazards, for example, risk assessment and communications, and emergency response operations.

- Adopt a proactive approach across the DRM cycle (prevention, preparedness, response and recovery), recognizing the essential and interlinked contribution of each phase to the health status of populations at risk of, affected by or recovering from disasters.

- Rely on country ownership, commitment and investment in achieving and sustaining the mission of DRM-H, with coordinated regional support.

- Consider community empowerment and resilience as the driving forces of DRM-H, as community members are the primary actors in DRM-H, and forge local partnerships among them, involving local government, civil society organizations, the private sector and individual citizens.

- Ensure planning, action and resource management are based on risk assessments of geological, hydrometeorological and technological hazards as indicated in the framework, building on the outcomes of the implementation of IHR (2005) and APSED, which address other hazards.

- Strengthen national and local health system functions and promote equity through the improvement of health information systems, the identification and monitoring of the health status of vulnerable groups, and the detection of pockets of low coverage of essential health services in high-risk areas for natural disasters.

- Position DRM-H as one of the pillars of health security, which is a core component of human security, together with economic, food, environmental, personal, community and political security.*(28–30)*

FIGURE 2.   Relationships of health security with the other components of human security

5.3   Audience

The *Western Pacific Regional Framework for Action for Disaster Risk Management for Health* is primarily intended to provide guidance to senior- and middle-level managers in ministries of health of the Western Pacific Region countries and areas responsible for DRM related to natural and other hazards.

The framework also aims to provide the basis for dialogue, coordination and collaboration with the national policy-makers and senior- and middle-level managers of

national disaster management agencies or similar agencies in each country and of the various governmental ministries and technical institutions involved in DRM, in order to enhance the necessary multisectoral approach.

This document is also intended for WHO and other international and regional stakeholders involved in providing technical, operational and financial support in national capacity-building for DRM-H.

5.4   Time frame

The framework provides guidance for national capacity development in DRM-H in the Western Pacific Region in the coming five years or more. The framework may be updated based on the development of the various ongoing global initiatives, including the *Sendai Framework for Disaster Risk Reduction 2015–2030,* adopted by 187 UN Member States on 18 March 2015, and the development of a global framework for DRM-H.

6. Framework components

To achieve the vision and mission and maximize investment, the *Western Pacific Regional Framework for Action for Disaster Risk Management for Health* recommends the following four key components for priority actions:

- governance, policy, planning and coordination,
- information and knowledge management,
- health and related services,
- resources (human, supplies, and finances).

To ensure the key components of DRM-H are in place, a number of strategic and operational priority areas have been identified to guide country actions.

FIGURE 3.   Relationships across framework components

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                    │   MISSION     │
                    └──────┬───────┘
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| Governance, policy, planning and coordination | Information and knowledge management | Health and related services | Resources (human, supplies, finances) |

RECOMMENDED ACTIONS AND RELATED ACTIVITIES
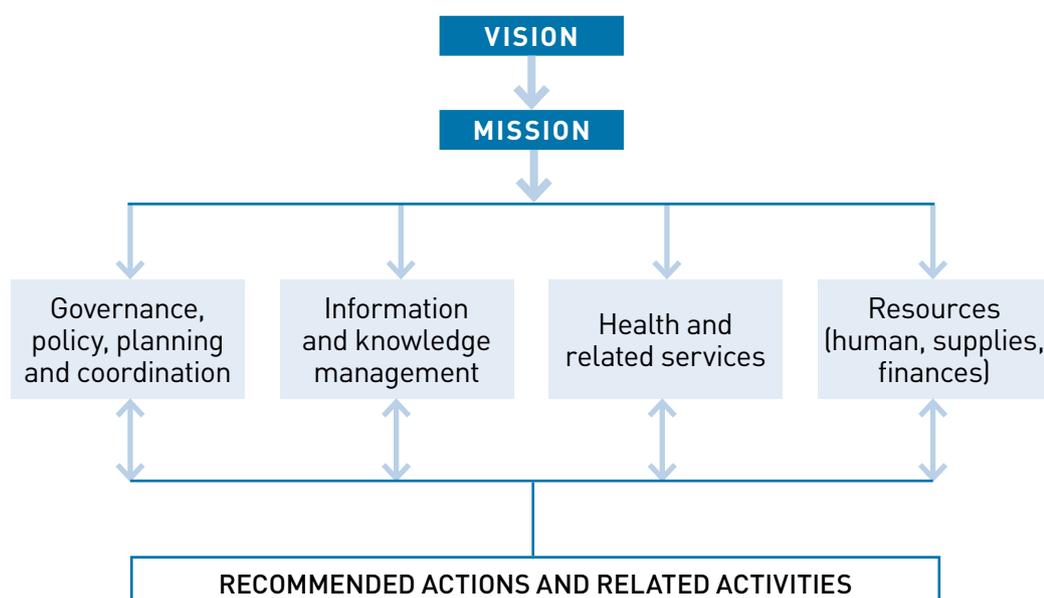
Table 1 presents the recommended actions for each of the framework's components, and the section that follows the table presents a range of activities related to each of the recommended action.

TABLE 1. Recommended actions for each of the framework's components

Framework components	Recommended actions
1. Governance, policy, planning and coordination	1. Ensure health sector contribution in the shift from disaster management to DRM and its representation on the relevant governing bodies. 2. Develop and revise relevant national health policies across the four phases of the DRM-H cycle. 3. Strengthen ministry of health unit(s) responsible for planning and coordinating DRM-H activities across the four phases of DRM.
2. Information and knowledge management	4. Contribute health information and health perspectives to multisectoral risk assessments at national, subnational and local levels. 5. Establish procedures for the management and utilization of information and knowledge from risk assessments among partners of health and other sectors. 6. Develop policies, mechanisms and procedures for risk communications for public, media and responders.
3. Health and related services	7. Match health programmes and services with the profiles of hazards and risk, as assessed and monitored at the national and subnational levels. 8. Define or revise existing health services packages for routine activities and disaster response. 9. Develop strategies for the continuity of health service delivery and mechanisms for response and recovery operations as part of national health preparedness plans. 10. Develop or enhance the Safe Hospital Initiative.

Framework components	Recommended actions
4. Resources (human, supplies, finances)	11. Review and develop the skills and experiences in disaster risk management for health that are available at national, subnational and local levels. 12. Develop national and subnational plans and mechanisms to meet staffing needs for surge requirements. 13. Identify critical medical supplies and equipment through risk assessment and analysis to ensure a minimum stocking level in appropriate locations. 14. Develop procedures for emergency contracting of health supplies and services. 15. Ensure policies for funding mechanism(s) to cover all components of the DRM-H cycle. 16. Establish or enhance contingency funding for disasters.

FRAMEWORK COMPONENT 1

Governance, policy, planning and coordination

Managing disaster risks is a complex and continuous process, requiring a functional governance structure, updated national policies and a system to coordinate multiple stakeholders. DRM-H is a vital aspect of national health policies, as well as other policies and strategies. The policies should define the roles and responsibilities of existing or new bodies at national and subnational levels responsible for the implementation of DRM-H, as well as create a mechanism for accountability and transparency. Legislation should be consistent with legally binding international agreements and conventions. In addition, DRM-H should be integrated into national health plans and intersectoral plans addressing the prevention, preparedness, response and recovery phases of the DRM cycle. These plans should demonstrate coherence and continuity among and between levels and jurisdictions – local, national and international. Intersectoral coordination mechanisms and business continuity plans are also recommended. As noted, such plans need to be regularly tested.

RECOMMENDED ACTION 1: Ensure health sector contribution in the shift from disaster management to disaster risk management, and its representation on the relevant governing bodies.

Related activities

a. The ministry of health needs to ensure liaison and coordination with the DRM activities of other ministries, sectors and institutions, and participation of the health sector in the national DRM committee or similar platforms.

b. The ministry of health should identify an existing structure or committees at the national level, or consider setting up a new one, responsible for DRM-H. Such committee should address the health dimension of the four phases of the DRM cycle in order to make the shift from disaster management to disaster risk management, involving all relevant departments of the ministry of health in a collegial effort.

c. The chairperson of such committee should sit on the national DRM committee, or similar body, and represent the health sector.

RECOMMENDED ACTION 2: Develop and revise relevant national health policies across the four phases of the DRM-H cycle.

Related activities

a. The terms of reference of the ministry of health DRM-H committee or equivalent body or bodies may include the following aspects depending on national context:

— develop DRM-H national policies, guidelines and standards; monitor the DRM-H plan's implementation; establish mechanisms to document lessons learnt and apply them to planning and training;

— develop a national dedicated DRM-H plan or mainstream DRM-H in appropriate sections of the national health sector plan or similar plans;

— plan for all phases of the DRM cycle based on multisectoral risks and vulnerability assessments, with involvement of exposed communities;

— ensure continuity of access to health care for disaster-affected populations, including provision and mechanisms that enable the waiving of users fees;

— adopt Codex Alimentarius food standards and related text into national policy and legislation;

— ensure nutrition as an essential package of health services at different levels of care;

— adopt food and nutrition policies that include:

• a ban on donations of breastmilk substitutes after emergencies and guidance on controlled distribution and use of breastmilk substitutes;

• appropriate evidence-informed food fortification standards; and

• education, training and awareness raising about the WHO Five keys to safer food.

— set up and provide oversight of relevant subnational DRM-H coordination and managerial bodies/mechanisms;

— define/update health facility building codes specific to hazards, and mandate national regulatory authorities for the monitoring of their use in the construction of new health facilities and in retrofitting those in need;

— designate a unit within the ministry of health responsible for all aspects of monitoring the roles and responsibilities of key partners in DRM-H to maximize the use of resources, and improve intersectoral coordination and collaboration at national and international levels;

— define a national pre-event registration system for foreign medical teams and international nongovernmental organizations, as well the coordination mechanisms during the response to and recovery from major disasters; and

— identify and build synergies with relevant national and international platforms, strategies or frameworks, and related work plans, including IHR (2005) and climate change adaptation.

b. Provide standards and guidelines to develop and implement DRM-H plans at the subnational level that are in line with national plans, with priority technical support on planning according to local hazards and vulnerabilities.

c. Coordinate the development of training curricula for DRM-H and support the delivery of training programmes to stakeholders at the national and subnational levels.

d. Embed DRM-H activities in the WHO Country Cooperation Strategy and in the Common Country Assessment/United Nations Development Assistance Framework.

RECOMMENDED ACTION 3: Strengthen ministry of health unit(s) responsible for planning and coordinating DRM-H activities across the four phases of DRM.

Related activities

a. The unit is represented in the ministry of health organogram with a mandate and resources to cover all phases of the DRM cycle in collaboration with the national disaster management office (NDMO) or equivalent and other stakeholders.

b. Develop strong operational links with the appropriate national authorities/ agencies responsible for national DRM, with a priority on the health component of public messages on early warning alerts, evacuation plans and campaigns to reduce existing risks or avoid new risks.

c. Promote community resilience through strategic partnerships with civil society, nongovernmental organizations and community leaders, with a priority focus on community-based preventive and curative health care.

d. Contribute to strengthening of the existing emergency operations centre in the ministry of health and utilize it during an event for coordinated response.

e. Establish linkages with the United Nations Country Team and Humanitarian Country Team dedicated bodies, such as the Health Cluster and Inter-cluster Coordination Group, for joint strategy development and planning of activities related to DRM-H to be conducted with support of international agencies, nongovernmental organizations and other multisectoral partners.

FRAMEWORK COMPONENT 2

Information and knowledge management

Information and knowledge management is the collection, processing and analysis of data, as well the production of knowledge that comes out of these analyses. Knowledge on managing disasters can be disseminated to inform and influence the strategic planning and monitoring of the implementation of DRM-H plans at national and subnational levels. Sound and reliable information is crucial for developing and implementing DRM-H activities across all four phases of the DRM cycle. Information management serves as the foundation for assessing risk trends, bolstering early warning systems, planning responses, coordinating various actors and the resources available during the response, monitoring the coverage of the various interventions, and evaluating performance. There must be an operational system to collect, collate and analyze data – harmonized in such a way that data can reach across sectors. Adequate mechanisms should be put in place to ensure that the right information gets to the right people at the right time. Effective methodologies should then be passed down to subnational levels so local practitioners can collect data.

Effective communication is a critical function within the health sector, among sectors and partners, and with the general public. Media partners are important channels for timely distribution of information and must be actively engaged throughout all phases of DRM.

RECOMMENDED ACTION 4: Contribute health information and health perspectives to multisectoral risk assessments at national, subnational and local levels.

Related activities

a. Ministry of health DRM-H unit should contribute/collaborate with NDMO-responsible section in conducting risk assessments for natural and human-induced hazards.

b. Ministry of health DRM-H unit should, based on the results of the risk assessments, identify exposed populations with high susceptibilities to specific hazards and local health system vulnerabilities to cope with the health consequences of such hazards.

c. Keep updated the geographically coded National Health Facility Registry, with information on the human resources and health services available by level of care and by administrative area.

d. Develop subnational and local risk maps showing the identified high-risk areas for specific hazards and the need for health preventive and preparedness measures.

e. Map and identify resources for all DRM-H activities for all stakeholders.

RECOMMENDED ACTION 5: Establish procedures for the management and utilization of information and knowledge from risk assessments among partners in health and other sectors.

Related activities

a. Develop a robust information technology and communications platform capable of communicating essential information to all stakeholders before, during and after disasters.

b. Develop and maintain systems for coordinated information management in collaboration with NDMO and key partners; collect, consolidate, share, integrate and maintain information relevant to DRM-H from health as well as from other sectors, with a priority on outcomes of hazards and vulnerabilities assessments.

c. Develop an agreed-upon system to gather, store and use information for assessments and emergency response according to the phases of emergencies, which include:

— pre-event information (baseline data)

— preliminary scenario definition and multi-cluster rapid/initial assessments

— continuing assessments and monitoring.

d. Develop a health sector/cluster mechanism to analyse the information and data coming from assessments and monitoring, and produce and share knowledge that can be used by decision-makers to define the priorities and planning of each phase of the DRM-H cycle.

e. Develop a roster of staff trained and equipped for assessments and with guidelines for investigation and reporting, particularly in the very early phase of the response to large disasters.

f. Ensure country adaptation and adoption of the health sector core set of inputs and processes, outputs and outcome indicators, to monitor the response and the evolution of the health needs of affected populations.

g. Develop procedures to monitor the implementation of the planned activities, the evolution of the local hazards, and the local capacities of the health system to respond according to the phases of the response and the evolving health needs of the affected populations.

RECOMMENDED ACTION 6: Develop policies, mechanisms and procedures for risk communications for public, media and responders.

Related activities

a. Utilize or establish a system for the development, dissemination and evaluation of messages based on assessment of impact of the event and related risks generated, and advise to specific audiences.

b. Test and validate procedures, authority and mechanisms to disseminate messages through the media and other channels.

c. DRM-H unit should pre-formulate, test and evaluate risk communications message templates so they can be released immediately in case of an event. Each message should be hazard appropriate, based on a risk assessment and target all identified vulnerable groups.

d. Ensure that responders have the means to receive information and feedback concerning risks related to their health, safety and security.

FRAMEWORK COMPONENT 3
Health and related services

All health institutions, systems, programmes and services need to be structurally protected, safe and capable of continuing to perform effectively under the impact of any hazard, and to face the increased workload originating from any emergency.

Safer and better-prepared health facilities are needed to withstand emergencies and to ensure an effective response. These should be supported by solid logistics and communications systems. A range of health-care disciplines contribute to DRM-H, ranging from public health and primary care to specialties such as infectious diseases, emergency medicine, surgery, anaesthetics and medical anthropology. Representatives from these various specialties should be engaged in DRM-H processes. Critical attention should be paid to health promotion and behavioural change, particularly in activities planned to prevent or mitigate existing risks of various hazards that need specific actions taken by populations at risk of exposure.

Readiness of health services during disasters requires planning and implementation of specific sets of activities at the national and subnational levels. These activities should be aimed at addressing the vulnerabilities of the populations at risk, and must take into account the capacity of the local health system to respond to the health needs of populations affected by disasters. Activities may include, but are not limited to, identifying areas of high risk and low health-care coverage, working to fill service provision gaps, developing contingency plans and developing a mechanism to rapidly assess the capacity of the health sector to continue delivering services following a disaster. As a whole, local capacity must be bolstered to link patients to care and ensure that health-care providers can cope with an increased demand for health services following a disaster.

RECOMMENDED ACTION 7: Match health programmes and services with the profiles of hazards and risks, as assessed and monitored at the national and subnational levels.

Related activities

a. Identify geographical areas at high risk of specific hazards and assess and monitor the coverage of key preventive programmes and curative services.

b. Identify health programmes and services that need to be strengthened in order to cover the basic health needs (universal health coverage) and cope with an increased demand due to the occurrence of events of specific hazards.

c. Ensure improved coverage of basic health services and readiness of critical health facilities according to local hazards and vulnerabilities identified following the two action points listed above.

RECOMMENDED ACTION 8: Define or revise existing health service packages for routine activities and for disaster response.

Related activities

a. Strengthen the provision of routine health services and define or revise health service packages for disaster-affected populations, taking into consideration and adapting to local contexts the internationally available packages, such as those that are among the most frequently used packages, including:

— the reproductive health minimum initial service package in humanitarian settings;

— Inter-Agency Standing Committee (IASC) guidelines on HIV/AIDS in humanitarian settings;

— IASC guidelines on mental health and psychosocial support in emergency settings;

— essential neonatal care and the integrated management of childhood illnesses;

— community-based management of acute malnutrition (CMAM); and

— management of severe acute malnutrition (SAM) with medical complications .

RECOMMENDED ACTION 9: Develop strategies for continuity of health service delivery and mechanisms for response and recovery operations as part of the national health sector preparedness plans.

Related activities

a. Define standards and establish mechanisms and standard operating procedures to preposition and set up temporary (tents) and/or transitional health infrastructure,

and deploy specialized or multipurpose mobile medical teams where local health systems are nonfunctional.

b. Develop national and subnational surge mechanisms based on risk analyses and the availability of human resources, and stockpile predetermined supplies and equipment, as part of the national response plans and local contingency plans.

c. Develop contingency plans, based on gap analyses and assessments of local hazards and vulnerabilities, by levels of care. Develop mechanisms and protocols for operational collaboration with other institutions or entities (line ministries, military, police, fire brigades, nongovernmental organizations, etc.) involved in all phases of DRM.

RECOMMENDED ACTION 10: Develop or enhance the Safe Hospitals Initiative.

Related activities

a. Ensure that the Safe Hospitals Initiative covers not only hospitals, but also all critical health facilities in hazard-prone areas.

b. Develop policies, guidelines, standards and procedures at the national and subnational levels for the Safe Hospitals Initiative using a multisectoral coordination body to ensure clarity of roles and responsibilities and to avoid duplication, reduce costs and streamline processes.

c. Identify and map critical health facilities in high-risk areas and prioritize them to apply the Safe Hospitals Index (structural, non-structural and functional) to determine their capacity to continue delivering services after a disaster and to cope with increased demand of selected services according to type of hazard in the catchment area.

d. Prioritize plans and funds to rehabilitate/retrofit critical health facilities following their Safe Hospitals Index assessments.

e. Develop mechanism to rapidly assess the capacity of health facilities impacted by a disaster to continue delivering services.

f. Identify locations for new hospitals through hazard analysis and risk assessment, and build any new hospitals according to the risk-specific building codes.

FRAMEWORK COMPONENT 4
Resources

Resources in the *Western Pacific Regional Framework for Action for Disaster Risk Management for Health* refer to the human skills and human resources, as well as finances, equipment and supplies, needed to implement DRM-H. Having reliable access to resources is crucial to implement DRM-H. There must be a mechanism for prompt deployment of experts, as well as opportunities for training and building the capacity of health workers and community members on the ground in a sustainable and effective manner. Systems must be in place to identify which medical supplies and equipment are critical during an emergency and to ensure a minimum stocking level in appropriate locations. Each phase of emergency response has different resource needs, especially as response operations are shifting to recovery. Thus, it is important to consider the phase of the response when planning for the procurement of resources and the deployment of experts. Dedicated funds within the health sector budget should be allocated for DRM-H, including for prevention interventions, planning, staffing, training and exercises. Dedicated personnel to manage DRM-H programmes and implement activities are recommended. Appropriate resources and infrastructure for training, developing and maintaining standby and deployment capacity of emergency response personnel are also vital.

HUMAN RESOURCES

RECOMMENDED ACTION 11: Review and develop the skills and experiences in DRM-H that are available at national, subnational and local levels.

Related activities

a. Develop a database of trained and skilled staff of the ministry of health and other institutions or organizations such as national Red Cross and Red Crescent societies, national and international nongovernmental organizations, civil society, international organizations, military forces, police and civil defence.

b. Conduct an education and training needs analysis based on the risk assessments.

c. Strengthen national programmes for DRM-H education and pre- and in-service training based on DRM-H national plan priorities.

d. Provide training and education to communities based on local risk assessments and planned solutions (early warning local systems, evacuation plans, etc.).

RECOMMENDED ACTION 12: Develop national and subnational plans and mechanisms to meet staffing needs for surge requirements.

Related activities

a. Establish mechanisms for the rapid deployment and acceptance of additional staff according to health priority and type of hazard. Mechanisms include capacity to register and manage foreign medical teams.

b. Plan and conduct regular simulation exercises at the various levels of the health system.

c. Develop and run in-service training courses at the local level based on hazard mapping and identified priority health services.

d. Establish a mechanism to ensure welfare and support for responders before, during and after an event.

e. Inform potential international partners about the national registration system for foreign medical teams and international nongovernmental organizations.

SUPPLIES

RECOMMENDED ACTION 13: Identify critical medical supplies and equipment through risk assessments and analyses to ensure a minimum stocking level in appropriate locations.

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a. Develop stockpiles for strategic locations identified in national and subnational plans.

b. Establish a supply-chain management system and guidelines to ensure quality, rotation and safe storage of critical supplies and equipment.

c. Revise, adapt to local context and store the different health emergency kits for various health programmes according to hazard and risk assessments.

RECOMMENDED ACTION 14: Develop procedures for emergency contracting of health supplies and services.

a. Establish a mechanism for speedy procurement and delivery of health supplies at the national and subnational levels.

b. Establish a mechanism that pre-identifies the technical specifications of goods, prices, delivery times and reliability.

c. Establish authority and procedures for requesting and accepting – or declining – medicines, personnel, field hospitals and other services provided by international partners.

d. Develop a provision for tax exemption and speedy clearance procedures for the importation of medical supplies.

FINANCES

RECOMMENDED ACTION 15: Ensure policies for funding mechanism(s) to cover all components of the DRM-H cycle.

a. Allocate a percentage of the national health budget to DRM-H.

b. Ensure funding is available for multisectoral risk mapping and assessment.

c. Include a provision for all DRM-H project budgets for monitoring and evaluation.

RECOMMENDED ACTION 16: Establish or enhance contingency funding for disasters.

a. Establish fast-track procedures to access contingency funds when needed.

b. Clearly delineate the authority for allocation and expenditure of contingency fund.

c. Develop policies, procedures and mechanisms for accepting, disbursing and accounting for international funds, for example, humanitarian action plans, flash appeals.

7. Implementing the framework

There is no rigid blueprint for DRM-H planning and implementation at the national level, as priorities must be driven by local hazards and vulnerabilities. However, the *Sendai Framework for Disaster Risk Reduction 2015–2030* includes health and well-being as explicit outcomes, with a priority on keeping health facilities operational during and after disasters.

In essence, the Sendai Framework is calling on the health sector to take a more active and intensive role in DRM than the sector played under the original *Hyogo Framework for Action (2005–2015).*

The *Western Pacific Regional Framework for Action for Disaster Risk Management for Health* includes a set of priority actions for each of the four components to be implemented across the four phases of the DRM cycle: prevention, preparedness, response and recovery.

A step-by-step approach is proposed in the regional framework, focusing on the management of risks related to natural hazards, such as geological and hydro-meteorological hazards, to contribute to an all-hazards approach. The priority action areas will be implemented alongside national core capacity strengthening efforts as required under IHR (2005), building on what already has been achieved in the Western Pacific Region through the implementation of APSED (2010) for various hazards.

While countries are generally encouraged to develop and implement dedicated national plans of action for DRM-H in line with the regional framework, some countries might consider other options, based on their own governmental structures and systems, the current level of capacity development, available resources and other factors. This is particularly vital for the Pacific island countries and areas where there are unique challenges due to the small size of populations, geographical isolation, and limited infrastructure and resources. In some contexts, synergies

and joint planning and implementation with the climate change adaptation activities may be an appropriate solution.

The following are some possible options for consideration:

1. develop, or update and implement, a dedicated national plan of action for DRM-H;

2. incorporate a dedicated health section into the overall national DRM plan;

3. incorporate a dedicated DRM-H component into the national health strategic plan;

4. include priority DRM-H activities within the existing national health programmes or initiatives; and

5. consider other innovative options, as appropriate.

Each of these options may have advantages and disadvantages. Countries are encouraged to conduct analyses and stakeholder consultations to develop the best approach based on the national situation and local context. Policy dialogues and other consultations with various actors and other sectors on the role of the health sector in the DRM are vital at all levels. This process has to consider the type of hazards at the national and subnational levels in defining the priority interventions across the four phases of DRM.

Countries are encouraged to establish or strengthen their annual stakeholder planning and review mechanisms to identify or update priory actions, monitor implementation, and document and share country and local best practices. Every disaster also provides an opportunity to learn from the response and use real-world experience to improve DRM-H.

Figure 4 illustrates the relationships among the four phases of the DRM cycle: prevention, preparedness, response and recovery. All sectors, including the health sector – but especially local communities and civil society exposed to various hazard risks – have to forge a partnership in which the public, private and informal sectors collaborate in planning and implementing the specific activities of DRM-H.

The partnership has national as well subregional, regional and global dimensions. In particular, at the regional and subregional levels, it will be necessary to facilitate periodic forums to discuss pressing issues and to share experiences and lessons learnt during the implementation of the framework's activities.

FIGURE 4. DRM cycle and the framework's components

Table 2 presents the template of a matrix of the framework components by DRM phases. The matrix may be used as a tool to support the identification of priority activities to be considered by national and subnational plans for DRM-H.

TABLE 2. DRM-H Planning matrix template

	Governance, policy, planning & coordination	Information & knowledge management	Health and related services	Resources (human, supplies, finances)
Prevent exposure and reduce susceptibility				
Preparedness				
Response				
Recovery				

8. Monitoring the framework

The *Hyogo Framework for Action (2005–2015)* proposed a set of 22 core indicators across five priority action areas. Governments assessed their progress against these indicators using an online tool in 2009, 2011 and 2013, with 133 countries reporting in 2013.

The development process of the *Sendai Framework for Disaster Risk Reduction 2015–2030* took stock of the analyses and lessons generated by the assessments, and offers a revised monitoring framework articulated across input, output and outcome indicators.

The public policy indicators are organized in groups that reflect the shift of the *Sendai Framework for Disaster Risk Reduction 2015–2030,* which is asking governments to generate policies that address not only the reduction of existing risks but also the prevention of new risks.

The attainment of the unchanged disaster risk reduction strategic objective of the *Hyogo Framework for Action (2005–2015)* – "the substantial reduction of disaster losses, in lives and in the social, economic and environmental assets of communities and countries" – requires public health authorities to document whether or not they have developed risk-resilient building codes for the construction of health facilities. If they have been developed, they must report whether or not they are being applied, how many new health facilities have been built under the new codes, and how many health facilities have been retrofitted so they will be safe during future disasters.

In addition, the selection and adoption of key DRM-H input, output and outcome indicators is a mandatory step in the definition of targets for national plans for DRM-H, as is the generation of baselines against which progress will be measured.

The health sector has a leading responsibility to help develop and monitor indicators, as well as baselines, and to measure reductions in disaster mortality, the number of health facilities damaged and non-functioning after disasters, and the overall impact of disasters on the well-being and health of populations.

The *Western Pacific Regional Framework for Action for Disaster Risk Management for Health* advocates for the health sector to strengthen the responsibility of documenting achievements and challenges through the selection and use of key DRM-H indicators within and across all countries of Western Pacific Region. The framework promotes and supports a technical consultation to identify and apply a core set of DRM-H indicators based on the new development in the coming years, as needed.

ANNEX 1. THE NOMENCLATURE OF DISASTERS

1. Definition of disaster

In order to accurately measure, aggregate, analyse and report disaster-related scientific data, it is *essential* that all organizations utilize a common, standard nomenclature for disasters and risk management. This critical need was the impetus for early development the United Nations *Internationally Agreed Glossary of Basic Terms related to Disaster Management.(31)* The United Nations and ISO 31000 now serve to extend the standardization of nomenclature to also include the field of disaster risk management (DRM).*(25)*

Disasters are "a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which does exceed the ability of the affected community or society to cope using its own resources".*(18)* The adverse health impacts of disasters may include loss of life, injury, disease and other negative effects on human physical, mental and social well-being.

Disasters may also be categorized as intensive risk and extensive risk events.*(18)* Disasters are categorized as intensive risks when intense hazards such as earthquakes, tsunamis, volcanoes, floods and major storms strike densely populated areas with high levels of vulnerability. Disasters are categorized as extensive risk when there is widespread risk associated with the exposure of dispersed populations to repetitive or persistent hazard conditions of low or moderate intensity. These events, for example, the drought–flood cycle, are often of a highly localized nature, yet can lead to debilitating cumulative disaster impacts throughout the entire Western Pacific Region.

Annex 3 contains a glossary that defines key terms used in disaster risk management.

2. Classification of hazards

Disasters are classified according to the causative nature of the hazard as either natural or human-induced in nature. The scientific literature – as well as governmental, nongovernmental and international organizations throughout the world) – consistent in agreement that the category of natural hazards includes geological, hydrometeorological, biological and extraterrestrial hazards.*(1,2,14,32)*

Technological or human-induced hazards – complex emergencies/conflicts, famine, displaced populations, industrial accidents and transport accidents – are events that are caused by humans and occur in or close to human settlements.*(14,33)* This can include pollution and transportation accidents.

Figure A1.1 presents the classification of hazards based on the most recent definitions for the natural and human-induced generic groups. Figure A1.1 also presents the subgroups of the hydrometeorological hazards (hydrological, meteorological and climatological) and the main types, subtypes and some examples of sub-subtypes for each group or subgroup of hazards. The classifications are important in adopting the same language and in classifying disasters that quite often present the coexistence of multiple hazards.

Figure A1.1 Classification of all hazards by generic groups, groups, subgroups, main types, subtypes and few examples of sub-subtypes

	Classification of hazards							
Generic groups[1]	Natural						Human-induced[2,3]	
Groups	1.1 Geological[4]	1.2 Hydro-meteorological			1.3 Biological[5]	1.4 Extraterrestrial[4]	2.1 Technological	2.1 Societal
Subgroups		1.2.1 Hydrological[4]	1.2.2 Meteorological[4]	1.2.3 Climatological[4]				
Main types / subtypes (sub-subtypes)	**Earthquake** – ground shaking – tsunami **Mass movement** **Liquefaction** **Volcanic activity** – ash fall – lahar – pyroclastic flow – lava flow	**Flood** – riverine flood – flash flood – coastal flood – ice jam flood **Landslide** (snow, mudflow, debris, rockfall) **Wave action** – rogue wave – seiche	**Storm** – extra-tropical storm – tropical storm – convective storm (e.g. storm / surge, tornado, wind, rain, winter storm / blizzard, Derecho, lightening / thunderstorm, hail, sand / dust storm) **Extreme temperature** – heat wave – cold wave – severe winter condition (e.g. snow / ice, frost / freeze, dzud[6]) **Fog**	**Drought** **Wild fire** – land fire (e.g. brush, bush, pasture) – forest fire **Glacial lake outburst**	**Emerging diseases** **Epidemics and pandemics** **Insect infestation[4]** – grasshopper – locusts **Foodborne outbreaks[7]**	**Impact** – airburst **Space weather** – energetic particles – geomagnetic storms – shockwave	**Industrial hazards[8]** – chemical spill, gas leak, collapse, explosion, fire, radiation **Structural collapse[8,9]** – building collapse, dams / bridge failures **Transportation[8,11]** – air, road, rail, water **Explosions / Fire[8]** **Air pollution[9]** – haze[10] **Power outage[11]** **Hazardous materials in air, soil, water[12,13]** – biological, chemical, radiological **Food contamination[7]**	**Armed conflicts[14]** – international – non-international **Civil unrest** **Terrorism** **Chemical, biological, radiological, nuclear and explosive weapons (CBRNE)[15,16]** **Financial crisis** – hyperinflation – currency crisis

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ANNEX 2. GEOLOGICAL AND HYDROMETEOROLOGICAL DISASTERS IN THE WESTERN PACIFIC REGION

1. The burden of geological and hydrometeorological disasters in the Western Pacific Region

Over the last decade, Afghanistan, China, Indonesia, the Philippines and the United States of America constitute the top five countries that are most frequently hit by disasters associated with natural hazards. In 2011, the Philippines experienced the highest number of natural disasters ever registered in its history. The country was affected by 18 floods and landslides, 12 storms, two volcanic eruptions, and one earthquake.*(2)*

Figure A2.1 presents the trend of disasters associated with natural hazards due to geological and hydrometeorological hazards worldwide and in Western Pacific Region countries over the past 20 years. While the number of disasters due to geological hazards presents a small variation across the years, both at the global and regional levels, the disasters due to hydrometeorological hazards increased in frequency per year over the time period considered, again at both the global and regional levels. The increase of hydrometeorological disasters in Western Pacific Region shows a tendency towards growth over the past 20 years. Indeed, from an annual average of 45 hydrometeorological events in Western Pacific Region between 1994 and 2003, an annual average of 60 events were observed between 2004 and 2013.

Figure A2.3 provides an overview of the aggregate number of natural disasters, affected populations, deaths and estimated overall economic costs for the Western Pacific Region as compared with the rest of the world. Over the past 20 years, 22% of all natural disasters occurred in the Western Pacific Region, however, in the same time frame, 62% of the total global population affected by disasters lived in the Region. Thus, Western Pacific Region is experiencing more than its fair share

Figure A2.1   Number of geological disasters by year, worldwide (WWD, green) and in Western Pacific Region (WPR, orange) countries, 1994–2013
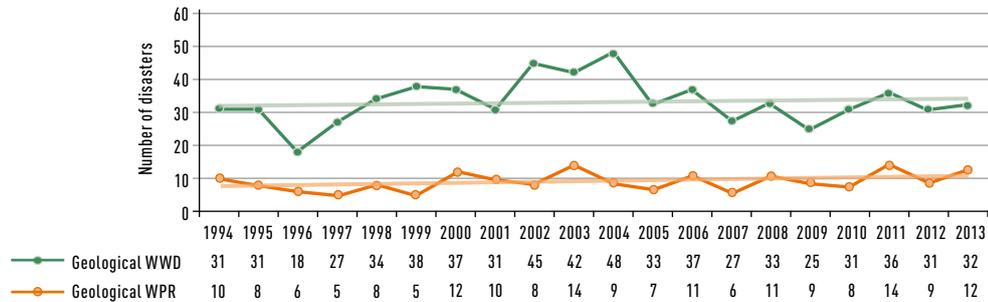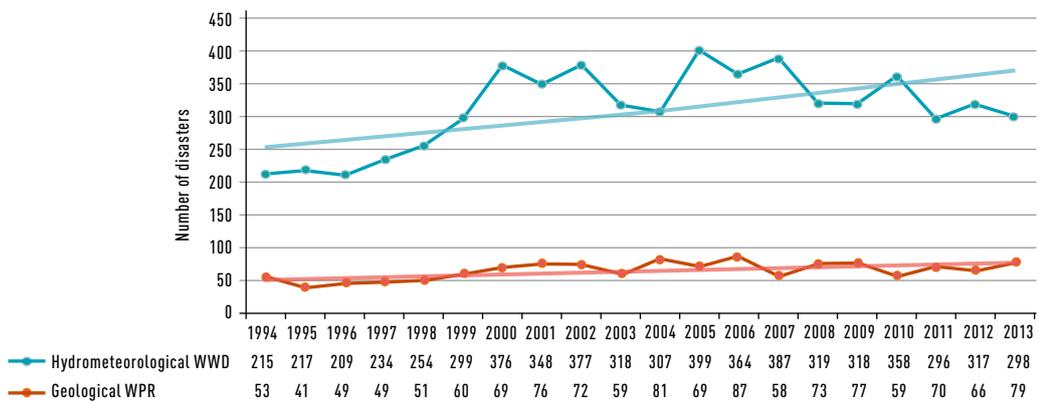

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Geological WWD	31	31	18	27	34	38	37	31	45	42	48	33	37	27	33	25	31	36	31	32
Geological WPR	10	8	6	5	8	5	12	10	8	14	9	7	11	6	11	9	8	14	9	12

Figure A2.2   Number of hydrometeorologycal disasters by year, worldwide (WWD, blue) and in Western Pacific Region (WPR, red) countries, 1994–2013

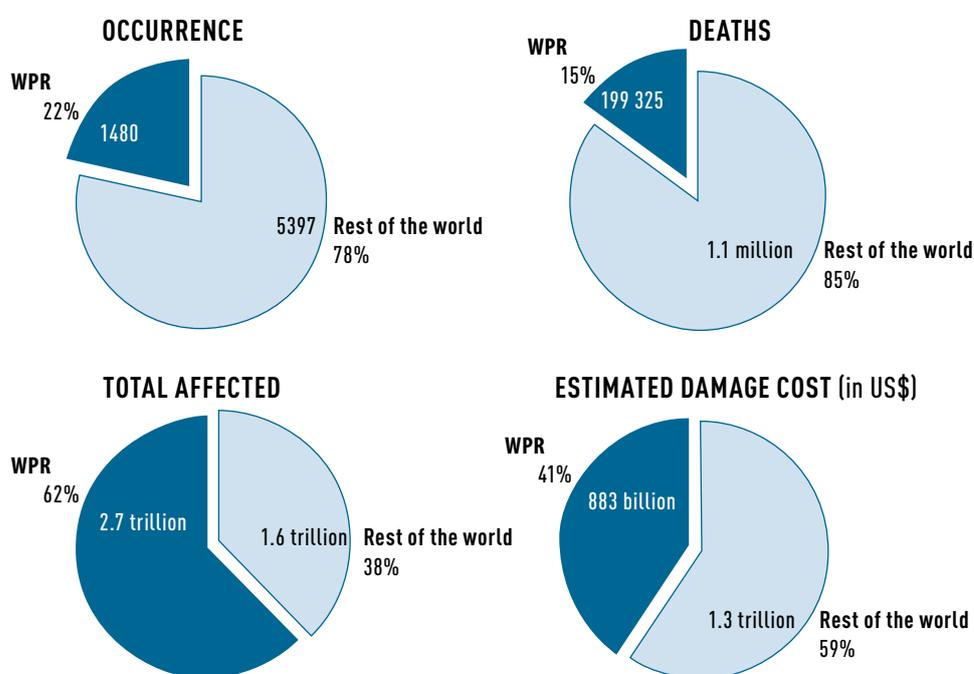|	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Hydrometeorological WWD	215	217	209	234	254	299	376	348	377	318	307	399	364	387	319	318	358	296	317	298
Geological WPR	53	41	49	49	51	60	69	76	72	59	81	69	87	58	73	77	59	70	66	79

of the impact of these disasters, thus the need for disaster risk reduction policies in the Region.

The total global economic cost in the last 20 years from the impact of disasters associated with natural hazards was around US$ 2.2 trillion, of which the Western Pacific Region accounted for US$ 883 billion, or 41%. The Western Pacific Region carries a disproportionate human and economic burden of disasters associated with natural hazards, which is also confirmed by data over the last two decades presented in the pie charts in figure A2.3.

The high percentage of people affected (62%) and the share of estimated economic costs generated by natural disasters (41%) in Western Pacific Region countries between 1994 and 2013 have to be viewed in light of the fact that the Region faced a much lower percentage (22%) of disasters associated with natural hazards during that time.

Figure A2.3   Cumulative numbers of events, reported deaths, affected populations, and estimated economic costs worldwide and in the Western Pacific Region (WPR), due to geological and hydrometeorological disasters between 1994–2013

OCCURRENCE

WPR 22% 1480

5397 Rest of the world 78%

DEATHS

WPR 15% 199 325

1.1 million Rest of the world 85%

TOTAL AFFECTED

WPR 62% 2.7 trillion

1.6 trillion Rest of the world 38%

ESTIMATED DAMAGE COST (in US$)

WPR 41% 883 billion

1.3 trillion Rest of the world 59%

2. Geological disasters

The most recent disasters related to geological hazards in the Western Pacific Region have dramatically illustrated the enormity of health impact associated with these events. The 2008 Wenchuan earthquake in China killed nearly 70 000 people and left 4.8 million people homeless. The 2001 Great East Japan Earthquake, tsunami and nuclear accident killed nearly 20 000 people and left 4.4 million households without electricity, and 1.5 million households without water. The World Bank has estimated the economic costs of the Great East Japan Earthquake at US$ 235 billion, making it the costliest disaster associated with natural hazards in world history. Earthquakes

in Christchurch, New Zealand, in 2010 and 2011 were much less deadly, yet created economic costs ranging from NZ$ 2.75 to NZ$ 3.5 billion.

More recently, in October 2013, the Bohol earthquake in the Philippines caused 223 deaths and damaged or destroyed the homes of 367 760 people. In January 2014, a total of 1910 people were still in official evacuation centres.

3. Hydrometeorological disasters

Hydrometeorological disasters increased in number and intensity during the last two decades in the Western Pacific Region, as presented in figure A2.1. For example, Typhoon Bopha in Mindanao in the Philippines in December 2012 resulted in loss of life and extensive damage and destruction to infrastructure, including local health facilities. Typhoon Haiyan in November 2013 killed almost 7000 people and affected an estimated 16 million, leaving many of them homeless *(14)*. Recent floods in Cambodia, Fiji, the Lao People's Democratic Republic and Viet Nam further demonstrated the power of this group of hazards to displace populations and seriously disrupt economies. In addition, drought-associated forest fires in South-East Asia in 1997 and 1998 affected some 200 million people in Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore and Thailand. In April 2014, flash floods in the Solomon Islands caused 22 deaths and affected over 50 000 people.

4. Emerging disaster risks in the Western Pacific Region

4.1   Climate change

Various studies have shown how climate change will impact the Western Pacific Region in coming years. Floods, droughts, damaging winds, extreme high temperatures and high sea levels are likely to occur with increased frequency and intensity. It is predicted that the maximum tropical cyclone intensity may increase 5–10% by around 2050, increasing peak cyclone-related precipitation rates by 25%. The areas below the high-tide level and storm-surge level are 0.48% and 0.94%, respectively, of the total land area of the Western Pacific Region; this will increase to 0.98% and 1.32%, respectively, if sea levels rise by one metre. As a result, more than 10% of the population of countries such as Cambodia, Viet Nam, and Pacific island countries and areas are likely to be affected. Adverse health effects related to sea-level rise disasters have already been documented in some Pacific islands. DRM-H is one of the primary means for health-related climate change adaptation.

4.2   Compound and hybrid disasters

Compound disasters occur when one disaster is complicated by a second disaster, for example a landslide following an earthquake. A hybrid disaster occurs when a disaster of one type results in a second disaster of a different type. For example, a natural disaster causes a secondary technological disaster. The Great East Japan Earthquake of 2011 is an example of the possible interaction between these two groups of hazards, when an earthquake triggered a tsunami and a breach at a nuclear power plant. The potential for hybrid disasters demonstrates the need to assess and monitor local vulnerabilities, taking into consideration the possible generation of new risks produced by the interactions of natural disasters in highly industrialized areas, and with the additional potential related technological hazards.

Hybrid disasters may also occur when a technological disaster triggers a natural disaster. One example is when a structural failure at a dam creates a flash flood resulting in the loss of electrical power and the risk of drowning. During last few decades, trends of industrialization, environmental degradation, pollution and urbanization are increasing the potential for risks of hybrid disasters related to the possible synergies between natural and technological hazards.

4.3   Sociopolitical instability

While the governments within the Western Pacific Region are generally strong and manage an effective emergency response system, some countries face political instability that creates a greater vulnerability and susceptibility to emergencies and disasters. For example, conflict on the island of Mindanao in the Philippines has claimed over 150 000 lives in the past four decades, and has displaced nearly 3 million people. Some of the areas hit by Typhoon Bopha in December 2012 were in the conflict zone, making the response and recovery difficult in some municipalities.

ANNEX 3. GLOSSARY OF KEY TERMS *(38,39)*

Absorptive capacity

A limit to the rate or quantity of impact that can be absorbed, or adapted to, without exceeding the threshold of disaster declaration.

All-hazards approach

Developing and implementing emergency management strategies for the full range of likely emergencies or disasters, including both natural and techno-logical; this also includes conflict-related hazards of terrorism and warfare.

Building code

A set of ordinances or regulations and associated standards intended to control aspects of the design, construction, materials, alteration and occupancy of structures that are necessary to ensure human safety and welfare, including resistance to collapse and damage.

Capability

The ability to achieve a desired operational effect under specified standards and conditions through combinations of means and ways to perform a set of tasks.

Capacity

The combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals.

Critical facilities

The primary physical structures, technical facilities and systems that are socially, economically or operationally essential to the functioning of a society

or community, both in routine circumstances and in the extreme circumstances of an emergency.

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 risk

The potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period.

Disaster risk management

The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.

Disaster risk reduction

The concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

Early warning system

The 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.

Emergency

A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which does not exceed the ability of the affected community or society to cope using its own resources.

Exposure

People, property, systems or other elements present in hazard zones that are thereby subject to potential losses.

Forecast

Definitive statement or statistical estimate of the likely occurrence of a future event or conditions for a specific area.

Hazard

A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Mitigation

The lessening or limitation of the adverse impacts of hazards and related disasters.

Non-structural measures

Any measure not involving physical construction that uses knowledge, practice or agreement to reduce risks and impacts, in particular through policies and laws, public awareness raising, training and education.

Preparedness

The 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.

Prevention

The outright avoidance of adverse impacts of hazards and related disasters.

Public awareness

The extent of common knowledge about disaster risks, the factors that lead to disasters and the actions that can be taken individually and collectively to reduce exposure and vulnerability to hazards.

Recovery

The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster-affected communities, including efforts to reduce disaster risk factors.

Residual risk

The risk that remains in unmanaged form, even when effective disaster risk reduction measures are in place, and for which emergency response and recovery capacities must be maintained.

Resilience

The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

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.

Risk

The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.

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.

Risk management

The systematic approach and practice of managing uncertainty to minimize potential harm and loss.

Risk reduction

Actions taken to lessen the likelihood of negative consequences of risk.

Structural measures

Any physical construction to reduce or avoid possible impacts of hazards, or application of engineering techniques to achieve hazard-resistance and resilience in structures or systems

Susceptibility

The state of being at risk, if exposed to a hazard.

Sustainable development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Vulnerability

The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

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