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# Bhutan

## Disaster Risk Management Status Review

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*Towards identifying national and local priorities for the implementation of the  
Sendai Framework for Disaster Risk Reduction*

DEPARTMENT OF DISASTER MANAGEMENT  
MINISTRY OF HOME AND CULTURAL AFFAIRS  
ROYAL GOVERNMENT OF BHUTAN



# Contents

<i>vi</i>	Abbreviations
<i>ix</i>	Acknowledgements
<i>1</i>	Executive Summary
<b>7</b>	<b>Section 1: Introduction</b>
<i>8</i>	1.1 Context
<i>8</i>	1.2 Purpose of the report
<i>9</i>	1.3 Target audience
<i>9</i>	1.4 Methodology and structure of the report
<b>13</b>	<b>Section 2: Country's disaster risk profile</b>
<i>14</i>	2.1 The Country in Brief
<i>15</i>	2.2 Disaster risk profile
<i>19</i>	2.3 Vulnerabilities
<i>23</i>	2.4 Disaster Risk and losses during 2005-2015
<b>27</b>	<b>Section 3: DRM status and progress</b>
<i>28</i>	3.1 Understand disaster risk
<i>28</i>	National and local risk assessments
<i>31</i>	Collection, analysis, management and use of disaggregated data and information
<i>33</i>	Disaster loss accounting at national and local levels
<i>34</i>	Regional/trans-boundary risks
<i>35</i>	3.2 Strengthen disaster risk governance to manage disaster risk
<i>35</i>	Legislative and regulatory framework related to DRR
<i>39</i>	Institutional framework
<i>43</i>	Policy environment and list of key policies related to DRR
<i>44</i>	Accountability mechanisms
<i>45</i>	3.3 Invest in DRR for resilience
<i>45</i>	National, local and sectoral budget allocation for DRR
<i>47</i>	Disaster risk transfer and insurance, risk sharing and retention and financial protection mechanisms
<i>48</i>	Policies, plans and investments to reduce risk in key development sectors
<i>54</i>	3.4 Enhance disaster preparedness for effective response and to "Build Back Better"
<i>54</i>	Disaster preparedness and contingency policies, plans, relief funds and capacity for preparedness and response
<i>56</i>	Early warning systems
<i>58</i>	Planning for post disaster recovery and reconstruction
<i>58</i>	International Cooperation in disaster response and relief



<i>59</i>	Section 4: Stakeholder mapping
<i>75</i>	Section 5: Key issues, challenges and priorities for Sendai Framework implementation
<i>76</i>	5.1 Understand disaster risk
<i>77</i>	5.2 Strengthen disaster risk governance
<i>78</i>	5.3 Invest in DRR for resilience
<i>81</i>	5.4 Strengthen disaster preparedness for effective response and to 'Build Back Better'
<i>82</i>	Conclusion
<i>84</i>	References





## ACRONYMS

<b>ADB</b>	Asian Development Bank
<b>ADPC</b>	Asian Disaster Preparedness Center
<b>BAFRA</b>	Bhutan Agriculture and Food Regulatory Authority
<b>BCCI</b>	Bhutan Chamber of Commerce and Industry
<b>BDA</b>	Bhutan Disaster Assessment
<b>BSB</b>	Bhutan Standards Bureau
<b>CBDRM</b>	Community-Based Disaster Risk Management
<b>CC</b>	Climate Change
<b>CCA</b>	Climate Change Adaptation
<b>CSO</b>	Civil Society Organization
<b>CWC</b>	Centre for Water Commission
<b>DCHS</b>	Division for Conservation of Heritage Sites
<b>DDM</b>	Department of Disaster Management
<b>DDMC</b>	Dzongkhag Disaster Management Committee
<b>DoES</b>	Department of Engineering Services
<b>DGM</b>	Department of Geology and Mines
<b>DGPC</b>	Druk Green Power Corporation
<b>DHMS</b>	Department of Hydro-Met Services
<b>DHS</b>	Department of Human Settlement
<b>DLG</b>	Department of Local Governance
<b>DM</b>	Disaster Management
<b>DMIS</b>	Disaster Management Information System
<b>DMP</b>	Disaster Management Plan
<b>DMS</b>	Department of Medical Services



<b>DoA</b>	Department of Agriculture
<b>DoR</b>	Department of Roads
<b>DRM</b>	Disaster Risk Management
<b>DRR</b>	Disaster Risk Reduction
<b>DT</b>	Dzongkhag Tshogdu
<b>EFRC</b>	Environmental Friendly Road Construction
<b>ESF</b>	Emergency Support Function
<b>EWS</b>	Early Warning System
<b>FYP</b>	Five-Year Plan
<b>GHI</b>	GeoHazards International
<b>GIS</b>	Geographical Information System
<b>GFDRR</b>	Global Facility for Disaster Reduction and Recovery
<b>GLOF</b>	Glacial Lake Outburst Flood
<b>GNH</b>	Gross National Happiness
<b>GNHC</b>	Gross National Happiness Commission
<b>HFA</b>	Hyogo Framework for Action
<b>IAP</b>	ISDR Asia Partnership
<b>ICIMOD</b>	International Center for Integrated Mountain Development
<b>IFRC</b>	International Federation of Red Cross and Red Crescent Societies
<b>IMTF</b>	Inter-Ministerial Task-Force
<b>INSARAG</b>	International Search & Rescue Advisory Group
<b>JDWNRH</b>	Jigme Dorji Wangchuck National Referral Hospital
<b>LG</b>	Local Government
<b>MDGs</b>	Millennium Development Goals
<b>MoAF</b>	Ministry of Agriculture and Forests
<b>MoE</b>	Ministry of Education





<b>MoEA</b>	Ministry of Economic Affairs
<b>MoF</b>	Ministry of Finance
<b>MoH</b>	Ministry of Health
<b>MoHCA</b>	Ministry of Home and Cultural Affairs
<b>MoLHR</b>	Ministry of Labor and Human Resources
<b>MoWHS</b>	Ministry of Works and Human Settlement
<b>NAPA</b>	National Adaptation Program of Action
<b>NDMA</b>	National Disaster Management Authority
<b>NEC</b>	National Environment Commission
<b>NEIC</b>	National Earthquake Information Centre
<b>NEOC</b>	National Emergency Operations Centre
<b>NESB</b>	National Environment Strategy of Bhutan
<b>NIPPP</b>	National Influenza Pandemic Preparedness Plan
<b>NRPP</b>	National Recovery and Reconstruction Plan
<b>NSB</b>	National Statistical Bureau
<b>PDNA</b>	Post-Disaster Needs Assessment
<b>RBA</b>	Royal Bhutan Army
<b>RBP</b>	Royal Bhutan Police
<b>RGoB</b>	Royal Government of Bhutan
<b>RICB</b>	Royal Insurance Corporation of Bhutan
<b>RNR</b>	Renewable Natural Resources
<b>RCSC</b>	Royal Civil Service Commission
<b>SAARC</b>	South Asian Association for Regional Cooperation
<b>SQCA</b>	Standards and Quality Control Authority
<b>SSI</b>	School Safety Initiative
<b>TDMC</b>	Thromde Disaster Management Committee



- UNDP** United Nations Development Programme
- UNDAC** United Nations Disaster Assessment and Coordination
- UNFCCC** United Nations Framework Convention on Climate Change
- UNICEF** United Nations Children's Fund
- UNISDR** United Nations International Strategy for Disaster Reduction
- UNOCHA** United Nations Office for Coordination of Humanitarian Affairs
- WB** World Bank
- WCDR** World Conference on Disaster Reduction
- WFP** World Food Programme
- WHO** World Health Organisation
- WMO** World Metrological Organization







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Special thanks go to the members of the DRM Working Group for attending our discussions and providing crucial feedback throughout the process. We sincerely appreciate the enthusiastic participants of the meeting held. Their feedback shed light on the practical aspects of DRM in Bhutan across sectors.

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The report was put together by Mr. Alexander Barrett, Program Coordinator at ADPC and Ms. Tshering Lhamtshok, Local Consultant in Bhutan. Our gratitude goes to them for their thorough and meticulous work to make this report a comprehensive summary of the current status of DRM in Bhutan.



## Executive Summary

In response to the Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework), this review was carried out to understand the current status of disaster risk management in Bhutan. The Department of Disaster Management (DDM), Ministry of Home and Cultural Affairs (MoHCA), Royal Government of Bhutan (RGoB) led the review with support from the Asian Disaster Preparedness Center (ADPC) and the Ministry of Foreign Affairs, Norway.

This review gives the Royal Government of Bhutan a clear understanding of the progress they have made under the Hyogo Framework for Action 2005-2015 (HFA) as well as highlight where future disaster risk management should be prioritized to ensure effective implementation of the Sendai Framework.

The report is divided into 5 main sections. Section 1 provides information on the background, objectives and methods of the review process. Section 2 presents an overview of Bhutan's socio-economic status, hazard profile, vulnerabilities and impacts of disaster based on available data. Section 3, starts the main body of the report and presents the current status and progress. Section 4 provides a brief account of key stakeholders in DRM in the country. Section 5 presents key issues, challenges and priorities in order of the Sendai Framework priorities.

### ***Section 1: Introduction***

The review followed a pre-structured method of stakeholder mapping, desk reviews, consultations and key informant interviews with stakeholders. A working group involving key stakeholders at the national level facilitated the process.

### ***Section 2: Disaster risk profile***

Bhutan is prone and vulnerable to a range of natural disasters such as earthquakes, glacial lake outburst floods (GLOF), flash floods, windstorms, fires and landslides. The country's geophysical location, its proximity to northeast India falling under Seismic Zone IV, and impacts of past earthquake indicate that Bhutan is at a high risk of seismic related hazards. Recent cyclones have brought unprecedented rain and flooding, putting

immense pressures on road and transport infrastructures. Climate change related Glacier Lake Outburst Flood (GLOF) is a major concern and poses serious risks to settlements and people living downstream. Seasonal strong wind causes damage to rural homes in Bhutan. Other hazards such as landslides, flash flood and forest/structural fires also sweep across the country causing significant damage to property and loss of life and livelihoods. Emerging risks from trans-boundary movement of people and goods such as epidemics and potential risks from nuclear activity in neighboring countries are also of concern to Bhutan.

While Bhutan is exposed to a wide range of natural hazards, its underlying vulnerabilities translate physical exposures to hazards into disaster risks. From poor construction practices, rapid urbanization and inadequate law enforcements to environmental degradation, low level of preparedness and other socio-economic factors render the country and its people vulnerable to both natural disasters and man-made disasters.

### *Section 3: Current status and progress*

In terms of understanding disaster risks, a number of initiatives have contributed to disaster risk management in the country albeit on an ad-hoc basis. Although assessments are mandatory for projects and programs, it is often carried out and shared by various sectors on a needs basis. Mainstreaming DRR into sectoral plans and programs started with the 10th Five Year Plan (FYP) and carries on in the 11th FYP. The DDM uses three tools for pre-disaster information, assessing trends and accounting losses and disaster impacts. Other service sectors, such as the Department of Hydromet Service, have initiated formal protocols for trans-boundary risk information sharing particularly with other South Asian countries.

In terms of strengthening governance to manage disaster risks in the country, Bhutan has developed comprehensive legal and policy instruments and an institutional framework. The DM Act 2013 is the key legislative document supported by the DM Rules and Regulations. In addition, there is an overall strategic plan document, as well as guidelines and action plans that support disaster risk management in various sectors. In order to facilitate planning and implementation of disaster related activities, the National Disaster Management Authority was established as the highest decision making body with technical and managerial support from the





Inter-Ministerial Task Force, the Department of Disaster Management, Dzongkhag Disaster Management Committees at the local level and other private and public sectors as required.

A number of funding mechanisms and insurance initiatives are in place or mandated with regard to investing in disaster risk reduction. This includes the operational response and relief expenditure, disaster relief budget, and insurance schemes for housing and hydropower infrastructures.

In preparing for effective response, sectoral and dzongkhag level contingency plans, His Majesty's Relief Fund, and a number of early warning systems are in operation. Two post disaster recovery and reconstruction plans were carried out after the devastating earthquakes of 2009 and 2011.

#### ***Section 4: Brief account of key stakeholders***

This section provides an overview of relevant stakeholders in Bhutan. It includes various sectors and agencies based on their potential role/contribution to the implementation of the Sendai Framework in Bhutan at all levels.

#### ***Section 5: Key issues, challenges and priorities***

Key issues, challenges and priorities for Bhutan are also reported in order of the four priorities of the Sendai Framework.

### **Priority 1: Understanding disaster risks: issues, challenges and priorities for action**

- There is need for DDM to collect, analyze and manage existing risk assessments that are currently being carried out in an ad-hoc manner.
- Coordination with key sectors to develop multi hazard atlas is a priority engaging technical expertise for long-term development and land use plans.
- Despite the challenges of resources needed to carry out research and plotting of windstorms, it is imperative that this emerging high-risk hazard is included in future risk assessments and planning.



- The existing tools for disaster information, trends and accounting losses and its impacts need to be reviewed and updated to make them functional. The BDA needs to be validated and standardized and made mandatory for all Type III disasters. The updated version of desinventar and DMIS tools need to consider and incorporate Sendai Framework indicators.

## Priority 2: Strengthen disaster risk governance – issues, challenges and priorities for action

- Challenges and issues in terms of coordinating DRM initiatives across sectors still exists in spite of the clear roles and responsibilities spelt out in the current legislative and policy framework. This calls for a more structured approach for engaging DDM in sector based risk reduction initiatives
- There is a need to create smaller or sub-IMTF comprising of hazard related technical expertise to ease the challenges of convening and making decisions.
- A number of sectors that have a greater stake in disaster risk management currently lack DRR considerations in their plans and programs. It is recommended strongly that the mainstreaming of DRR continue as a National Key Result in the 12th FYP.
- The most vulnerable sectors such as road and bridge infrastructure needs to develop new technical standards and specifications that addresses disaster and climate change considerations in the construction processes to build resilient infrastructures.
- There is inadequate evaluation of DRM activities in the country. It is recommended that DDM create a more regular evaluation system with clear indicators to measure progress and create a culture of accountability.
- To address the current issues of poor coordination and communication during emergencies, the National Incident Command System needs to be approved and activated.
- It is recommended that Dzongkhag Disaster Management Officers are made full time and permanent human resources in the dzongkhags



to ensure retention of capacity and mainstream DRR in dzongkhag level plans and programs.

### Priority 3: Invest in DRR for resilience – issues, challenges and priorities for action

- There is a risk currently in government assets and infrastructures being non-insured including critical public infrastructures and heritage buildings. Given the issue of inadequate resources to insure these assets, it is encouraged that sectors carry out cost-benefit analysis for risk sharing.
- In the agriculture sector, there is lack of specific technical knowledge on integrating DRR into planning processes and impacts of disasters on the sector. There is need for MOAF to identify entry points and actions especially in relation to climate change and impacts.
- The Tourism Council of Bhutan needs to identify entry points, sensitize and assess the impacts of disasters on the sector in coordination with DDM.
- The education sector needs to continue building capacity for principals, focal teachers and teams and initiate DRM programs in Early Child Care and Development and special needs children.
- There is a need to integrate DRM into plans and policies of the energy sector and initiate coordination with DDM to share information, lessons learned and resources.
- The information and communication sector needs to support DDM in developing a communication plan or framework for national disaster management system, especially to share information after a disaster occurs.

- It is recommended that DDM establish a formal mechanism to work with the Department of Human Settlement and National Land Management to utilize their capacity in creating hazard maps.
- The Bhutan Building Rules (2002) needs to be reviewed and updated with appropriate information and technologies.

#### Priority 4: Strengthen disaster preparedness for effective response and 'Build Back Better' – issues, challenges and priorities for action

- There is a need to issue an executive order for notified agencies to develop sector contingency plans. This will expedite the overall national DM and contingency planning.
- During the creation of both the national and sectoral contingency plans, it is important to integrate gender and disability considerations.
- There is a need to review and strengthen the capacity of responders and emergency service agencies at the national and local levels in terms of skills, knowledge, equipment and technology.
- There is lack of a centralized early warning system that considers all hazards. It is recommended that DDM carry out an analysis of existing sector-based EWS, identify gaps, consolidate data and information for the upcoming NEOC.
- The NEOC must also standardize processes, communication languages, roles and responsibilities of all actors generating and issuing early warnings to ensure effective information dissemination for all including the marginalized groups.
- There is a need for a comprehensive national recovery strategy to accelerate coordination in assessments, expedite resource allocation and link recovery and reconstruction to develop plans that include climate change aspects of disaster.



# SECTION 1: INTRODUCTION





## 1.1 Context

The Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) requires each State to take the primary responsibility to prevent and reduce disaster risk and at the same time disaster risk reduction (DRR) being the shared responsibility of central governments, relevant national authorities, sectors and stakeholders. The implementation and monitoring of the Sendai Framework would therefore, require that in each country there is a clear understanding among the government, both central and local, sectors, partners and stakeholders of the country's baseline to be able to identify national targets and priorities for action. Understanding the progress and challenges at the national and local levels will be essential for fostering international cooperation and for contributing to the regional and global monitoring of the progress. This report is a step towards understanding disaster risks in Bhutan by analyzing the progress made under the Hyogo Framework for Action 2005-2015 (HFA) in the four priority areas of the Sendai Framework.

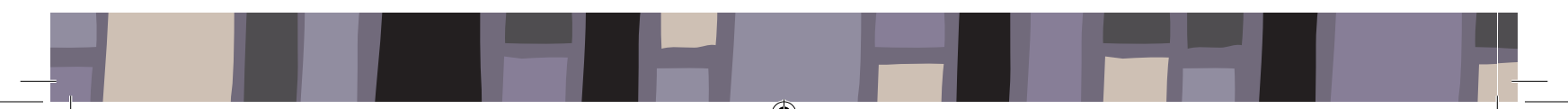
## 1.2 Purpose of the report

The Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) sets the outcome of “substantial reduction of disaster risk and losses”, to be measured against seven global targets that are both quantitative and qualitative, against the baseline of the 2005-2015 period.

The Sendai Framework also requires each State to take the primary responsibility to prevent and reduce disaster risk and at the same time disaster risk reduction become a shared responsibility of central governments, relevant national authorities, sectors and stakeholders.

Over years, countries including Bhutan have improved national monitoring and reporting on DRR progress. The HFA progress monitoring has been an instrumental part of this progress. Nevertheless, information is scattered and little is known on how development sectors understand and manage disaster risks.

Reviewing the status of Bhutan's DRM will help address the above gaps. If developed through a participatory process, it will help enhance collaboration among all sectors and stakeholders in the implementation and monitoring of DRM in general and Sendai Framework in particular.





It will also promote coherence and synergy of future actions to maximize the impacts.

The review will mainly reflect on the status of DRM in Bhutan during the period 2005-2015. The report development is based on desk reviews, National HFA reports, consultative meetings (mainly with key development sectors) and interviews.

### 1.3 Target audience

The report provides an insight into Bhutan's progress in DRM and will help decision makers in assessing the current situation and take appropriate policy decisions for the future. In this regard it would be helpful to the development planning offices at National, Sectoral and Dzongkhag levels. It would also provide vital information to the disaster management apparatus in Bhutan, identifying the key target areas for the future. It would offer assistance to the NGOs, INGOs and international development partners in assessing the country's performance in the field of DRM, identifying areas for future partnership building and priority setting.

### 1.4 Methodology and structure of the report

Bhutan's DRM Status Review followed the outline approved by member countries during the IAP meeting in June 2015 in Bangkok:

- A disaster risk profile of the country
- A DRM status section, broken down into the four priorities of the Sendai Framework
  - Understanding disaster risk
  - Strengthen disaster risk governance to manage disaster risk
  - Invest in DRR for resilience
  - Enhance disaster preparedness for effective response and to "Build Back Better"
- A stakeholder mapping of actors involved in DRM and CCA
- A section focused on the key issues, challenges and priorities for Sendai Framework implementation.



The methodology for the report was through the following approach:

#### **i. Decide on priority sectors for DRM**

The DDM, working with the government and non-government agencies, selected priority sectors for preparing for disaster risks. Prioritized sectors will be chosen through the government's experience as well as specific criteria including:

- a. the contribution to National GDP,
- b. labour force %
- c. Budget allocation
- d. Growth trend of sector (measured by a-c)
- e. vulnerability to disasters,

#### **ii. Stakeholder mapping**

A stakeholder mapping was undertaken initially to understand the actors who are involved in DRM at the national level as well as within each sector. This involved government agencies, civil society, NGOs, UN agencies and private sector.

#### **iii. Create DRM Working Group (DRM-WG)**

A DRM Working Group (DRM-WG) was created to help facilitate the development of the DRM status report. This DRM-WG comprise of:

- Key persons from DRM at the national level including persons from DDM
- Persons from priority sectors
- Development partners

#### **iv. Literature review of accessible information**

While the DRM WG was being created, a literature review of information specific to DRM interventions in the country was carried out. Information gathered included:



- General trends and patterns in disaster occurrences and their impacts losses (mortality and economic losses based on availability of data) due to those events creating a hazard, vulnerability, and risk profile of the country.
- The current status of DRM in the context of the four priorities for action of the Sendai Framework. Reviewing the effort/input by the government and other stakeholders during the last ten years. Specifically analyzing national HFA reports, ten year HFA synthesis reports and other existing status reports
- Efforts/action taken in last decade to enhance the **understanding of disaster risks** at all levels and the availability and use of risk information at national, sub-national and sectoral level.
- The current status of **risk governance** in the country including institutional frameworks, existing policies, strategies and legislations. Assessing the current legislative and regulatory framework, policy environment, institutional structure as well as accountability and implementation mechanisms.
- The current status of **integration of DRR in to selected priority sectors**, focusing on sectoral damages and losses, budget spent and the current status of DRR in the sector. A detailed assessment was necessary in terms of the enabling environment including current policies, plans and legislations supporting integration as well as guidelines, sector budgets and implementation mechanisms.
- The status of **disaster preparedness for response and recovery** in the country and assessing availability of policies, legislations, plans and systems for preparedness, response, early warning, and recovery.

During the collection of this information it will be crucial to properly cite the literature to avoid any plagiarism issues.



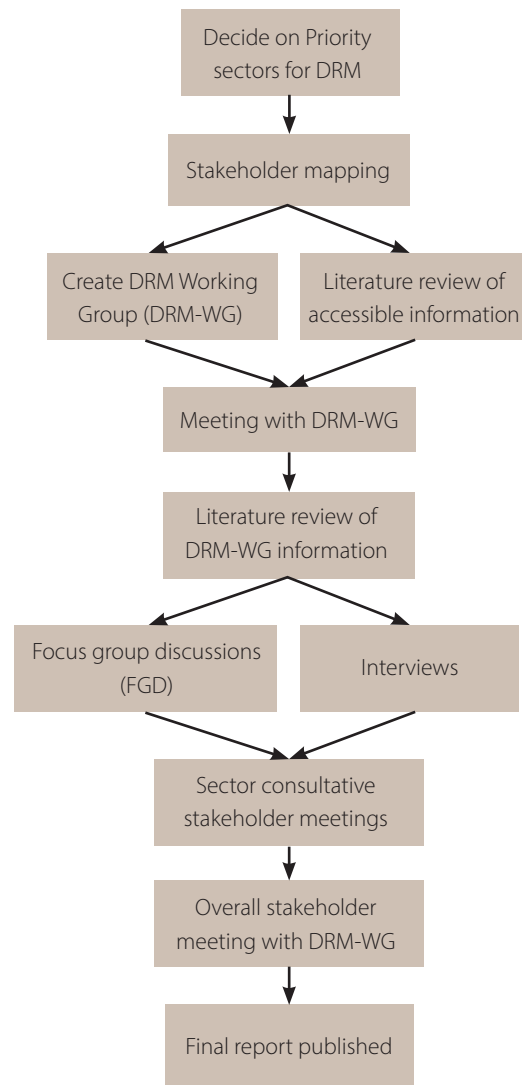


Figure 1.  
The  
approach  
to creating  
Bhutan's  
DRM  
status  
Report

#### v. Focus group discussions (FGDs) and key informant interviews (KIIs)

To collect further information, FGDs and KIIs were carried out with government and non-government agencies at the national level and in priority sectors. These were performed in a manner which gives equal opportunity to marginalized/vulnerable groups. Information gathered at this stage focused on what are the key issues and priorities for the country in implementing the Sendai Framework priorities for action and contributing to the achievement of global targets and outcome. Sector specific key challenges and priorities were also a focus of the discussions and interviews.

#### vi. National and Sector consultative stakeholder meetings

Consultative stakeholder meetings were held at the National level to provide the key findings developed from the FGDs and KIIs. A draft of the report specific to the national level or sector were presented and discussed.



# SECTION 2 : COUNTRY'S DISASTER RISK PROFILE



This section provides a general overview of the trends and patterns in disaster occurrences and their impacts losses (mortality and economic losses based on availability of data) due to those events. A brief depiction of hazard, vulnerability and risk profile of Bhutan is given below.

## 2.1 The Country in Brief

Bhutan is a landlocked country situated in the Eastern Himalayas covering an area of 38,394 sq. km. It is largely mountainous with altitudes ranging from 150 meters in the south to 7500 meters above sea level in the north. A notable geophysical feature of Bhutan is its glaciers in the northern regions covering about 10% of the total surface area bringing a significant amount of freshwater resources to its rivers. Deep and narrow valleys with concentrated populations are carved into the mountain ranges by Bhutan's rivers that are perpetually fed by both glacial melts and the monsoons. Forests are the most dominant land cover, making up 70.5 % of the country's total landmass with a sizeable proportion under its protected area systems (51.4%). Bhutan's climate is as varied as its altitudes and has a larger influence from the Indian monsoons. Temperatures vary according to elevation with cool temperate climate in the central regions, hot and humid towards the South, severe winters and cool summers in the northernmost regions.

### Box1. Key Socio-economic Indicators

GDP per capita (2014):	USD 2611.74
GDP by production: (current prices)	Nu. 55,478.1
GDP real growth rate (2014):	5.46%
Population poverty rate (2012):	12.0%
Projected Population (2014):	759,817
Labor Force (2014):	348,742
Unemployment rate (2014):	2.6%
Literacy rate (2014):	63%
Differently-abled persons (2012):	21,894

Bhutan is one of the least populated countries in Asia with an estimated population of 757,042 in 2015 (NSB, PHCB 2005) currently growing at a rate of 1.2% per annum (Bhutan Poverty Assessment 2014). It is projected to increase to 887,000 by 2030 due to positive population momentum compared to 634,982 counted in 2005 during the population and housing census.



Nearly 60% of the population resides in rural areas depending on agriculture and small-scale livestock farming.

Bhutan has seen a growing trend in urbanization and urban population over the last few decades. The proportion of the population living in urban areas increased from 13% in 1985 to 30.9% in 2005 with an annual urban growth rate of 6% for that duration. By 2014, 37.9% of the population were living in urban areas and growing at a rate of 3.4%. Internal migration from rural to urban areas is a significant factor in determining the rate of urbanization. This high rate of migration is in turn caused by push factors such as higher poverty incidences in rural areas and accessibility to markets and services (RAIRD 2007). Meanwhile, employment and education opportunities are other factors that influence rural urban migration.

According to the Bhutan Poverty Analysis Report 2012, poverty is still a rural phenomenon although trends show a reduction from 31 percent in 2007 to 17 percent in 2012. Poverty in rural areas (16.7%) is also significantly higher than urban areas (1.8%). Households that are poor tend to be larger in size with more children, household heads with low level of education, and employed in the agricultural sector.

## 2.2 Disaster risk profile

### **Hazards**

Bhutan is prone and vulnerable to a range of natural disasters such as earthquakes, GLOF, flash floods, windstorms, forest fires and landslides that have caused significant loss and damages to lives, properties and public infrastructures. Geo-physically, Bhutan is located in the young Himalayan Mountains and considered to be one of most seismically active zones in the world. In the past decades, Bhutan has experienced several earthquakes measuring over 7.0 on the Richter scale claiming lives and rendering people homeless. Recent cyclones had brought unprecedented rain and flooding putting immense pressures on transport infrastructures. Climate change related Glacier Lake Outburst Flood (GLOF) poses another kind of risk to the people of Bhutan living downstream. Seasonal strong wind causes huge damage to rural homes in Bhutan. Other hazards such as landslides, flash flood and forest/structural fires also sweep across the country causing significant losses to the properties and lives of people.





## Earthquake

Bhutan is located in one of the most seismically active zones in the world along the boundary between the Indian and the Eurasian tectonic plates. Although, there is no detailed and comprehensive seismic micro-zonation of Bhutan, it is assumed that the continent-to-continent collision resulting in a stress build-up in the Himalayan region places the country either in Zone IV or V due to its contiguity and proximity to the north-eastern part of India, which falls under the same seismic zonation according to the Bureau of Indian Standards.

There are no official and comprehensive historical records of earthquakes and its impacts in Bhutan. However, a list of seismic events in past four decades is available from various sources

Table 1 Major seismic events in Bhutan 1700 to present

Year	Intensity (Richter Scale)	Epicenter	Impacts
1713	Not available	Not available	Collapse of houses and loss of lives
1897	8.0	Shillong Plateau, India	Destroyed dzongs in Punakha, Lingzhi and damaged dzongs in Wangdiphodrang, Trongsa, Bumthang and Thimphu
1906	6.5	Bhutan-China-India borders	No information
1910	5.7	North of Punakha	No information
1934	8.3	Bihar, India & Nepal borders	No information
1941	6.75	West of Trashigang	No information
1947	7.9	Bhutan	No information
1980	6.1	Sikkim, India	Human casualties
1988	6.4	Bihar, India & Nepal borders	Several landslides
2003	5.5	Paro, Bhutan	Damages to buildings in Thimphu, landslides along highways
2006	5.5 and 5.8	Dewathang	126 houses suffered minor damages
2009	6.1	Mongar	Claimed 12 lives, damaged 4950 houses, 45 BHUs, 117 school, 800 cultural heritage structures, 29 RNR offices and 26 village head (gup) offices with total estimated loss at Nu. 2501 million (USD 42.00)
2011	6.9	Greater Sikkim Area	Loss of one life from earthquake triggered landslide, damages to 6977 rural houses, 22 hospitals, 286 heritage buildings/sites, 27 RNR centers.



The two recent and major earthquakes that occurred in 2009 and 2011 had devastating effects on Bhutan. Please refer to section 2.3 for further information.

### ***Glacial Lake Outburst Floods (GLOF)***

The impact of global climate change and rising temperatures in Bhutan is most visible in the formation of supra-glacial lakes due to accelerated glacier retreat. Consequently, the increase in the volume of water in the lakes leads to glacial lake outburst floods that bring about loss of lives and damages to livelihoods, infrastructure and properties including age-old cultural heritage sites. On October 7, 1994, a partial breach of the Luggye Tsho caused a catastrophic flood wave along its path downstream claiming 22 human lives and causing damage to infrastructures and properties. The risk of potential disasters inflicted by GLOF is particularly pronounced as the entire northern expanse covers 77 glaciers and 2674 glacial lakes of which 25 are expected to pose medium to high risks.

### ***Flashfloods***

Bhutan is also vulnerable to recurrent and seasonal hazards such as flashfloods and landslides on a continuing basis, especially in southern and eastern Bhutan. Most flood events are flash floods, which are local floods of great volume over a short duration. The effects of climate change further impact seasonal hazards and Bhutan has also witnessed more extreme events in recent years. The Cyclone Aila precipitated floods in 2009 affected the whole of Bhutan taking 12 lives and causing losses of more than Nu. 700 million.

### ***Landslides***

Landslides and mudslides are a recurring phenomenon in Bhutan mostly triggered by intense rainfalls on fragile and steep topography during the monsoons. Most landslides tend to occur in the eastern and southern foothill belts where the terrain is steep and rocks underlying the soil cover are highly fractured, allowing easy seepage of water. Other morphological conditions including tremors of an earthquake also contribute to landslides as witnessed in the aftermath of the earthquakes in the past decades. Both urban centers and rural communities that are dependent of critical infrastructures such as roads and the agriculture sectors are susceptible to landslides.



### Windstorm/Rainstorms

Bhutan has witnessed more frequent and widespread windstorms and rainstorms in the recent past believed to be triggered by variations in climate and climate change. Extreme weather events such as excessive precipitation and drought have had its impacts on livelihoods in past while windstorms have affected almost all dzongkhags blowing off roofs of both public infrastructures and traditional houses in the villages. Cyclone Aila, which originated in the Bay of Bengal in May 2009 affected 17 districts and reported 12 lives lost with an estimated damage of Nu. 719 million.

Table 2 Windstorms in Bhutan 2010 to present  
(Sources: Consolidated from ADRC Bhutan Country Report, 2015 and Kuensel issue Sunday, August 2016)

Year	Area Affected	Damage and Loss
April 2011	17 Dzongkhags	Roof damages to 2424 rural homes, 77 monasteries, 4 stupas, 57 education centers, 21 BHU/ORC, 6 RNR offices, 4 gup offices and 3 RBP building
Mar-Apr 2012	4 Dzongkhags	Roof damages to 221 rural homes, 10 monasteries, 4 schools and 1 RNR office structure
July 2013	1 Dzongkhag	Roof damages to 4 houses
Sept 2013	1 Dzongkhag	Roof damages to 22 rural houses, 1 RNR office, 1 ERC and damages to crops (less than 100 acres)
Dec 2013	13 Dzongkhags	Roof damages to 1012 rural houses, 12 education centers, 58 cultural heritage sites, 3 local government offices, and 8 BHU/ORC
Mar-May 2014	8 Dzongkhags	Roof damages to 208 rural houses 2 schools, 20 government structures and 4 monasteries
April 2015	9 Dzongkhags	Damages to 792 houses, 92 cultural and public infrastructures, 3 people injured.



### *Fire on Human Settlements and Forest Resources*

On June 24 2012, the four-century-old Wangduephodrang Dzong was razed down to the ground by a fire causing irrevocable damage and loss to Bhutan in terms of its rich cultural heritage. Similarly, fires have destroyed homes and taken human lives in the past. In 2002, 25 traditional houses in Haa valley burnt to the ground while in 2011, two fire incidents razed through Chamkhar town causing heavy loss and damage to 92 households.

Fire incidences on human settlements and forests are on the rise annually in Bhutan. Forest fires in Bhutan are mostly manmade in nature and incur huge losses to its biodiversity and livelihoods of rural communities. Besides, impacts and losses in terms of related ecosystem services is unaccounted and often difficult to measure. On average, an estimated 10,000 acres of forest cover is lost to forest fire annually.

### *Epidemics, pests and diseases*

Communities in Bhutan have been affected by outbreak of pest and epidemic diseases in the past. Malaria has largely affected the southern belt, but is today on the verge of elimination with no death cases reported since 2012 and only 64 cases reported in 2015, half of which imported from India. However, the recent influenza pandemic in the region has been a cause of concern for Bhutan. Bhutan's contact with the outside world has increased with the convenience of both air and surface travel to the countries of the region. Bhutan's porous border with India and frequent exchange of poultry products heighten the risk of infections in the eventuality that India is affected by the pandemic. In response, the National Influenza Pandemic Plan for Avian Flu has been prepared by the Department of Livestock, Ministry of Agriculture, with WHO support, to facilitate clinical surveillance and testing of animals/ birds with symptoms.

Bhutan is also the roosting ground for a large number of black-necked cranes and other wild birds that migrate to Bhutan from across its borders. They can be potential carriers of Avian flu into the country.

## 2.3 Vulnerabilities

While Bhutan is exposed to a wide range of natural hazards, it is the underlying vulnerabilities that translate physical exposure to hazards into disaster risks. These include poor construction practices, inadequate



enforcement of building by-laws, rapid urbanization, environmental degradation awareness on disaster risk reduction and planning. The limited availability of safe land for construction in mountainous region, scattered settlement patterns and irregular climatic conditions further aggravate vulnerabilities.

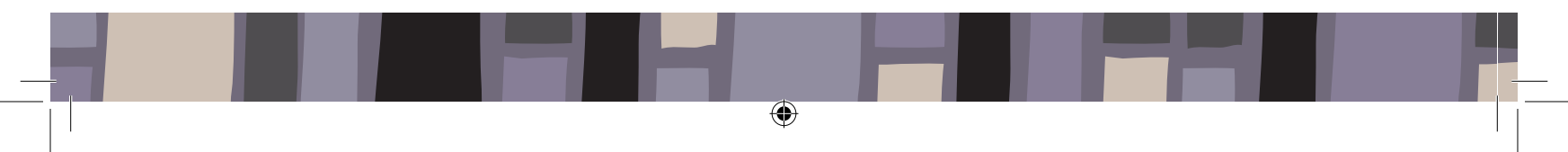
### *Unsafe construction practices*

Bhutan has a strong tradition of vernacular houses, made of stone, rammed earth and timber. However, safety of traditional constructions has suffered due to the loss of traditional safe construction practices and techniques and lack of adequate masonry skills, particularly in the rural areas. The past two earthquake events caused extensive damages to rural homes all over Bhutan demonstrating high vulnerability of traditional buildings to earthquakes and other natural hazards. The Bhutan Building Codes, 2003 mandates inclusion of earthquake-resistant design features in engineering structures but there are no codes yet for non-engineered constructions like rural homes, and community built structures. There is a strong need for research and consolidation of indigenous knowledge related to traditional structures that would help strengthen and conserve traditional construction practices.

The lack of incorporation of adequate disaster risk reduction elements beginning with safe locations, disaster resilient building designs and construction, renders physical infrastructure in both public as well as private domain susceptible to natural hazards. Inadequate monitoring and quality check of construction materials and buildings are also important issues. In addition, insufficient technical expertise among engineers, architects, masons and other building artisans on disaster-resistant construction practices also increases vulnerability of physical structures.

### *Unplanned urbanization*

Bhutan witnessed a spurt of urbanization in the last few decades and this growth has been unplanned and haphazard. Increasing population, population densities, built structure and other demographics have increased exposure and risks to hazards in urban centers like Thimphu and Phuentsholing and other emerging townships. The continuation of developmental activities in hazard/red-zone areas, for example in the GLOF red zone areas in Punakha and Wangdue valleys is a serious concern.





These kind of development lead to increasing exposure and higher vulnerability resulting in irrecoverable losses during disasters.

There is also insufficient and slack enforcement of building by-laws and codes in the urban areas. Weak enforcement of building by-laws and codes in the urban areas due to lack of expertise and trained human resources to enforce the same is a major factor contributing to the vulnerability of the built-form. The compliance among common people is also low due to a general apathy to disaster risk management issues.

#### ***Socio-economic factors***

Socio-economic conditions compel socio-economically disadvantaged sections to live in unsafe and hazardous areas such as steep slopes or flood-prone riverbanks and adopt livelihood patterns that increase their vulnerability to hazards and expose them to a high degree of risk. This can be attributed to either the lack of well-planned settlement and land use planning policies, hazard zonation mapping in settlements and the high migration rate to urban settlements. Another dimension to this factor is the increasing loss of social norms and traditions such as the disintegration of joint family structures and the erosion of community ties and social practices that could affect the resilience of individuals and families to disasters.

#### ***Remote settlements and fragile road networks***

Bhutan's mountainous terrain has resulted in physically remote and isolated settlements that could be rendered inaccessible during major hazards and emergencies. The lack of emergency communication facilities and procedures and the fragile road network and transportation system further add to the vulnerability.

#### ***Inadequate levels of awareness***

There is a need for sustained awareness and advocacy efforts at all levels. At the decision making level, there is a need to develop a common understanding on the existing hazards, the level of risk and the priority actions needed to be implemented; at the sector and local government level there is a need to understand the importance of mainstreaming DRR and enhancing preparedness and response capacities; and at the community levels, both urban and rural, there is a need to help identify hazards and risks and take actions for safety and resilience. There has been significant



progress in the education and health sectors, however, knowledge and awareness levels are low at community level, both rural and urban. There is still a need for all stakeholders (government, parliamentarians, businesses, civil society organizations, etc.) to understand that disasters are a manifestation of underlying risk factors and to be united in efforts to integrate disaster risk reduction and climate change adaptation within development policy and practices for sustainable development.

### *Low levels of preparedness and response capacities*

There is a general lack of disaster preparedness and response planning at all levels – national, sector, dzongkhag, gewog, community and family. There is a need to revisit and revalidate the DM and contingency planning guidelines at various levels to enable the development and adoption of disaster management and contingency plans as mandated by the DM Act, 2013. The limited capacity in early warning, risk communication and response at all levels also add to increasing vulnerabilities.

### *Vulnerability of Key Facilities*

It is imperative for key facilities such as health centers, schools, disaster management facilities and key public and administrative buildings to be disaster resilient to ensure their functionality during emergencies. Structural performance of schools and health facilities were unsatisfactory during the past disaster events. There is a need to prioritize vulnerability assessments of these key facilities (including critical disaster management and telecommunication facilities) to enable systematic and mandatory incorporation of seismic resistant and other hazard resilient features particularly for schools, hospitals and other health centers.

JICA is currently supporting Bhutan Telecom to come up with a Business Continuity Planning project for disaster control, which will include multi-hazard mapping of BT infrastructure. Bhutan Telecom is in the implementation stage of this project. It will be implemented in Thimphu, Bumthang, Samtse, Gelephu, Samdrup Jongkhar and Trashigang.

### *Vulnerability of heritage buildings*

Safety and disaster resilience of heritage buildings and monuments is of utmost importance as the loss of such heritage structures and more importantly their contents are irreplaceable. The destruction of



Wangduephodrang Dzong was an important reminder. In addition to the Dzongs, most of the other heritage buildings and monuments (lhakhangs, dzongs, chortens, etc.) are also equally vulnerable. There is a need to urgently focus efforts on making heritage building sites and monuments disaster resilient.

#### *Poor development of risk transfer mechanisms*

A well-designed risk financing program enables a disaster-prone country to avoid major economic disruptions following natural disasters by meeting its post-disaster funding needs without resorting to major budget reallocations, additional taxation, or external borrowing. There is need for Bhutan to have a well-designed risk- financing program to ensure post-disaster funding needs are fulfilled, as well as to facilitate means to build back better in the aftermath of a disaster.

#### *Environmental degradation*

Environment conservation is an important cross-cutting theme for Bhutan and the Constitution mandates sixty percent of Bhutan's land mass to be under forest cover for all times to come. However, the increasing population and rapid urbanization in major cities and towns is putting a strain on the surrounding environment due to inappropriate infrastructure planning and construction. Development of roads require cutting into the fragile mountain sides leading to landslides and similarly mining activities lead to rapid degradation and denudation of hills causing landslides, flash floods and siltation in river systems. Deforestation due to forest fires, over-grazing and fuel wood collection also exacerbates such hazards. Timely interventions are necessary to curtail or mitigate environmental degradation before the situation becomes precarious threatening human settlements and other national assets.

## 2.4 Disaster Risk and losses during 2005-2015

Two reports on damage and loss assessments are available from the joint rapid assessments carried out collaboratively with officials from the Royal Government of Bhutan, UN agencies and the World Bank in 2009 and 2011.

In 2009, cyclone Aila caused flooding in 17 dzongkhags with an estimated loss of USD 17 million (BTN 719 million) in property damages.





Table 3: Estimated value of loss of September 2009 earthquake. (Source: RGOB, World Bank and United Nations. Joint Rapid Assessment for Recovery, Reconstruction and Risk Reduction. 2009.)

Sl. No.	Sectors	Number of structures affected	Approximate Total Loss	
			(Nu. in million)	USD in million
1	Shelter	4614	1119	23.3
2	Education	91	594	12.3
3	Cultural Heritage	773	650	13.5
4	Health	29	124	2.6
5	Government & Public Offices	49	14	0.3
Grand Total			2501	52

According to the report, a total of 4,614 households were reported to have been affected in 12 dzongkhags, representing approximately ten percent of all households in some areas. An estimated 7,290 people were left without adequate shelter. The earthquake caused destruction of infrastructure and institutions including 91 schools, 25 health centers and hospitals, 50 government offices, 281 monasteries, and 485 stupas (chortens) and 7 Dzongs (district administration centers). Twelve people died and 47 were injured during the earthquake.

Table 4 Estimated value of loss of September 2011 earthquake. (Source: RGOB, World Bank and United Nations. Joint Rapid Assessment for Recovery, Reconstruction and Risk Reduction. 2011.)

Sl. No.	Sectors	Approximate Total Loss	
		(Nu. in million)	USD in million
1	Housing	774.00	15.80
2	Education	50.18	1.02
3	Cultural Heritage	340.91	6.96
4	Health	10.23	0.22
5	Government & Public Offices	16.73	0.34
6	Agriculture	5.58	0.12
	Total Loss	1,197.63	24.26

In the aftermath of the 2011 earthquake, 345 houses were completely destroyed, 1,660 suffered major damages, and 5,960 suffered minor damages. In addition to houses, religious and cultural heritage monuments including 13 dzongs, 119 choetens and 355 lhakhangs were affected to varying degrees. Several government and public buildings including 47 gup's offices, 31 Renewable Natural Resources (RNR) centers, and 47 other public buildings suffered damages. One hundred and seventeen school buildings including extended classrooms and non-formal education centers were also affected. The earthquake caused 1 death (due to landslide) and injuries to 14 people.

It is estimated that approximately 7% of the total population has been directly affected by the earthquake.

*Insurance Claims paid in 2014 and 2015 for rural housing*

The Royal Insurance Corporation of Bhutan Limited insures rural housing for structural damages. Available data on claims in years 2014 and 2015 totaled USD 1.6 million for all hazards while a total of 2422 houses were affected.

Table 5 RIC Insurance claims from damage to rural houses by hazard

Hazard Type	2014			2015		
	No. of HH	Claims (Nu. million)	Claims (USD. million)	No. of HH	Claims (Nu. million)	Claims (USD. million)
Earthquake	86	1.5	0.03	315	3.69	0.06
Fire	92	8	0.13	54	4.47	0.07
Windstorm	637	11.97	0.20	1125	19.33	0.29
landslide	14	0.34	0.01	39	1.62	0.02
Flood	3	0.08	0.00	0	0	0.00
Other	34	0.5	0.01	23	0.22	0.00
Total	866	22.39	0.37	1556	29.33	0.44



# SECTION 3 : DRM STATUS AND PROGRESS



This section presents the current status of DRM in the context of the four priorities for action of the Sendai Framework. Each sub section will provide an account of the effort/ input being put by the government and other stakeholders during the last ten years (2005-2015).

### 3.1 Understand disaster risk

#### *National and local risk assessments*

In Bhutan, assessments are mandatory for any project carried out by the Royal Government of Bhutan, often with a disaster aspect to them. The Gross National Happiness Commission (GNHC) is currently integrating DRR assessments within sectors planning processes.

From a mainstreaming DRR perspective, there is a direction from the RGOB that DRR is integrated into programs. As a policy matter, it is important that assessments are integrated into plans and programs. The 11th Five-year plan has identified 'improved disaster resilience and management' as one of the Sixteen National Key Result Areas. Through this, DRR has been mainstreamed into a number of sectors including the carrying out of disaster risk assessments.

A number of risk assessments have been carried out by different stakeholders, each looking at a particular hazard at different geographical area. The following are some of the key assessments carried out in the last decade:



Table 6. Risk assessments carried out in Bhutan between 2005-2015

Title of Assessment	Year Conducted	Leading Agency	Hazard Covered	Area Covered
Biological hazards on import of chicken, (Meat, DOC, eggs, used eggs tray, infected feeds from Infected farms,) Plants: uncertified plant and plant products, soil, bio-agent.	2012-2015	BAFRA (MoAF)	Biological hazards (Bacterial & Viral)	Exporting countries and importing agencies
Forest fire risk area and hazard mapping	2014-2015	DOFPS (MOAF)	Fire	All Dzongkhags
Geological and geo-thermal assessments for slope stability of Trashigang Dzong	2013	DCHS (MoHCA)	Landslide	Trashigang Dzong
Need assessment for earthquake depilation condition for the country	2005-2015	DCHS, DOC (MoHCA)	Earthquake	All Dzongkhags
Probabilistic seismic hazards assessment	2010-2017	DGM (MoEA)	Earthquake	All Dzongkhag
Landslide inventory mapping in Samtse and Chukha	2012-Ongoing	DGM (MoEA)	Landslide	Samtse and Chukha dzongkhags
Updating GLOF hazard map along Punatsangchu valley	2015-2019	DGM (MoEA)	Flood	Punatsangchu valley
Monitoring and assessment of changes in glaciers, snow and glacio-hydrology in Bhutan	2014-2017	DHMS (MoEA)	GLOF, Flood	Four basins of Wangchu, Punatsangchu, Magdechu and Chamkharchu
Earthquake risk assessment and impacts on structural failures	2008-2015	DGPC	Earthquake	Hydropower infrastructure
Risk of fire emergencies inside powerhouse	2008-2015	DGPC	Fire	Hydropower infrastructure



Title of Assessment	Year Conducted	Leading Agency	Hazard Covered	Area Covered
Vulnerability assessment on earthquake	Dec 2013- Jan 2014	MoE	Earthquake	Seven dzongkhags
HVCA for all hazards covering all dzongkhags (Education/SAVE)	2016	MoE	Multi-hazard	All Dzongkhags
Initial seismic vulnerability assessment of JDWNRH	2012	JDWNRH	Earthquake	JDWNRH
Initial seismic vulnerability of district hospitals in Trashiyangtse and Trashigang	2013	MoH & GHI	Earthquake	Trashiyangtse District Hospital and Trashigang District Hospital
Vulnerability and adaptation assessments (SNC)	2011	NEC	Vulnerability assessment for water, agriculture and forest	Wangchu river basin (Thimphu, Haa, Paro and Chhukha) Kanglung (maize) Bhur (rice) Phobjikha (Potato) Entire country (forests)
Geotechnical study and hazard mapping for Valley Development Planning	2013- Ongoing	MOWHS	Multi Hazard	Numerous Valleys and Urban areas
Bridge condition assessment	2013-2015	DoR (MoWHS)	Flood	All Dzongkhags
Slope disaster study Rapid Baseline Assessment of Local Preparedness and Responsiveness to Climate Induced Hazards	2014-2016 2015	DoR (MoWHS) NEC	Landslide Climate induced hazards	80 kms stretch along Tronsa-Wandgi-Reotala National level
Vulnerability and adaptation assessment on health outcomes associated with climate variability and change	2012 - 2014	MOH	Vector borne diseases, water borne diseases and climate induced disasters	National Level



Title of Assessment	Year Conducted	Leading Agency	Hazard Covered	Area Covered
Study on the conservation of rammed earth buildings in the Kingdom of Bhutan	2013-2017	DOC (MoHCA)	Earthquake	National level (Wangduphodrang Dzong Case Study)
Study of typology of rammed earth buildings, workshop resolving structural issues related to Traditional Bhutanese Buildings particularly Dzongs (case: Wangduphodrang Dzong)	1999-2007	DOC (MoHCA)	Landslides	National level
Detailed soil surveys and maps	1999-2007	NSSC (MOAF)	Landslides	National level
Seismic Risk Assessment		Thimphu Thromde	Earthquake	National level Thimphu Thromde

*Collection, analysis, management and use of disaggregated data and information*

As can be seen in the list of risk assessments carried out, a number of agencies are involved in the collection of risk information. The following table lists agencies that used disaster risk assessment as a precondition for sector development planning and programming.





Table 7 Collection and analysis of risk information by sectors

Sector/Agency	Information collection protocol/mechanism	Purpose
Human Settlement (DHS)	No systematic information collection and update Multi hazard information collection in collaboration with other service agencies such as DHMS and DGM	Multi-hazard mapping for valley development, Thimphu earthquake risk management, DM plans for Thimphu and Phuntsholing Thromdes (municipalities)
Education	HVCA and CBDRM processes at national and local levels	HVCA used for planning DM and Contingency Plans for MOE and School DM plans
Livestock	Risks are assessed on a daily basis for import of plant and animal products.	Outputs are used for preparedness, response and mitigation measures
Health	Risk assessments on pandemics	Outputs used for program planning and budgeting for surveillance and monitoring
Forest	There is no systematic collection of risk information although there is one assessment on forest fire hazard mapping	
Energy	All hydropower planning and plan approval require comprehensive assessments including geological, social and environmental impact assessments. There is no formal data collection and update protocols in place for commissioned hydropower plants. However, risk assessments are carried out as per ISO certification of DGPC (Information Management System)	Preparation of Detailed Project Report and EAP
Geology and Mines	Information collection protocol/mechanism	Purpose
Hydro Meteorology	Data Management System of DHMS is a formal protocol for periodical and systematic update of hydrology and meteorology data/information with annual maintenance and calibrations	(i) Forecasting and disseminating to the public through media (ii) Hydropower development planning



Sector/Agency	Information collection protocol/mechanism	Purpose
Culture	No systematic assessment and analysis available but inventories of heritage sites and risk assessments are carried out	Planning for protection and promotion of heritage sites
Road Infrastructure	Impacts assessments are mandatory for all road construction projects	Planning, approval and construction

Currently risk information is collected on a needs basis by sectors meaning that there is no formal mechanism for developing and updating risk information. This information is also shared between stakeholders in an ad-hoc manner when the need arises.

### Disaster loss accounting at national and local levels

The DDM currently uses three tools in its disaster loss accounting, which uses information gathered at the Dzongkhag level and is collected to create a national level accounting system. The three tools are the desinventar, the Disaster Management Information System (DMIS) and the Bhutan Disaster Assessment Tool (BDA)

The **desinventar** is a disaster information management system created for the systematic collection, documentation and analysis of data and trends on losses and impacts caused by disasters associated with natural hazards. With increased understanding of the disaster trends and their impacts, better prevention, mitigation and preparedness measures can be planned to reduce the impact of disasters on the communities.

The **DMIS** is a web-based database system to record pre-disaster information including infrastructure inventory, SAR equipment, capacity building activities such as list of trained personnel and contact information of disaster related entities.

The **BDA** is a tool used for compilation of damages during and immediately after the disaster. In order to compile the exhaustive information that may be required by essential sectors. Focal persons and IT officials in



20 dzongkhags received training in the use of the tool. The BDA covers the following areas:

- Education
- Protection
- Shelter
- Health & Nutrition
- WASH (Water, Sanitation and Hygiene)
- Food & Livelihoods
- Transport & Communications
- Culture

The BDA tools have different forms for different stages of Disaster period. The different stages of disaster periods are as follows:

1. Preliminary Disaster Report: to be used for preliminary damage assessment within 24 hours.
2. Initial Assessment of Disaster Scenario (IADS): to be used for the assessment of the damages within 72 hours.
3. Local Authority Assessment (LAA) and Household Level Assessment (HLA): to be used for detail damages assessment within 15 days.

### **Regional/trans-boundary risks**

A number of protocols are currently in place for trans-boundary risk information sharing particularly with other South Asian countries.

The Flood Warning Section under the Department of Hydromet Services (DHMS) within the Ministry of Economic Affairs in collaboration with the Central Water Commission of India provides early warning based on flood monitoring stations under operation in Bhutan. Information and data on river water level and rainfall data from the stations are continuously transmitted to designated stations in the Indian States of West Bengal and Assam. The flood warning stations are monitored 24 hours during the monsoon season and data are transmitted using wireless sets on an hourly basis to stations in India.

The web based Regional Flood Information System under the Hindu Kush Himalayan Hydrological Cycle System (HKH HYCOS) project aims at making flood information available to minimize the loss of lives and property involving four countries of Bhutan, Nepal, Bangladesh and Pakistan.



The contingency plan for the Bhutan Agriculture and Food Regulatory Authority (BAFRA), under the Ministry of Agriculture and Forest include notifying trading partners (external) and importing agencies about outbreaks and infected areas.

The Ministry of Agriculture and Forests (MoAF) and Ministry of Health (MoH) together drafted the National Influenza Pandemic Preparedness Plan (NIPPP) that contains mechanisms for both responding to influenza pandemics across the border as well as mechanisms for notifying the relevant countries of an outbreak within Bhutan.

Surveillance and reporting mechanism have been developed by the Ministry of Health to be able to notify Public Health Events of International Concern as required by the International Health Regulations (IHR 2005).

### 3.2 Strengthen disaster risk governance to manage disaster risk

#### **Legislative and regulatory framework related to DRR**

In 2006, the Department of Disaster Management in collaboration with relevant agencies formulated the National Disaster Risk Management Framework (NDRMF), the first guiding principle for the policy and planning disaster activities in Bhutan. However, due to the increase of populations and urbanization, combined with better understanding for how to address disaster risk, Bhutan enacted the Disaster Management Act of Bhutan 2013, which nullifies the NDRMF.

The Disaster Management Act 2013 (DM Act) is the key legislative document supported by the Disaster Management Rules and Regulations 2014. The purpose of the DM Act is to provide for:

- a) The establishment and strengthening of institutional capacity for disaster management;
- b) Mainstreaming of disaster risk reduction;
- c) An integrated and coordinated disaster management focusing on community participation; and
- d) Matters incidental thereto.



(DM Act, 2013)

The DM Rules and Regulations establishes an administrative and regulatory framework for disaster management, including the:

- Disaster management institution framework;
- Rules for business and governance;
- The functioning of the Critical Disaster Management Facility;
- The functioning of the Emergency Operation Centre;
- Roles, principles and functioning of Early Warning Systems;
- Functions of the Search and Rescue Team;
- How Disasters are classified;
- Trigger Mechanism for response;
- Rules and regulations in the response phase;
- Financial arrangements;
- Application and grievance procedures;
- Role of CSOs, religious organisations and volunteers; and
- Rules for International assistance.

(DM Rules and Regulations, 2014)

A number of other legislative documents in Bhutan also includes aspects of disaster risk management. The following table outlines the key documents and their relevance to DRM:

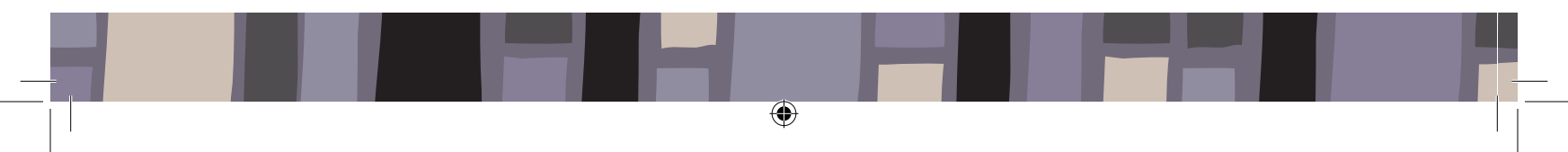




Table 8. Key laws and regulatory frameworks related to DRM

Title of Laws and regulatory frameworks, policies	Year law came into effect	Relevance to disaster risk management
Constitution of the Kingdom of Bhutan	2008	Article 33 states how a state of emergency is called as well as the steps needed to be undertaken for when a state of emergency is called.
Forest and Nature Conservation Act	1995	Highlights the need for fire protection measures to protect forests (Section 31)
Livestock Act of Bhutan	2001	Prevents and control of livestock disease outbreaks.
Bhutan Buildings Rules	2002	Contains structural control standards in the analysis of structure and in the design of structure particularly for increasing resilience to earthquakes and fire.
The Food Act of Bhutan	2005	National Food Quality and Safety Commission responsible for "in the case of a food emergency, identify the organizations or units responsible for taking action, specify the actions to be taken, coordinate a national response and keep records of any such food emergencies".
Bhutan Information and Media Act	2006	Responsibility of Minister to "promote the use of ICT to enhance crisis preparedness, response and consequence management of natural and man-made disasters".
Land Rules And Regulations	2007	One of the criteria for leasing Government Reserved Forests Land for Establishment of Commercial Agriculture Farms is that the land must avoid areas vulnerable to natural risk, hazards and disasters (paragraph 387)
National Environmental Protection Act	2007	Highlights actions relating to Environmental emergencies (paragraph 63-65).
Thromde Rules	2011	A general function of a Thromde is: "Prevention and management of disasters" (paragraph 8 o)
The Water Act of Bhutan	2011	Highlights that in the construction and safety of water infrastructure, a commission or competent body can carry out a number of actions for the purpose of preventing or minimizing the risk of flooding and flood damage. (Paragraph 48 d). Also includes actions necessary in water related emergencies (Paragraph 54).



Title of Laws and regulatory frameworks, policies	Year law came into effect	Relevance to disaster risk management
Forest Fire Rules of Bhutan	2012	Facilitates effective implementation of section 31 of the Forest and Nature Conservation Act
Road Act	2013	One of the Department of Roads responsibility is to: "Notify the general public with accurate and real time information on the road condition during road blocks caused by natural disasters, landslides, snow and such other similar causes" Paragraph 19 (12) and "Mobilize machinery and human resources in the event of a natural disaster to restore and keep the affected road open to traffic" Paragraph 19 (16)
Rural Construction Rules	2013	Regarding building standards: "All constructions shall meet the basic standards of health, hygiene and safety including earthquake resilience and fire and wind safety measures as prescribed in the Bhutan Building Rules and the Building Codes of Bhutan". Paragraph 29
The Water Regulation of Bhutan	2014	A number of actions are included in this document related to flood risk including the use of flood risk buffer zones and River Basin Management Plans which would include the information on flood risk zones. Information for allocation of strategic fire hydrants is also included. The MoHCA's function includes: "Develop and maintain an efficient information dissemination system to inform the public in times of water related natural disasters and coordinate on preparedness and mitigation measures to be taken during such events (Paragraph 12 c)
The Waste Prevention and Management Act	2009	There are specific clauses within the act on prevention and management of hazardous and e-wastes by relevant agencies (paragraph 13 and 15)



## **Institutional framework**

### *The National Disaster Management Authority*

Clause 7 of the DM Act 2013 established the National Disaster Management Authority (NDMA), as the highest decision making body on disaster management in Bhutan.

The NDMA comprises of:

1. The Prime Minister, as the ex-officio Chairperson;
2. The Minister for Home and Cultural Affairs, ex-officio Vice Chairperson;
3. The Finance Minister;
4. The Secretaries of all Ministries;
5. Gyalpoi Zimpon;
6. Head of the National Environment Commission;
7. President, Bhutan Chamber of Commerce and Industry;
8. Head, Department of Disaster Management as Member Secretary; and
9. Such other member as may be co-opted in accordance with rules framed under the Act.

The NDMA is responsible for approving - national DM strategies, policies; the national DM and Contingency Plan; vulnerability and hazard zonation maps; structural and nonstructural measures, national standards, guidelines and procedures.

The NDMA is also responsible for allocation of DM related funds; directing agencies to mainstream disaster risk reduction into their development plans, policies, programs and projects; and ensuring the establishment of an Inter-Ministerial Task Force.

In addition, the NDMA has the power to direct any agency including private sector on disaster management; establish/commission research, develop and provide training in the field of disaster management; direct the Department of Disaster Management, Dzongkhag Disaster Management Committees and agencies including the private sector as may be necessary for the effective implementation of the Act; or perform such other function as may be prescribed under the Act or any law in force. (DDM, 2016)





### *The Inter-Ministerial Task Force*

The constitution of the Inter-Ministerial Task Force (IMTF) is mandated by Clause 49 of the DM Act 2013. The IMTF comprises of technical experts from relevant agencies and will consist of such number of members as prescribed by the NDMA. The Head of the DDM is the ex-officio chairperson of the IMTF.

The IMTF is responsible for review of – hazard zonation and vulnerability maps; structural and non-structural measures; risk reduction activities; national standards, guidelines and operating procedures. The IMTF will also provide technical assistance in the preparation of the National DM and contingency plan and advice the setup of critical disaster management facilities. (DDM, 2016)

The DM Act 2013 mandates the creation of the IMTF however there have been some implementation issues. As the IMTF is on body that includes all technical bodies, it is difficult to find a time when all members are available to meet.

### *The Department of Disaster Management*

The DDM is designated as the Secretariat and executive arm of the NDMA as per clause 59 of the DM Act 2013. As the nodal National Coordinating Agency for disaster management, the DDM is responsible for - laying down strategies, policies for disaster management; ensuring that agencies mainstream DRR; preparing the National Plan in coordination with relevant Agencies; formulating national standards, guidelines and procedures for disaster management; developing and implementing public education, awareness and capacity building programme; developing standard training module and curriculum on disaster management; developing and maintaining Disaster Management Information System; and ensuring implementation of Disaster Management and Contingency Plans.

DDM is also responsible for facilitating - the constitution and functioning of DM Committees; the formulation of hazard zonation and vulnerability maps by relevant agencies; the set up and functioning of Critical Disaster Management Facilities; the establishment/commissioning of research, development and training in the field of disaster management; collaboration with other countries, organizations, nongovernmental organizations, business establishments; and coordination of international disaster response, relief and recovery assistance. (DDM, 2016)



### *Agencies and Private Sector*

Clause 66 of the DM Act 2013 mandates every agency, including private sector, notified by the NDMA to institute a disaster management unit in its organization. A notified agency (Ministry, sector, organization) is responsible for - preparing and implementing disaster management and contingency plans; putting in place measures to ensure continuity of critical services in the event of a disaster; hazard zonation and vulnerability maps; developing and compliance of structural and non-structural measures; ensuring the establishment and functioning of critical disaster management facilities; providing assistance to DDMCs as and when required and perform other functions as directed by the NDMA. A detailed profile of key sectors/institutions related to disaster risk management in Bhutan is listed in section 4.

Similarly, the notified private sector agencies are also responsible for preparing and implementing DM and contingency plans, ensure continuity of critical facilities, provide assistance whenever required and perform other functions as prescribed under the DM Act 2013. (DDM, 2016)



Figure 2 Bhutan's DRM Institutions (Source DDM)

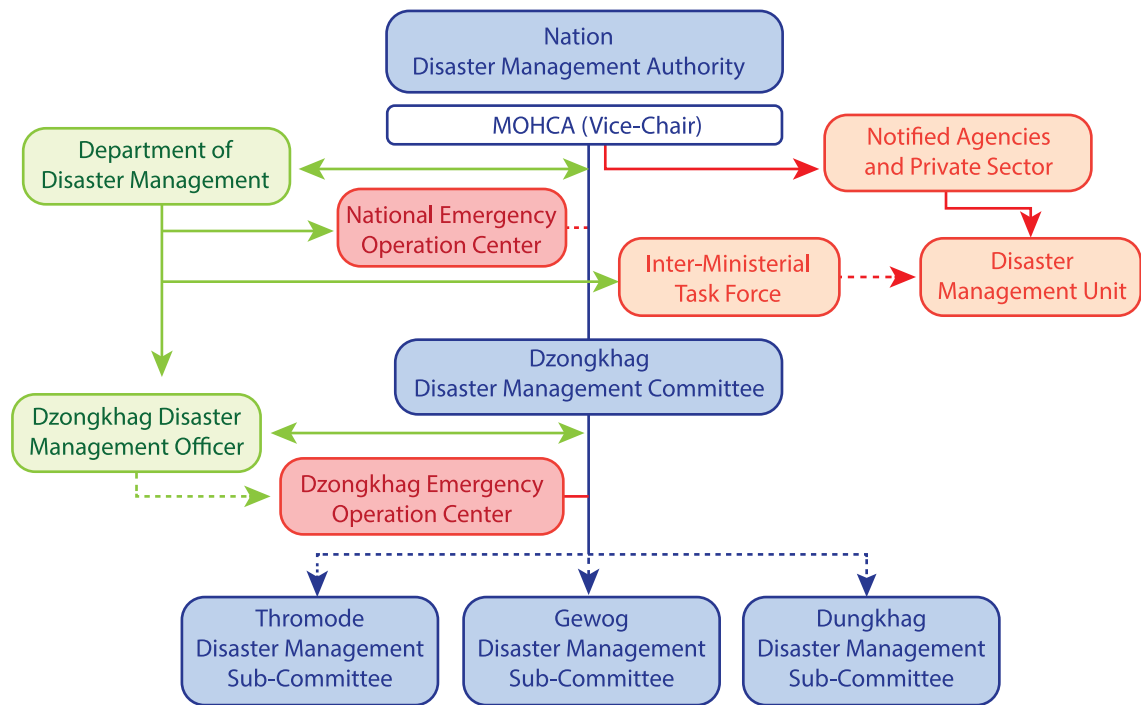
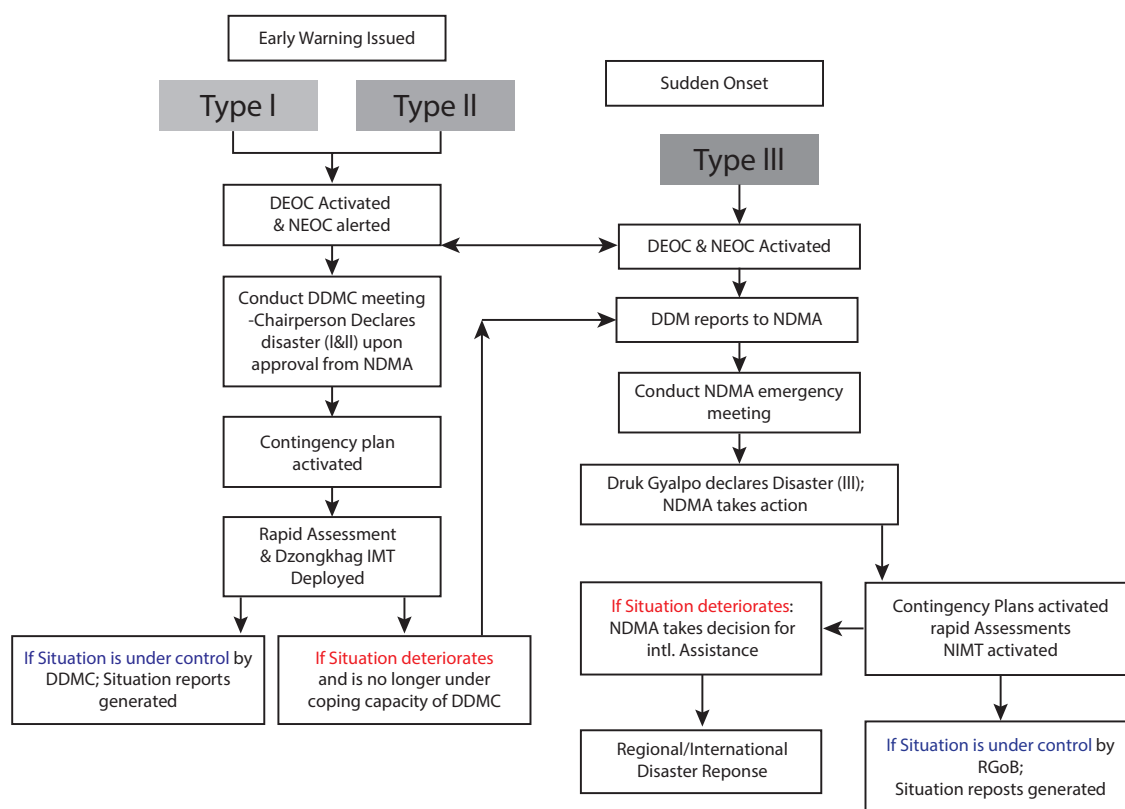


Figure 3 Decision Flow Chart specified in the national response system  
(Source: DDM, 2016)

### Disaster Types and Decision Making Chart



### Policy environment and list of key policies related to DRR

The 11th Five Year Plan identified ‘improved disaster resilience and management’ as one of the Sixteen National Key Result Areas. Through this DRR is incorporated as a criterion in the GNH Checklist for Planning Tool in the Local Development Planning Manual as well as a cross-cutting issue in the Protocol for Policy Formulation.



Having “improved disaster resilience and management’ as one of the Sixteen National Key Result Areas has had great success in mainstreaming DRR considerations into key sectors, particularly health and education. However, there are still a number of sectors that have not integrated disaster risk considerations within their plans and policies.

As per the DM Act 2013, the Department of Disaster Management formulated the following Policy and Plans in collaboration with relevant agencies (DDM, 2016):

1. Draft Disaster Risk Management Strategy (DRMS)
2. Disaster Management and Contingency Planning Guidelines
3. School Disaster Management Planning Guideline
4. Guideline on Proper Construction Practices for Non-Engineering Buildings (Stone Masonry)
5. National Action Plans for School Earthquake Safety
6. National Action Plans for Earthquake Safety of Health Facilities
7. Post-Earthquake Safety Assessment Guidance Document
8. National Recovery and Reconstruction Plan for 2009 & 2011 Earthquake
9. Dzongkhag Disaster Management Plan (Paro)



Particularly at the Dzongkhag level, DDM has built capacity through advocacy and education. This has included the appointing of Dzongkhag Disaster Management Officers (DDMOs) and formulating the DDMCs.

#### **Accountability mechanisms**



Two key accountability mechanisms have been currently used for evaluating the impact of DRM in Bhutan at the national level, the Performance Audit of Disaster Management (2016) carried out by Royal Audit Authority (RAA), and after the 10th five year plan a DRM Programme Outcome Evaluation (2014), which was commissioned by the Gross National Happiness Commission Secretariat.

The RAA conducted the **Performance Audit of Disaster Management (2016)** with an overarching objective to ascertain whether the agencies charged with the governance and management of disaster have geared their efforts towards ensuring that the country, in general is safe and resilient against potential disasters facing the country (RAA, 2016). The specific objectives of the audit are as provided below:

- i. To ascertain that the agencies concerned have exercised due regard in ensuring economy, efficiency and effectiveness in the use of resources in managing disaster;
  - ii. To review the effectiveness of the legislation, institutional and governance mechanism on disaster management in the country;
  - iii. To determine the existence and effectiveness of coordination amongst the authorities at various levels; and
- 
- 



- iv. To ascertain whether the major projects and programs on disaster management have contributed in building up disaster resilient community.

The purpose of the **DRM Programme Outcome evaluation** was to assess the outcomes of the results-based framework of the Disaster Risk Management program for the 10th Five Year Plan period encompassing all the major programs and projects implemented within the period. The main objectives of the evaluation were:

- i. To assess the program outcomes as compared to stated objectives;
- ii. To assess the effectiveness, efficiency, sustainability and relevance of the program in delivering the outcomes;
- iii. To identify major issues and challenges faced during program implementation;
- iv. To identify lessons learned and provide recommendations following good international practices in the region and globally; and
- v. To document and generate information based on good practices

Currently, the Annual Performance Agreement (APA) is the only formal accountability mechanism in place that sets annual priorities and drives implementation to deliver results. APA creates the basis for evaluating activities of DDM and other sectors including individual performance that contributes to the overall organizational performance.

### 3.3 Invest in DRR for resilience

#### **National, local and sectoral budget allocation for DRR**

The following funding mechanisms have been identified as per the DM Act 2013.

##### *Response and Relief Expenditure*

During emergencies, the DDMCs and other relevant agencies are expected to meet the expenses for response and relief operation from the respective annual budget. This is in accordance with the Financial Guidelines for



Disaster Management formulated under the DM Act 2013. This emergency expenses are later reimbursed by the Ministry of Finance.

His Majesty the King has personally attended to the welfare of affected individuals and families in times of disasters through the Druk Gyalpo's Relief Fund. This grant provides relief, recovery and reconstruction support to affected families.

#### *Disaster Relief Budget*

There is a separate budget for national DM activities managed by the Department of National Budget, MoF. It is used for restoring essential public infrastructure and service centers.

Where the disaster situation demands, the emergency procurement for relief and response not reflected in the annual quotation of the Dzongkhag/agency may be exempt from the standard procedures specified in the Procurement Rules and Regulations. Except for procurement of immediate relief activities, the rest of the procurement is expected to follow the normal RGoB Procurement Rules and Regulations.

#### *Budget for Department of Disaster Management*

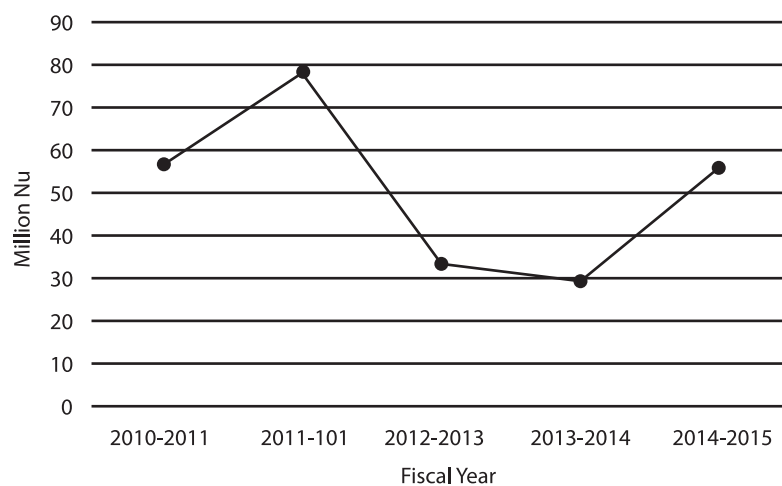


Figure 4 Total Budget for DDM between 2010 and 2015 (Source: DDM)

A separate budget head called the Department of Disaster Management Budget is used for capacity building; establishing and maintaining critical disaster management facility, including purchase of equipment; and other activities required to strengthen preparedness.



Figure 4 shows the budget allocation for DDM over the last 5 years. The increase in 2011 is a reflection of the increase in awareness for DRR activities in response to the 2011 earthquake where substantial funds were given from both the Bhutanese government as well as external sources to assist in mitigation and preparedness activities.

### *Recovery and Re-construction*

During recovery and re-construction, the DDMC is responsible for undertaking damage assessment of public assets and infrastructure and submit the assessment report along with the work programme and cost estimate to the DDM for review and onward submission to the NDMA. The NDMA then recommends to the government for release of funds to the sectors concerned.

### **Disaster risk transfer and insurance, risk sharing and retention and financial protection mechanisms**

Risk transfer mechanisms are a key tool for sharing financial risk by ensuring that funds are available when disasters occur. The Royal Government of Bhutan, through the MoHCA and MoF, has a Memorandum of Understanding with Royal Insurance Corporation of Bhutan Limited (RICBL), on a scheme to extend insurance coverage to all the houses in the rural areas in the country. This initiative of the government has reduced the financial burden on rural household by insuring rural houses providing subsidy (RAA, 2016).

The insurance scheme covers damages caused due to fire, earthquake, flood, landslide, storm and lightning. Through this arrangement the government has subsidized Nu. 42.785 million on rural house insurance in the period between 2013 and 2015, while the benefit to the rural household was Nu 81.906 million. This has not only helped rural household to benefit from insurance to build better houses but also eased the burden on the Government by compensating the claims through premium subsidy (RAA, 2016).

In the past, through external support, cash compensations were given for loss of crops and livestock suffered as a result of disasters and wildlife depredation, however, there are issues confronting compensation scheme such as availability of external support, sustaining the fund, difficulty in verifying claims and also creating unhealthy precedent. In view of these





challenges, MoA with RICB has initiated a study to look into the possibility of instituting crop insurance schemes and other sustainable risk transfer options.

### **Policies, plans and investments to reduce risk in key development sectors**

#### *Agriculture*

One of the key risks within the agriculture is the threat of disease outbreak/zoonosis (diseases that are transmitted from animals to humans). The Royal Government of Bhutan, through BAFRA and the DoL, have taken a number of measures to reduce this risk.

There are a number of acts and policies in the Agriculture sector which relate to disaster risk management:

- Within the Livestock Act of Bhutan (2001) there are actions necessary for preventing and controlling livestock disease outbreaks.
- Within the Land Rules and Regulations (2007), one of the criteria for leasing Government Reserved Forests Land for Establishment of Commercial Agriculture Farms is that the land must avoid areas vulnerable to natural risk, hazards and disasters (paragraph 387).
- Also within the Food Act of Bhutan (2005), the National Food Quality and Safety Commission is responsible for "in the case of a food emergency, identify the organizations or units responsible for taking action, specify the actions to be taken, coordinate a national response and keep records of any such food emergencies".
- The Agriculture sector also formulated the National Influenza Pandemic Preparedness Plan (NIPPP) to support integrated planning and preparedness for pandemic influenza across all sectors.
- Within the National Irrigation Policy (revised 2012) there are provisions for direction to address water shortages and drought

The MoAF is currently in the process of creating a contingency plan specific to the sector that will feed into the country's national contingency plan.



The Agriculture sector has also invested in a number of activities to reduce disaster risks including:

- The Integrated Watershed Management to ensure Sustainable Environmental Services, reducing the risk of drought affecting farmers
- Sustainable Management of Forests, which includes an element of protecting forests from fire.
- Sustainable Land Management to prevent land degradation

### *Tourism*

Currently there are no policies or acts in the tourism sector that relate to disaster risk management. However, the sector carries out mandatory and regular first aid trainings for all tourist guides and monitors hotels based on standards that include emergency exits. The tourism policy is currently being drafted and has recommendations for incorporating disaster considerations.

### *Health*

The current Health Sector Emergency/Disaster Contingency Plan (HSEDCP) was developed in 2010 by the Department of Health Services to establish an integrated health sector emergency preparedness and response mechanism within the health sector. The plan is expected to be reviewed, updated and finalized by 2016 to enhance the capacity of health sector to have an effective disaster and emergency response.

The Department also looks after addressing trauma relating to both natural and manmade disasters. Hospitals located along the highways and Dzongkhags are being scaled up in terms of facilities for trauma care.

The National Action Plan for Earthquake Safety (2013) has also been put into action. The health sector is also in the process of drafting:

- SoP on Health Emergency Operating Center (HEOC)
- SoP on Mass Casualty Management (MCM) Draft
- National Guideline on Vulnerability Assessment of Health Facilities
- Guideline for Conducting Emergency and Disaster Simulation and Drills
- 12 hospitals have contingency plans in place.



### *Education*

Children are particularly vulnerable during a disaster as well as to shock and anxiety post-disaster. A number of interventions have been undertaken to mainstream DRR issues into the education sector. Vulnerability assessments and HVCAs were carried out in schools across Bhutan to assess the risk within said schools. This was in response to the substantial damage to schools experienced in the 2009 and 2011 earthquakes. During this assessment, it was found that 91% of the schools have School Disaster Management Committees (SDMC) with representation from local governments, parents, community leaders, teachers and staff and 83% had a disaster focal teacher with 71% having received some form of DM training.

The education sector has a number of plans and policies in place to guide DRM within the sector, these include:

- The National Action Plan for School Earthquake Safety (January 2013)
- Sector Coordination Mechanism for DRR implementing partners with SoPs and Specific roles & responsibilities (2013 and is being reviewed in 2016)
- Contingency Plan for Education Sector (2014 and is being reviewed in 2016)
- Facilitators Manual: Disaster Preparedness for Safer Schools-Making Schools Disaster Resilient 3rd (Revised in 2014)
- Disaster Management & Contingency Plan of MoE (2016)

### *Energy*

The energy sector is one of the fastest growing sectors in Bhutan in relation to percentage of GDP because of the great hydropower potential of Bhutan. As such it is crucial that it is protected from the impacts of future disasters as well as the impacts of climate change.

To share the risk of disasters impacting the energy sector, all hydropower plants are insured both during construction phase and after completion.

The Integrated Energy Management Master Plan for Bhutan (2010) highlights the impact that disasters could have on the power sector and included the following table for adaptation options according to hazard type:



Table 9 Adaptation Options for Energy Sector according to Hazard Type  
(Adapted from Integrated Energy Management Master Plan for Bhutan)

Climate Hazard	Adaptation Option
Glacial lake outburst flood (GLOF; due to temperature rise)	Installation of early warning systems
	Artificial lowering of glacier lake levels
	Assessment of glacier lake outburst flooding threats to hydropower projects
Landslide (due to high-intensity rain)	Soil conservation and land management
	Preparation of a national database on landslide-prone areas and intensity of landslides to assess the risk of landslides
	River bank protection and small stream catchment protection
	Slope stabilization of areas prone to major landslides and flash floods
Flash flood (result of GLOF or due to high-intensity rain)	Watershed catchment management integrated with land management/soil conservation
	Weather and climate forecasting
	Promote community-based forest management and afforestation projects in ways to conserve land, water resources, and wood production
	Protect water treatment plants to ensure safe drinking water
Drought (due to temperature rise and/or longer intervals between rains)	Optimize the installed power plant capacities
	Low river flow/water shortage studies/impact on hydropower generation, drinking, and irrigation water supply.
	Weather and climate forecasting
	Research and development on water use efficiency, resistant crop varieties, water harvesting



Druk Green Power Corporation Limited, one of the largest energy providers in Bhutan, currently operates and maintains four hydropower plants. They have undertaken a number of actions to reduce the risk of disasters including risk assessments for

- Risk of flash floods and dam failures
- Risk of fire emergencies inside UGPH/Surface Power House & within the vital installations and premises
- Risk of earthquakes

As part of the planning and operation the following procedures and plans have been created:

- Standard Operating Procedure for flashfloods & Dam failure
- Emergency Action Plan for Fire, Floods, Earthquakes, Hazardous & Chemicals Spills
- Emergency Action Plan for General Fires & Earth quake
- Emergency Action Plan for Flash Floods & Dam
- Emergency Action Plan for GLOF & Flash Flood

Other energy resources are also growing within Bhutan including biogas, wind and solar. As these technologies are developed, it is crucial that is done in a manner that does not increase the risk of disasters. At the same time, it is crucial to ensure minimal disruption and re-establishment of energy supply as soon as possible following a disaster.

### ***Information and Communication***

The Bhutan Information and Media Act (2006) states the responsibility of Minister to “promote the use of ICT to enhance crisis preparedness, response and consequence management of natural and man-made disasters”.

The Bhutan Telecom & Broadband policy also states:

*“The Government shall leverage Telecom and ICT infrastructure to prevent, mitigate and manage disasters. It shall work with relevant players to establish a robust communication system for use during disaster. Telecom operators shall be mandated to follow International standards and best practices for contingency planning.”*



Currently the disaster communication system has not yet been implemented.

### ***Infrastructure***

Infrastructure is usually where the majority of damage is done after an earthquake as well as other hazards. To counter this, a number of legislative documents consider disaster risk including:

- Road Act (2013). One of the Department of Roads responsibility is to:

*“Notify the general public with accurate and real time information on the road condition during road blocks caused by natural disasters, landslides, snow and such other similar causes” Paragraph 19 (12) and “Mobilize machinery and human resources in the event of a natural disaster to restore and keep the affected road open to traffic” Paragraph 19 (16)*

- Rural Construction Rules (2013) Regarding building standards:

*“All constructions shall meet the basic standards of health, hygiene and safety including earthquake resilience and fire and wind safety measures as prescribed in the Bhutan Building Rules and the Building Codes of Bhutan”. Paragraph 29*

- Bhutan Buildings Rules (2002). It contains structural control standards in the analysis of structure and in the design of structures particularly for increasing resilience to earthquakes and fire.

The Human Settlement Department, in the process of creating Valley Development Plans have created a number of Geotechnical studies and hazard maps. These highlight where it is appropriate to build as well as where the high hazard risk areas are situated. After plans have been shared with Dzongkhags, compliance and development review are carried out.

The DES is currently undertaking pilot retrofitting of buildings to build their resilience to future earthquakes. They also carry out sampling of buildings recent built to ensure they comply with building standards.



### *Culture*

The protection of cultural heritage is a key priority within Bhutan. As such a number of initiatives have been undertaken to reduce the risk of damage by hazards, including:

- Damage assessments were carried out post both the 2009 and 2011 with the assistance of DDM.
- Geological and geotechnical assessments carried out in Trashigang Dzong
- Fire Risk mitigation in Trashigang Dzong and Wangduechholing Palace, Bumthang
- A protection of Antiquity plan was created in Punakha Dzong and Wangdue Dzong
- Needs assessments were also undertaken in all Dzongkhags as per Dzongkhag plans
- DDM has carried out the Dzong fire safety program for 17 Dzongkhags.

### 3.4 Enhance disaster preparedness for effective response and to “Build Back Better”

#### **Disaster preparedness and contingency policies, plans, relief funds and capacity for preparedness and response**

The following table highlights the disaster preparedness and contingency policies, plans, relief funds as well as projects related to building capacity for preparedness and response

Table 10 Disaster preparedness and contingency policies, plans, relief funds and capacity for preparedness and response

Title of Policy, Plan, Relief Fund	Relevance to Preparedness and Response
DM Act 2013 DM Rules and Regulations 2014	Provisions in sections 74, 76 and 77 to develop contingency plans for dzongkhags and notified agencies including private sector.
Disaster management and contingency planning guidelines	Provides a systematic approach and methodology to develop Contingency Plans for dzongkhags and notified agencies. It also provides assistance and guidance to the NDMA, DDMC, notified agencies and private sector for preparing realistic and implementable respective Contingency Plans by establishing linkages with the National Disaster Risk Management Strategy, Annual Work Plans and the Five Year Plans. Currently in the draft stage.
Dzongkhag Disaster Management and Contingency plan (Paro) Draft DM Plan and Contingency Plans for 2 Dzongkhags of Gasa and Trongsa	The plan presents hazard, vulnerability and capacity profile for the 10 Gewogs in Paro. It also outlines priority disaster risk reduction, awareness raising and capacity building activities for Paro and spells out the standard procedures for response in the Dzongkhag. An implementation and monitoring process for the plan is also included.
Disaster Management and Contingency Plan of the Ministry of Education	In line with a comprehensive approach to safety within the education sector to ensure safe buildings and facilities, establish effective disaster management, and embed disaster risk reduction education into formal and informal learning programs and processes, the DM and Contingency Plan of MOE addresses all hazards, actual and potential and encompasses risk reduction and risk management including awareness, mainstreaming and capacity building, and preparedness for effective response to ensure education continuity and early recovery.
The Druk Gyalpo's Relief Fund Act 2012	Grants relief, recovery and re- construction support to affected families.
Capacity Building with NaSART and Dzongkhag SAR Teams; Desuung, Existing Fire Services Division	The National Search and Rescue Team (NaSaRT) was constituted in 2011 and a number of basic search and rescue trainings have been provided at national, regional and Dzongkhag level. The DDM is in the has carried out training of dzongkhag SAR teams in all Dzongkhags and is in the process of carrying out further training to refresh the SAR teams.



Continuation of Table 10 Disaster preparedness and contingency policies, plans, relief funds and capacity for preparedness and response

Title of Policy, Plan, Relief Fund	Relevance to Preparedness and Response
Health Sector Emergency/Disaster Contingency Plan (HSEDCP)	Establishes an integrated health sector emergency preparedness and response mechanism to address all types of trauma relating to both natural and manmade disasters
National Influenza Pandemic Preparedness Plan	Inputs into BAFRA/MOH activities
Community Based Disaster Risk Management (CBDRM) (policy document)	The program aims to raise awareness in communities, ensure a decentralized and locally empowered disaster management system and is envisioned to result in the development of community based disaster management plans at block and district level. Through the CBDRM process, the DDM has sensitized local officials and trained planning teams to facilitate a bottom-up CBDRM planning process in 16 districts.
Communication Strategy for DHMS	Ensures strategy includes DRM aspects
Contingency plans for 12 hospitals	Prepares contingency plan for hospitals
Relief Fund with Department of National Budget	BTN 250 million annual budget for use of disaster relief

### Early warning systems

Early warning systems are crucial for alerting the Bhutanese people of a potential hazard. The more efficient and effective a EWS is, the more time people have to prepare and/or evacuate. The table on the following page shows EWSs that are currently in place in Bhutan.

Table 11 Current Early Warning Systems in Bhutan

Title of EWS	Year Created	Year Created Lead Agency	Hazards	Area Covered	Remarks
Automatic Water Level Stations	2010-2014	DHMS	Flood	Lhuntshe, Trashigang, Trashiyangtse, Paro, Sarbang (6 dzongkhags)	HKH HYCOS Project:
Automatic Weather Stations	2010-2014	DHMS	Meteorological hazards	Trashiyangtse, Mongar, Thimphu (3 dzongkhags)	
GLOF/Rainstorm Flood Forecasting/EWS	2013-2016	DHMS	Flood and Rainstorm	Punakha-Wangdi valley, Mangdechu and Chamkharchu river basins	JICA
Flood monitoring network station		DHMS	Flood	Head quarter, Thimphu	World Bank
28 Manual Water Level Stations		DHMS	Meteorological hazards	All Bhutan	
National Emergency and Operation Centre	2015	DDM	Multi-hazard	National level	Ongoing under NAPA II
Seismic stations (GPS)		DGM	Earthquake	Thimphu, Bumthang, Tashigang, Samdrupjongkhar, Sarpang/ Gelephu, Samtse	Ongoing project for 121 seismic stations and 20 intensity meter stations.

Community based fire guardians or “Misoops”, are an indigenous early warning system found in every village to inform on fire outbreaks in all dzongkhags.

### **Planning for post disaster recovery and reconstruction**

Two post-disaster recovery and reconstruction plans were created after the two earthquakes in 2009, titled the “National Recovery and Re-Construction Plan” and in 2011, which was titled “National Recovery and Re-Construction Plan (NRRP) ‘Building back better’ for safe and Happy Bhutan”. Both strategies included rural home reconstruction and sector plan implementation.

### **International Cooperation in disaster response and relief**

A number of multilateral organisations assisted in the response of both the 2009 and 2011 earthquakes, particularly in carrying out the post disaster needs assessment and providing relief and recovery items. This included actors within the United Nations System; multilateral donors, including the World Bank Group, the Asian Development Bank and EU DIPECHO; and Bilateral donors, both directly and through channeling of resources through NGOs.



# Section 4: Stakeholders mapping



This section provides an overview of relevant stakeholders who are present in Bhutan and their involvement in DRM. It will also map the stakeholders and their potential role/contribution to the implementation of the Sendai Framework in Bhutan at all levels. Information presented in this section is directly taken from the National Disaster Risk Management Strategy, created by the DDM, MoHCA.

### National Disaster Management Authority

Clause 7 of the DM Act 2013 established the National Disaster Management Authority (NDMA), as the highest decision making body on disaster management in Bhutan.



The NDMA is responsible for approving - national DM strategies, policies; the national DM and Contingency Plan; vulnerability and hazard zonation maps; structural and nonstructural measures, national standards, guidelines and procedures. The NDMA is also responsible for allocation of DM related funds; directing agencies to mainstream disaster risk reduction into their development plans, policies, programs and projects; and ensuring the establishment of an Inter-Ministerial Task Force.

In addition, the NDMA has the power to direct any agency including private sector on disaster management; establish/commission research, develop and provide training in the field of disaster management; direct the Department of Disaster Management, Dzongkhag Disaster Management Committees and agencies including the private sector as may be necessary for the effective implementation of the Act; or perform such other function as may be prescribed under the Act or any law in force.

### Dzongkhag Disaster Management Committee

Clause 24 of the DM Act 2013 mandates every Dzongkhag Administration to constitute a Dzongkhag Disaster Management Committee (DDMC) under the Chairmanship of the Dzongdag.

The DDMC is responsible for – Preparing and implementing the Dzongkhag Disaster Management and Contingency Plan; monitoring and evaluating measures for prevention, mitigation, preparedness, response and capacity building taken up by sectors in the Dzongkhag; ensuring establishment and functioning of Critical Disaster Management Facility; ensuring mainstreaming of disaster risk reduction into the local





development plan and programs; ensuring compliance of approved hazard zonation and vulnerability maps; ensuring the enforcement of structural and non-structural measures; ensuring communication of hazard/disaster events to the DDM and NDMA; ensure assessments and monitoring reports; ensure promotion of education, awareness, capacity building at dzongkhag and community level; conduct regular mock drills; report on the progress of implementation of the Disaster Management and Contingency Plan; direct Dzongkhag, Thromde and Gewog Disaster Management subcommittees, if any; and perform such other functions as prescribed under the Act by the NDMA.

#### *DDMC Subcommittee*

The DDMC may, if it considers necessary, constitute subcommittees at the Dzongkhag, Thromde and Gewog levels to assist the DDMC. All Gups, Thrompons are members of the DDMC and are responsible for preparing the Dzongkhag Disaster Management and Contingency Plan; ensuring mainstreaming of disaster risk reduction into Gewog and Thromde plan, policy, programme and project; reporting to the DDMC on the measures taken by each sector on awareness, prevention, mitigation, preparedness, response and capacity building; reporting on a quarterly basis to the Dzongkhag Disaster Management Committee on the implementation of Dzongkhag Disaster Management and Contingency Plan or Gewog or Thromde Disaster Management and Contingency Plan, if any; educating and raising awareness and supporting community capacity building; conducting regular mock drills; facilitating efficient functioning of Critical Disaster Management Facilities; ensuring adherence to hazard zonation and vulnerability map and implementation of structural and non-structural measures; ensuring communication of disaster information to DDMC; conducting disaster response, relief and recovery operation under the direction and supervision of the DDMC; and identifying and mobilizing local resources for response and relief operations.

#### National Emergency Operations Centre (NEOC)

The National Emergency Operations Centre (NEOC) shall be the hub for maintaining a constant vigil on the emerging disaster situation and coordination of response endeavors. It shall supervise and maintain regular contact with Dzongkhag Emergency Operation Centers (DEOCs) and Early Warning and Emergency Operation Centers of different sectors/agencies,



to receive regular updates, continuously assess and monitor the situation and provide regular situation reports to the NDMA. The various EoCs will provide early warning, advisory or alerts on any impending disaster situation to the vulnerable population. The NDMA will direct relevant agencies to put in place EWS as a monitoring and advisory tool to identify hazard and notify all vulnerable population and responding agencies of threatening disaster situation or disaster.

The DDM shall formulate and agree upon a national disaster response coordination system/mechanism and establish the National Contingency Plan with advice from the IMTF and in collaboration with the relevant sectors and agencies.

A multi-sector cluster coordination mechanism shall be instituted for coordination of response at the national level. The number of required clusters such as – the Shelter Cluster, the Education cluster etc. should be established in advance. Cluster leads should be appointed in accordance with the sector's functions and expertise, for e.g. the cluster for medical response, health and sanitation should be led by the Ministry of Health. Incident Command System shall be adopted formally as the mechanism for onsite incident management. The response mechanism should allow the participation of UN and other international agencies in the country and should also have provisions for receiving and coordinating response and relief assistance from outside the country, as required.

### Department of Disaster Management, Ministry of Home and Cultural Affairs (MoHCA)

The Department of Disaster Management (DDM) is designated as the Secretariat and executive arm of the NDMA as per clause 59 of the DM Act 2013. As the nodal National Coordinating Agency for disaster management, the DDM is responsible for – laying down strategies, policies for disaster management; ensuring that agencies mainstream DRR; preparing the National Plan in coordination with relevant Agencies; formulating national standards, guidelines and procedures for disaster management; developing and implementing public education, awareness and capacity building programme; developing standard training module and curriculum on disaster management; developing and maintaining Disaster Management Information System; and ensuring implementation of Disaster Management and Contingency Plans.



DDM is also responsible for facilitating - the constitution and functioning of DM Committees; the formulation of hazard zonation and vulnerability maps by relevant agencies; the set up and functioning of Critical Disaster Management Facilities (establish NEOC/ DEOC and maintain emergency communication on network, and facilitate the development of EWSs); the establishment/commissioning of research, development and training in the field of disaster management; collaboration with other countries, organizations, non-governmental organizations, business establishments; and coordination of international disaster response, relief and recovery assistance.

### Inter-Ministerial Task Force

The constitution of the Inter-Ministerial Task Force (IMTF) is mandated by Clause 49 of the DM Act 2013. The IMTF comprises of technical experts from relevant agencies and will consist of such number of members as prescribed by the NDMA. The Head of the DDM is the ex-officio chairperson of the IMTF.

The IMTF is responsible for review of – hazard zonation and vulnerability maps; structural and non-structural measures; risk reduction activities; national standards, guidelines and operating procedures. The IMTF will also provide technical assistance in the preparation of the National DM and contingency plan and advice the setup of critical disaster management facilities.

### Mandated Agencies and Private Sector

Clause 66 of the DM Act 2013 mandates every agency, including private sector, notified by the NDMA to institute a disaster management unit in its organization. A notified agency (Ministry, sector, organization) is responsible for - preparing and implementing disaster management and contingency plans; putting in place measures to ensure continuity of critical services in the event of a disaster; hazard zonation and vulnerability maps; developing and compliance of structural and non-structural measures; ensuring the establishment and functioning of critical disaster management facilities; providing assistance to DDMCs as and when required and perform other functions as directed by the NDMA.

Similarly, the notified private sector agencies are also responsible for preparing and implementing DM and contingency plans, ensure continuity





of critical facilities, provide assistance whenever required and perform other functions as prescribed under the DM Act 2013.

## Ministry of Home and Cultural Affairs



Apart from DDM, the following departments work on DRM within MoHCA:

### *Department of Culture (DoC)*

Department of Culture (DoC) is a central agency for realization of a harmonious and progressive society through preservation, protection, development and promotion of the shared ideals & values and the unique cultural identity and its expressions. Its main responsibilities are to inventor and document cultural heritage; frame proper and relevant legislation and its management for conservation and protection of cultural heritage; promote cultural industries and vitalization of communities for poverty alleviation; conserve, develop and promote performing arts; train communities to create awareness, appreciation and practice of culture; preserve and promote national language, dialects and literature; promote cultural tourism to ensure the safeguard of the country's cultural heritage; classify and map cultural sites and heritage; promote and develop traditional architectural designs for use & commercialization and provide museum services.

### *Department of Local Governance (DLG)*

Department of Local Governance (DLG) promotes supports and facilitates local governments to achieve their development objectives, in line with the Royal Government's policy of Gross National Happiness. The Department in overall enhances capacities of local government functionaries and institutions, supports poverty alleviation through Royal Kidu Grant Program, provide legal support/advice to the local administrations, supports disaster risk management at the national and local levels in coordination with relevant agencies, ensures implementation of the policy of decentralization and builds capacities of local government functionaries and institutions, their knowledge, skills and attitude.





### *Department of Immigration*

The Department of Immigration under the Ministry of Home and Cultural Affairs checks and controls all foreign entries and maintains a computerized database of all foreigners including their location. This database is especially important in terms of rendering emergency services in the event of a disaster.

### **Ministry of Economic Affairs (MoEA)**

The following departments work on DRM within MoEA:

#### *Department of Geology and Mines (DGM), Ministry of Economic Affairs (MoEA)*

The main roles of the Department of Geology and Mines include geological mapping, exploring mineral resources, providing engineering geological services and ensuring environment friendly exploitation of economic mineral resources. DGM is also responsible for carrying out scientific studies and monitoring of natural hazards like Glacial Lake Outburst Flood (GLOF), earthquakes and landslides, which are prevalent in Bhutan. The Department also acts as crucial link between Bhutan and the geological organizations of other countries for exchange of information and technology.

#### *Department of Hydro-Met Services (DHMS), Ministry of Economic Affairs (MoEA)*

The Department of Hydro-Met Services (DHMS) is a key technical department in the country providing weather, water, and climate data, services and forecasts for sustainable planning and development and facilitating early warning systems for GLOFs, floods, landslides, droughts and other climate related hazards. DHMS provides weather, water, climate and related environmental services to a wide range of sectors to help them reduce risks from the associated conditions. The department is responsible for



- i) Providing daily forecasts of temperature, humidity and weather outlook and severe weather warnings, which is important for planning and implementing programs and services;
- ii) Providing early warnings and alerts of extreme events including Glacier Lake Outburst Floods (GLOF);
- iii) Agro-meteorological services to the agricultural community to help improve production and reduce risks and losses;
- iv) Providing forecasts and warnings of floods and related information both within the country and to neighboring states; and
- v) Hydro-meteorological data for the country to all interested agencies for planning, development and monitoring.

### Ministry of Works and Human Settlement (MoWHS)

The following departments work on DRM within MoWHS:

#### *Department of Engineering Services (DES).*

Due to rapid socio-economic development and pressing challenges related to establishment and expansion of settlements, former Department of Urban Development and Engineering Services (DUDES) were bifurcated into two new Departments in 2011: Department of Engineering Services (DES) and Department of Human Settlement (DHS).

The DES is mandated for:

- i) architecture designs, landscape designs and structural designs;
- ii) survey and design of urban infrastructures when required;
- iii) repairs and rehabilitation of distressed structures when directed;
- iv) design of electrical, plumbing, mechanical services, etc.;
- v) construction technology application and development;
- vi) monitoring of construction and quality;
- vii) disaster risk prevention and mitigation measures;
- viii) enforcement of development control regulations;
- ix) parenting of dzongkhag engineering sector; and
- x) coordination of donor aided projects for infrastructure.



The Engineering Adaptation and Risk Reduction Division (EARRD) and the Flood Risk Mitigation Division (FRMD) were created under the Department of Engineering Services (DES) to look after disaster risk reduction and mitigation activities. The EARRD is a focal in the technical division of the MoWHS dealing with all engineering aspects involved in the disaster prevention and mitigation strategies and its promotions.

### ***Department of Human Settlement (DHS)***

The DHS specializes in and focus on preparation of polices, strategies and development plans for settlements and coordinate developments both at the regional and the national level.

The DHS mandated to:

- i) prepare human settlement policies and strategies,
- ii) carry out research, studies and analyses to identify potential growth centers and draft proposals for development,
- iii) co-ordinate preparation of national spatial plan, regional plans and land use plans,
- iv) prepare urban design guidelines,
- v) carry out plans to address construction, safety and disasters,
- vi) prepare physical and infrastructure development plans and local area plans along with the development control regulations,
- vii) draft legislation, regulations, guidelines and standards related to human settlement,
- viii) strict implementation of Development Control Regulations,
- ix) implementation of land use, planning of adherence to precinct,
- x) government agency constructing buildings not comparable with traditional architecture,
- xi) construction of slopes,
- xii) promotion of low height buildings,
- xiii) assess development applications for compliance with the approved development plans and/or relevant development objectives,
- xiv) carry out planning audit and review of development plans and the DCRs, and
- xv) carry out detailed topographic survey of specific areas/regions for preparation of settlement development plans.



### *Department of Roads (DoR)*

The Department of Roads (DoR) is responsible for planning, execution and management of all road infrastructures development in Bhutan. So far Bhutan has 8,381Km of road network. All district headquarters and some Gewogs are accessible by road. The country's fragile terrain, high ridges and deep gorges, scattered settlement and low population density are some of the constraints, which hinder the development of road network in Bhutan. Every monsoon, there are many landslides, roadblocks and flashfloods in most parts of the country. Roads and bridges have been washed away and some damaged due to landslides and flashfloods. The Royal Government also spends considerable resources in the monsoon damage restoration works such as rebuilding protection walls, culverts, and drainage system and in some cases realignment of the entire road.

### *Ministry of Agriculture and Forests (MoAF)*

The following departments work on DRM within MoAF:

#### *Department of Agriculture (DoA)*

The Ministry of Agriculture plays an important role in increasing food production, raising rural income and improving the livelihood of the nation's large rural population while preserving the pristine natural environment and conserving the rich natural resources of land, water, forests, flora and fauna for future generations.

The Department of Agriculture provides technical expertise and provides measures to control the outbreak of pests and diseases in the agricultural fields. If the situation becomes worse and if there are severe food shortages, then the Department also provides direct food aid to the affected group of people for a limited duration as a temporary measure. The Dzongkhags also provide small amounts of free inputs such as seeds and fertilizers to the affected farmers. The DoA is also responsible to liaise with Insurance Companies and relevant agencies to institute crop Insurance schemes and explore assistance in collaboration with relevant agencies at times major catastrophes.



### ***Department of Forests and Park Services (DoFPS)***

The Department of Forests and Park Services (DoFPS) mandated to ensure the maintenance of a minimum of 60 per cent of the country's geographical area under forest cover for all times according to the Constitution of Bhutan. The Forest Protection & Enforcement Division (FPED) under the Department looks after forest protection, sustainable management & utilization of land and forest resources. The Division manages forest fires in the country through designing and implementing a nationally coordinated forest fire awareness program and enhancing people's awareness about forest fire, analyzing data on forest fire of the country and proposing appropriate measures to minimize forest fire incidence, developing a National Fire Prevention Strategy, providing technical backstopping to the Dzongkhag Forestry Sector & Divisions/ Parks for effective forest fire management, conducting training programs for field staff, developing technical manuals of forest fire management, procurement and distribution of basic forest firefighting equipment & demonstrating their application to field staffs, and ensuring training modules & impart training on forest fire fighting for armed force personnel and forest fire volunteers.

### ***Bhutan Agriculture and Food Regulatory Authority (BAFRA)***

BAFRA is mandated to contribute towards the national goal of food self-sufficiency by safeguarding the farming system of the country from exotic pests and diseases and ensuring quality farming inputs through effective enforcement of standards and regulations. One of key activity of the Agency is to implement sanitary and phytosanitary measures effectively to protect the health and life of humans, plants and animals including the environment from risks of entry, establishment and spread of exotic pests and diseases.

### ***National Soil Services Center (NSSC)***

The NSSC was created in the 8th FYP period and reports directly to the Department of Agriculture (DoA). The aim of the center is to coordinate soil/land management research activities of the RNR sector. There are four units/section – Soil and Plan Analytical Laboratory (SPAL), Soil Survey Unit (SSU), Soil Microbiology Unit (SMU) and Soil Fertility Unit (SFU). The center has two ongoing projects - the WB/GEF Sustainable Land Management



Project and UNDP/GEF Building Capacity and Mainstreaming Sustainable Land Management in Bhutan Project.

### Ministry of Foreign Affairs

The NDMA may make recommendations to the Government to appeal for international and/or regional assistance to deal with disaster effectively, if it determines that a disaster situation exceeds national capacity to respond to disaster. DDM shall, in collaboration with the Ministry of Foreign Affairs coordinate and channel such assistance.

The Ministry of Foreign Affairs shall also assist DDM in the management, facilitation and ensure that visas are granted for the time necessary to carry out disaster response, relief or initial recovery activities.

### Ministry of Finance (MoF)

The following departments work on DRM within MoF:


#### *Department of Budget & Accounts (DNB)*

The Department of National Budget (DNB) is the central agency for national financial resources and management of the government. The DNB has linkages with all the budgetary agencies (Ministries, Dzongkhags, Gewogs, Autonomous agencies) in the government. The responsibility and functions of DNB in relation to disaster risk management will be on the aspects of financial management in accordance with financial provisions in DM Act 2013 and Financial Guidelines.

#### *Department of Revenue and Customs (DRC)*

The Royal Government of Bhutan, through the DRC and DDM, generated the Model Customs Facilitation Agreement, a bilateral agreement allowing the expedition of aid to the country in the event of a disaster.

The agreement allows the following aid consignments to have speedy entry and transit during an event of a disaster:

- search and rescue teams,
  - search dog teams and mobile medical units,
  - high technology emergency communication equipment, and
  - other emergency relief items
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Such agreements along with vital information shared by national authorities enable UN agencies, intergovernmental, governmental and non-governmental organizations as well as other humanitarian actors to quickly contact appropriate National Customs Authorities to bring in relief consignments for saving lives and reducing the suffering of the affected people (UNOCHA, 2011).

## Ministry of Health

The following is one of the departments that work on DRM within MoH:

### *Department of Medical Services (DMS), Ministry of Health (MoH)*

The Department of Medical Services (DMS) under the Ministry of Health is responsible in provision of health care services at all levels, including emergency health services. In case of outbreaks the Department of Public Health is responsible for risk assessment, event verification (in collaboration with Royal CDC and relevant agencies), reporting, guidance for the health sector response, implementation of timely control measures and risk communication.

## National Environment Commission (NEC)

The National Environment Commission is a high-level autonomous agency of the Royal Government of Bhutan and is mandated to look after all issues related to environment in Bhutan. Its high-level commission ensures that it will have the authority to call for assistance it will need from other government bodies. The Commission also monitors the impact of development on the environment and aims to put in place the necessary controls, regulations and incentives to the private/public sectors to achieve sustainable development through the judicious use of natural resources. The coordination of inter- sectoral programs, the implementation of policies and legislation with regard to the environment is also another important mandate of the Commission.

The NEC Secretariat plays a key role in promoting sound environmental policies and investments. This Secretariat is responsible for ensuring that Bhutan follows a sustainable development path and that all projects be it public or private, take into consideration environmental aspects





## Royal Bhutan Army (RBA)

The RBA is a key actor particularly during the response. Before a disaster has occurred RBA designates one Liaison Officer as the Disaster Preparedness Focal Point as well as prepares operational plans for responding to the call of the Dzongkhag during disaster. RBA also hold drills on disaster preparedness and response (DDMP Guidelines).

Once a disaster is about to occur, the RBA issue cautionary instructions to all concerned as well as assist in search and rescue efforts, evacuation of affected population; and assists in disbursement of relief materials.



Once the disaster has subsided, RBA assists in the conducting of surveys in affected areas and assess requirements of relief and rehabilitation. They assist local administration in removing dead bodies and debris in affected areas as well as participate in the general reconstruction and rehabilitation operation.

## De-Suung

With shortage of manpower often occurring after disasters occurred, His Majesty created the De-Suung Organization, a voluntary organization. DeSuups voluntarily assist their neighbors, community, society and the country at large in times of emergencies or disasters as well as carry out other social and charitable works. To build the capacity of the volunteers, the De-Suung Head Office in collaboration with the Royal Bhutan Army trains two batches of volunteers (120-125 volunteers in each batch) annually at the Military Training Centre, Wangduephodrang through a value based personal development programme that includes training in disaster management. ([www.desuung.org.bt](http://www.desuung.org.bt) 2016)

## Bhutan Chamber of Commerce and Industry (BCCI)

The BCCI provides linkage between the government and the privates and works closely with all government agencies, autonomous organizations and, international organizations and donor agencies towards facilitation and promotion of trade & industrial development in the kingdom. A key of ensuring that development is sustainable is through the building disaster and climate risk considerations into development planning. The BCCI is a key actor for advocating and engaging private sector organisations to mainstream DRR.





## Royal Bhutan Police (RBP):

The primary function of Royal Bhutan Police (RBP) is the prevention and detection of crime and maintaining law and order in the country. It also provides fire and rescue services. According to new Royal Bhutan Police Act, 2009, the following will be the roles and responsibilities of the RBP during disasters:

- i) assisting in the protection and rescue of life and property during fire hazards and other natural calamities,
- ii) Protecting public property from loss and destruction.
- iii) Rendering necessary assistance to safeguard lives and properties during disasters.
- iv) Superintendents of police/officer commanding/officer in-charges shall work under the supervision of respective Dzongdas/Dungpas in times of disasters and natural calamities.
- v) Constituting a Fire Services Division with required units in Division Headquarter and Fire Stations in the Dzongkhags and municipal areas to provide professionalized fire and rescue services.

## Insurance Companies

Insurance is a risk transfer tool that transfers the potential financial loss that disasters often incur onto the insurance corporation.

Royal Insurance Corporation of Bhutan Limited was incorporated on 7th January 1975 under the Charter of His Majesty the fourth Druk Gyalpo Jigme Singye Wangchuk, primarily to meet the Insurance need of its Citizen as well as to actively participate in the economic development of the nation.

The Royal Insurance Corporation of Bhutan Limited has been entrusted by the Royal Government of Bhutan to implement the Rural House Insurance Scheme to indemnify the rural population in case of fire, flood and earthquake, which may cause damages to their homes. It also provides both short term and long-term financial to the promoters of the big and small projects to accelerate the economic growth of the country.



## United Nations System:

The United Nations and its agencies, funds and programs are crucial partners in disaster risk management. In cooperation with national and other stakeholders, the UN works to improve disaster risk management systems, support effective national policies and strengthen institutions. Within the context of the “One UN” system, it is expected that all UN agencies, funds and programs, will work in close harmony with RGoB and continue to provide financial and technical assistance on disaster risk management, preparedness and capacity development in addition to responding to humanitarian crises.

## Other International/ Regional Organizations and Development Partners

Multi-lateral donors, such as the World Bank (WB), the Asian Development Bank (ADB), SAARC and bilateral donors such as the Governments of Japan, Denmark, India and Austria are major financial supporters for disaster risk management initiatives in Bhutan.

Regional disaster management centers and institutions such as the Asian Disaster Preparedness Center (ADPC), Asian Disaster Reduction Center (ADRC), SAARC DM center also play an important role by providing technical support and assisting in the implementation of disaster reduction activities.







Section 5:  
Key issues,  
challenges and  
priorities for  
Sendai Framework  
implementation



This section is based on the above analysis of the status to highlight the key issues and priorities for Bhutan in implementing the Sendai Framework priorities for action and contributing to the achievement of global targets and outcome. It will assist countries in setting up the national and local mechanisms for monitoring and reporting on Sendai Framework progress embedded in the national DRR monitoring systems.

## 5.1 Understand disaster risk

- With risk assessments currently undertaken in an ad hoc manner by sectors, DDM needs to collect and collate all risk assessments that have been carried out. These assessments then need to be analyzed to produce information that all sectors can use and be stored in a manner that is accessible for sector personnel. The sharing platform could utilize the current DMIS system.
  - In parallel to the collection of risk assessments, DDM needs to coordinate with key sectors to develop a multi-hazard atlas that is available for long-term development and land use plans. DDM needs to utilize capacities in other sectors and assign specific tasks to a focal person to collect and use the assessment reports. Particularly, DDM will need to engage the relevant technical sectors such as DGM, DHMS, DES, NLC, and DHS to utilize their capacities to create the multi-hazard maps.
  - Windstorm is an emerging high-risk hazard, given its intensity and frequency in the recent years and the estimated damages and losses incurred in the housing and agriculture sector. It is imperative that it is included in future multi-hazard risk assessments and mapping. Clearly, there are challenges in terms of resources available to carry out technical research and plotting of windstorms. DDM in collaboration with DHMS could explore options to partner with institutions that currently study windstorms.
  - The policies and programme on DRM in Bhutan must also incorporate nuclear and radiological risks arising from increasing application of nuclear science and technology in energy, industry, agriculture and defense in neighboring countries given Bhutan's geographic location and proximity to such risks. In addition, there is also a need to consider aviation disaster risks including risks from commercial airliners across Bhutan's airspace.
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- The Bhutan Disaster Assessment tool needs to be reviewed, revised and validated as well as standardized by DDM. Within the review, it would be recommended that BDA's be made compulsory for type III disasters.
- The desinventar and DMIS tools need to be review and updated and utilized for disaster risk management planning and decision-making. Currently sectors are not using desinventar, or DMIS as they are nonfunctional. These tools are crucial for the measuring Bhutan's progress in the Sendai Framework targets and goals. During the review, Sendai Framework indicators need to be incorporated into the DMIS. In the process of reviewing, it is also recommended that DDM look into the possibility of combining the two tools into one database to make it user-friendly.

## 5.2 Strengthen disaster risk governance

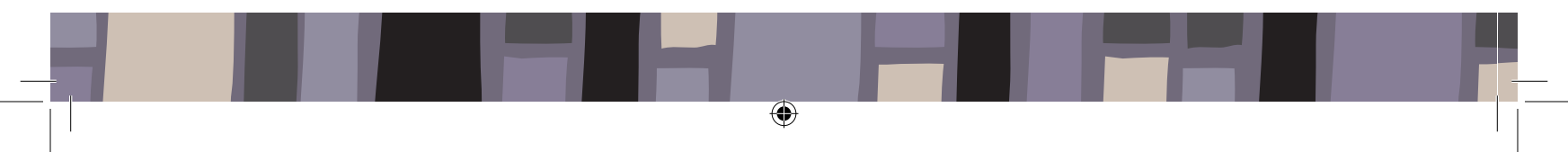
- The current legislative and policy framework for DRM is clear in the roles and responsibilities of agencies. The upcoming DRM strategy supports legislative requirements in the DM Act. However, there are challenges in coordinating DRM initiatives across sectors. There needs to be a more structured approach for engaging DDM with sectors so there is clarity on who to approach and when. In the current system there is miscommunication for whether sectors approach DDM or vice versa.
- The current structure of the Inter-Ministerial Task Force comprises of all relevant technical agencies creates challenges in terms of convening at a particular time and place. It is recommended that smaller or sub IMTF be created that have members with specific technical expertise based on hazard or vulnerability.
- A number of sectors that have a greater stake in disaster risk management currently lacks DRR considerations in their sectoral plans and programs. It is recommended strongly that the mainstreaming of DRR continues as a National Key Result in the 12th FYP.
- It is also recommended that sectors that are most vulnerable to frequent hazards such as road and bridge infrastructure develop new technical standards and specifications that addresses disaster and



climate change considerations in the construction processes to build resilient infrastructures.

- The current evaluation of DRM activities has been through the Performance Audit and the Programme Outcome Evaluation. Both are thorough mechanisms but are not carried out very regularly. It is recommended that DDM create a more regular evaluation system to analyze the efficiency, effectiveness and economy of their DRM programs. In doing this, clear indicators are crucial to measure progress and for future planning. This is expected to create a stronger culture of accountability.
- Apart from the monitoring and reporting mechanisms for DRM activities at the national level, cross sector reporting and monitoring and evaluation also needs to occur within sectors. It is recommended that DDM uses either the current tools (e.g. DMIS) it has in place or create another platform for collecting, collating and analyzing reports developed by sectors related to DRM.
- To address the current issues of poor coordination and communication during emergencies, the National Incident Command System needs to be approved and activated to ensure there is a clear understanding of roles and responsibilities. DDM is also in the process of creating the National Emergency Operating Centers and Dzongkhag Emergency Operating Centers that will become the hubs for maintaining a constant vigil on the emerging disaster situation and coordination of response endeavors.
- Although the creation of Dzongkhag Disaster Management Officers has significantly improved disaster risk management at the Dzongkhag level, it is recommended that DDMOs are made full time and permanent to ensure retention of capacity and mainstream DRR in Dzongkhag level plans and programs.

### 5.3 Invest in DRR for resilience

- There is a great risk currently in government assets and infrastructure being non-insured. Non-insured structures include roads, bridges, Dzongs, communication infrastructures and airports. The need for insuring these assets is more pronounced with the increasing frequency of disasters over the years. At the same time, previous
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damages to government infrastructure has been rebuilt mostly funded through external sources. However, as Bhutan graduates from LDC status, it will become more difficult to mobilize external resources. It is highly encouraged that these public assets are insured by responsible sectors based on risk information and cost-benefit analysis.

- In terms of crop and livestock insurance, issues are affordability of premium by farmers and low awareness on risk sharing and risk transfer. The Department of Agriculture (MOAF) in collaboration with insurance companies is exploring options that addresses both sustainability and affordability.

### *Agriculture*

- Although there is adequate awareness within the agriculture sector regarding climate change and disaster risk issues and the need for integrating it into the sector plans and policies, there is a lack of specific technical knowledge on how to integrate DRR into their planning and implementation processes. It is recommended that the MOAF carry out a technical workshop with assistance from DDM to discuss entry points and actions to improve their preparedness and mitigation of disasters.
- There is need for research to assess and monitor how the agriculture sector is affected by disasters. Given that the agriculture sector will be greatly affected by the climate change, research to understand and predict future impacts is necessary.

### *Tourism*

- It is recommended that the Tourism Council of Bhutan organizes a sensitization workshop on DRR in coordination with DDM and provide them with entry points for reducing disaster risk both pre and post disaster. It would also be necessary to sensitize other tourism sector actors, particularly tourist guides on the need for disaster risk reduction actions.
- Research is necessary to monitor how the sector is affected by disasters as well as piloting of potential actions to reduce the risk of disasters.





### *Education*

DDM has worked substantially with the education to build the resilience of the sector and the number of DRM activities carried out within the sector reflect this. The next step for building the resilience of the sector is to:

- Carry out capacity building for Principals, disaster focal teachers and the school disaster management teams
- Research in to initiating DRM programs for Early Child Care and Development and special needs


### *Energy*

- In the energy sector there is a need to integrate DRM into plans and policies. DGPC as an organization is fully prepared in terms of DRM, having generated action plans and SOPs however there is a need to initiate coordination with DDM in terms of information, lesson and resource sharing.

### *Information and Communication*

- It is recommended that I&C sector staff support DDM in promoting the use of ICT to enhance crisis preparedness, response, and consequence management of natural and manmade disasters as mandated by the Information and Media Act (2006). This could include supporting DDM in the development of a communication plan framework for the national disaster management system for sharing information after a disaster occurs to both government staff as well as to the general public.

### *Infrastructure*

- The Department of Human Settlement, MoWHS, has significant capacity in creating hazard maps, which it uses for developing valley development plans. It is recommended that DDM works with the Department and establishes a formal mechanism for sharing their hazard maps with other sectors
  - It is recommended that the Bhutan Building Rules (2002) be reviewed and updated to ensure that the most up to date information and technologies are used.
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## 5.4 Strengthen disaster preparedness for effective response and to 'Build Back Better'

- The pressing need currently is for agencies to develop DM and contingency plans within their sector. Once this is carried out, then the overarching national DM and contingency plan, which incorporates the sector plans, can be developed. There is a need to pass executive orders to relevant agencies and private sectors to institute DM Units to spearhead the development of DM and Contingency plans.
- During the creation of both the national and sectoral DM and contingency plans, it is important to integrate gender and disability considerations.
- There is a need to review and strengthen the capacity of responders and emergency service agencies at the national and local levels in terms of skills, knowledge, equipment and technology.
- There is currently a lack of centralized EWS that considers all hazards (some EWS are already in place such as the hydro-meteorological EWS). Early warnings are currently being generated and issued by specific agencies through the most available channels such TV, radio and social media however not in a structured manner. It is recommended that DDM carried out an analysis of the current EWS in place. This will highlight what gaps there are as well as investigate how these EWS can be consolidated.
- The upcoming NEOC must standardize processes, communication language, roles and responsibilities of all agencies that are generating and issuing early warnings in the NEOC. Effective information dissemination must include marginalized groups.
- There is a need for a comprehensive national recovery strategy to accelerate coordination in assessments, expedite resource allocation and link recovery and reconstruction to develop plans that include climate change aspects of disaster.



## Conclusion


In response to the Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework), this review was carried out to understand the current status of disaster risk management within Bhutan. The review was led by the Royal Government of Bhutan's Department of Disaster Management, Ministry of Home and Cultural Affairs with support from the Asian Disaster Preparedness Center and the Ministry of Foreign Affairs, Norway.

This review gives the Royal Government of Bhutan a clear understanding of the progress they have made under the Hyogo Framework for Action 2005-2015 (HFA) as well as highlight where future disaster risk management should be prioritized to ensure effective implementation of the Sendai Framework.

Within the first priority of the Sendai Framework, **understanding disaster risk**, it was found that DDM itself has a number of tools it uses for collection and understanding the impacts of disasters as well as mechanisms for information regarding disaster risk reduction activities. It was found however that a number of activities to assess risk were carried out by sectoral actors. It is crucial that DDM is able to harmonize their current mechanisms with the significant capacity within sectors.

In the second priority, **strengthen disaster risk governance to manage disaster risk**, it was found that the current legislation in place related to disaster risk management is comprehensive. However, it has only recently come into effect and so it will take some time for the coordination mechanisms to be functional. There are also still gaps within the coordination of sectoral activities including implementation, monitoring and evaluation, post-disaster mechanisms.

Within the third priority, **invest in DRR for resilience**, there has been some substantial work to integrate DRM within sectors. A key challenge has been the use of insurance as a risk-transfer mechanism, that currently missing, particularly with some government key-infrastructure. Sectors such as health and education have made significant strides in building their resilience through working with DDM. It is important that other sectors make similar progress during the Sendai framework period.





During investigation of the fourth and final priority, **enhance disaster preparedness** for effective response and to “Build Back Better”, it was found that work was being carried out by DDM to improve disaster preparedness and response, specifically in creating a national level contingency plan as well as contingency plans within sectors. The creation of NEOC and DEOC, currently being established will streamline disaster responses. It is crucial however that a National Incident Command System is created to ensure there is clear understanding of roles, responsibility and chain of command for all actors.

Bhutan has made great strides in building the resilience of the country to future disasters during the decade of the HFA and it is now clear what steps are necessary to continue this trend during the Sendai Framework.



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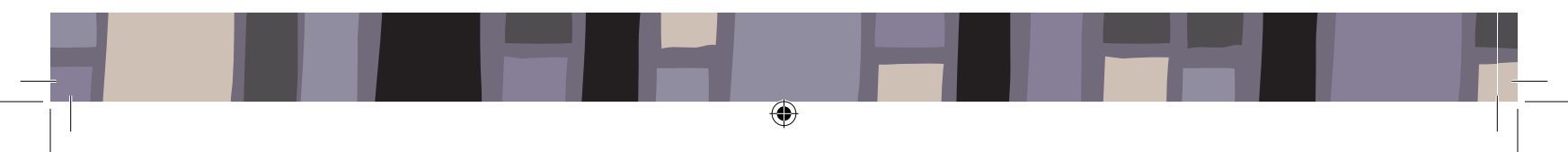
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