

## COUNTRY REPORT: BHUTAN



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## List of Abbreviations

ADRC	Asian Disaster Reduction Center
BHU	Basic Health Unit
CBDRM	Community Based Disaster Risk Management
DDMC	Dzongkhag Disaster Management Committee
DDM	Department of Disaster Management
DES	Department of Engineering Services
DoC	Department of Culture
DGM	Department of Geology and Mines
DMSPF	Disaster Management Strategic Policy Framework
DRR	Disaster Risk Reduction
DSE	Department of School Education
ECR	Extended Classroom
GNHC	Gross National Happiness Commission
GLOF	Glacial Lake Outburst Flood
IMTF	Inter-Ministerial Task Force
MoAF	Ministry of Agriculture and Forests
MoE	Ministry of Education
MoEA	Ministry of Economic Affairs
MoH	Ministry of Health
MoHCA	Ministry of Home and Cultural Affairs
MoWHS	Ministry of Works and Human Settlement
NDMA	National Disaster Management Authority
NFP	Non Formal Education
NIPPP	National Influenza Pandemic Preparedness Plan
NKRA	National Key Result Areas
NRRP	National Recovery and Reconstruction Plan
ORC	Outreach Clinic
PHRD	Japan Policy and Human Resource Development
RBP	Royal Bhutan Police
RNR	Renewable Natural Resources

## List of Glossary of Terms

Chorten	Stupa
Dzong	Fortress
Dzongdag	District Administrator
Dzongkha	National Language of Bhutan
Dzongkhag	District
Dungkhag	Sub-district
Lhakhang	Temple
Thromde	Municipal
Gewog	Administrative Block consisting of a number of sub-blocks
Chiwog	Sub-Blocks consists of number of villages under an elected leader in LG.

## 1. General Information

<b>Formal Name:</b>	Kingdom of Bhutan
<b>Capital:</b>	Thimphu
<b>Population:</b>	797,765 (2016) <u>World Bank</u>
<b>National Language:</b>	Dzongkha
<b>Capital:</b>	Thimphu city
<b>Political System:</b>	King is Head of State and Government (Cabinet) is elected by the Ruling Government for five-year term.
<b>Currency:</b>	Ngultrum (US: 65 Ngultrums)
<b>Religion:</b>	Majority Mahayana Buddhism and Hinduism, Christian minority
<b>District (Province):</b>	20
<b>Sub-District:</b>	15
<b>Blocks:</b>	205
<b>Sub-Blocks (Chiwog):</b>	1044

Bhutan is largely mountainous with altitudes ranging from 100masl in the south to 7,500masl in the north. The country is characterized by a fragile mountainous ecosystem where high, rugged mountains, glaciers and moraines, deep valleys and ravines and depressions earmarking watercourses, drainage basins and waterfalls are the main physical features. The dominant topographic features are the high Himalayas in the north with snowcapped peaks and alpine pastures, north–south valleys and ranges forming watersheds, deep valleys created by fast-flowing rivers, rugged foothills, and alluvial plains with broad river valleys. Valleys in western and central Bhutan like Punakha and Wangdue Phodrang are wider with straight or concave lower slopes and substantial alluvial deposits. The valleys in eastern Bhutan like Lhuentse, Trashigang, and Zhemgang cut deeper, and have steep convex side slopes, narrow V-shaped valley floors, and negligible alluvium. Sarpang and Samdrup Jongkhar are in the foothills of the Himalayas with dense deciduous forests and alluvial lowland river valleys.

The country is endowed with numerous glaciers fed rivers that are being exploited to generate electricity. Bhutan has four seasons and the climatic condition varies with hot subtropical climate in the south to cool winters and hot summers in central valleys and severe winters to cool summers in the north.



Figure 1: Location Map of Bhutan

## 2. Natural Hazards in Bhutan

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>I. Earthquakes;</li> <li>II. Floods, including flash floods and</li> <li>III. Glacial lakes outburst floods (GLOFs);</li> <li>IV. Landslides;</li> <li>V. Forest fires.</li> </ul> | <ul style="list-style-type: none"> <li>VI. Outbreaks of pests and epidemic diseases;</li> <li>VII. Droughts (local-level water stress);</li> <li>VIII. Wind, storms, hail, lightning.</li> </ul> |
|---|--|

### 2.1 Natural Hazards Likely to Affect the Country

Bhutan is prone to many natural disaster hazards due to its location in the fragile geological conditions, active seismic zone as per the Indian Codes, steep terrains and variable climatic conditions with great elevation difference. These hazards include, earthquake, windstorm, forest fire or structure fire, landslides, flash flood, Glacial Lake Outburst Floods (GLOF), outbreak of pest, epidemic diseases and drought. Bhutan being located in the fragile young Himalayan range, it is susceptible to many climatic change effects around the globe and increase in the frequency and magnitude of above mentioned natural hazards causing the threat to the lives and property.

Even though Bhutan does not have past available climate change data, Bhutan has been experiencing extreme climate events more frequently over the recent years. The GLOF in 1994 and windstorm in 2011 & 2013 are the some of the recent climate change effects to the lives and property in the country. Also, May 2009, Cyclone Aila was one of the worst climatic disasters in Bhutan causing huge damage to livelihood of people in the country.





Figure 2: 2009 Earthquake damage



Figure 3: 2013 windstorm damage



Figure 4 : Glacier Lake Out-Burst Flood (GLOF)



Figure 5: Flash Flood



Figure 6: Forest Fire



Figure 7: Mongar Town Fire



Figure 8 : Landslides



Figure 9: Artificial dam formation

Disaster events faced by Bhutan may not appear large-scale in comparison with disasters affecting other countries, but such events coupled with frequent losses to recurring and seasonal hazards has a serious impact on the assets and livelihoods of the people, and on the overall development gains made so far by Bhutan.

In the recent years, due to the rapid urbanization and increase in the populations especially in the urban cities, natural hazards are also increasing and causing the threat to the lives and property. Flash flood, landslides, windstorm and forest fire are some of the seasonal natural hazards. Flash flood and landslides mostly occurs during the monsoon season and forest fire occurs mostly during the dry season. The windstorm occurs mostly during the seasonal change.

## 2.2 Recent Major Disasters

### 2.2.1 Earthquake

Bhutan experiences many natural disasters in the recent years, one of the most awaking disaster is the 2009 earthquake followed by the 2011 Earthquake. Bhutan has been affected several times by the past earthquakes like 1897 earthquake measuring M8.7 with the epicenter located in Shillong Plateau, India, which affected many Dzongs in Bhutan.

Table 1: List of recent earthquakes that have affected Bhutan (DDM, 2014)

Year	Magnitude (Richter Scale)	Location	Losses/ Remarks
2003	5.5	Gunitsawa, Paro	Few landslides along highways Minor damages in building Paro, Haa and Thimphu reported.
2006	5.8 and 5.5	Epicenter near Dewathang struck successively between 2:04 a.m. and 2:07 a.m.	Around 126 houses suffered minor damages

		local time.	
21, Sept. 2009	6.1	Narang, Mongar	12 live lost, damaged 4950 households, 45 BHUs, 117 schools, over 800 cultural heritage buildings; 29 RNR offices and 26 Gup's office Total estimated loss of Nu. 2501.00 million (US\$ 42.00million)
18 Sept. 2011	6.9	Greater Sikkim Area, mostly affecting Haa, Paro, Samtse and Chukhha Dzongkhags in Bhutan.	Loss of one life due to landslides and 14 injuries. 6977 rural home damaged, 36 schools, 22 hospitals, 286 heritage sites, monasteries, 27 RNR centers.
4 Jan 2016	6.7	Manipur Earthquake	Affected 221 homes partial, 228 Minors, 13 schools, nine temples, two basic health units, a dzong, and a gewog and Renewal Natural Resources office each. About 80 percent of the damages were reported in Trashiyangtse, Trashigang, Mongar and Pemagatshel. Eastern part affected the most.

### 2.2.2 Windstorm

Windstorms have become more frequent and widespread disasters in recent years in Bhutan. The 2011, 2013, and 2014 windstorms have affected majority of the districts in Bhutan (refer Table 2). Information on past windstorm damages reveal that the roofs of traditional Bhutanese houses are particularly vulnerable to windstorms given the nature of construction practices in traditional Bhutanese buildings.

The recent windstorm disaster affected mostly the rural homes in Bhutan and affecting the livelihood of the people.

Table 2 : Recent Windstorm Disaster

	Year	Dzongkhags/Areas affected	Damages
1	April 2011	17 dzongkhags affected	2424 rural homes roof damaged, 77 lhakhangs, 4 chortens, 57 schools/NFE centers, 21 BHU/ORC, 6 RNR offices, 4 Gups office and 3 RBP buildings
2	March-April, 2012	Zhemgang, Wangdue, Punakha, Haa	221 rural homes roof damaged, 10 lhakhangs and 4 schools, 1 RNR office
3	July 2013	Sarpang	4 homes roof are affected
4	Sept.	Zhemgang	22 rural homes roof damaged, 1 RNR office, 1

	2013		ECR affected and less 100 acres of maize field are affected
5	Dec 2013	Bumthang, Chukhha, Dagana, Gasa, Haa, Lhuentse, Paro, Punakha, Samtse, Trashigang, T/Yangtse, Thimphu, Wangdue	1012 rural homes roof damaged, 12 schools /ECRS, 58 cultural heritage sites, 3 local govt. offices and 8 BHUs/ORCs affected
6	March 2014	Dagana, Mongar, S/Jongkhar, Sarpang, Trashigang, Zhemgang	102 rural homes roof damaged, 2 schools and 4 lhakhangs affected
7	May 2014	Samtse Dzongkhag	106 homes, 20 government structures are affected
8	April 2015	Dagana, Tsirang, Chukha, Sarpang, Samtse, Phuntsholing, Pema Gatshel and Samdrup Jongkhar	972 Structures, 5 cattle, crops damaged, 3 persons injured. Community temples and govt structures damaged.
9	25 Feb 2016	Punakha	37 Houses and several govt government structures are affected



Figure 10: BHU and Rural home roof damage by windstorm

### 2.2.3 Glacial Lake Outburst Floods (GLOF)

The most recent GLOF disaster event is 1994 GLOF, triggered by the outburst of Luggye Tsho in Lunana caused massive damages downstream in the Punakha-Wangdue valleys and claimed 21 lives. A study conducted by the Department of Geology and Mines (DGM) in collaboration with ICIMOD identified 2,674 glacial lakes in Bhutan alone, of which 562 are associated with glaciers.

### 2.2.4 Flash Floods

One of the most recent climate change effect disaster is 2009 Cyclone Aila precipitated floods, which affected the whole of Bhutan taking 12 lives and causing losses of more than Nu. 700 million. Most of the flash flood occurs during the monsoon season (refer table 3).

Table 3 : List of GLOF and Flash flood disaster events (DDM, 2014)

	Year	Origin	Affected Areas	Impact
1	1994	Eastern Lunana (burst of Lugye Tsho)	Punakha-Wangdue valley	21 lives lost, 91 households affected, 12 houses damaged, 5 water mills washed away, 816 acres of dry land. 965 acres affected by sand and silt, damage to livestock and stored grains and materials, 4 bridges washed away, 2 <i>chortens</i> destroyed, 1 temple in Tsojug badly damaged.
2	2000	Heavy rains (Flood)	Phuentsholing, Pasakha and other southern cities	49 lives lost, Damages to factory infrastructure in Pasakha,
3	2004	Heavy rainfall (Flood)	Six eastern <i>dzongkhags</i> , Trashigang, Trashiyangtse and Samdrupjonkhar being the most affected ones.	9 lives lost, 29 houses completely washed away, 26 houses collapsed and 107 houses partially damaged; 161 acres of wetland and 503 acres of dry land washed away; 39 irrigation channels damaged
4	May 2009	Cyclone <i>Aila</i> brought unprecedented rainfall and flooding to the country.	17 districts were affected.	12 live lost, estimated damages losses of Nu. 719 <i>million</i>
5	June 4 2013	Flash flood caused by Jichuronchu (tributary of Mo Chu) due to heavy rainfall.	5 villages in Kabisa gewog, Punakha affected	Over 14 acres of agricultural land filled with debris
6	August 2016	caused by Heavy Monsoon	125 family displaced 4 people lost lives	Southern Bhutan affected most drained huge national budget for reconstruction and restoration.



Figure 11: GLOF of 1994



Therthormi Glacier, Lugge Glacier, Luge Hanging Glacier just above the right lateral moraine of Luge and Druckchung Glaciers, Luge Tsho, and Thorthormi Tsho. Also showing is the trench formed by water flowing from Luge Hanging Glacier into Thorthormi Lake. The breach point of Luge is also seen on the left lateral moraine of Luge (Phuntso Norbu October 1994)

Figure 12: Throthomi lake site after lake mitigation

### 2.2.5 Landslides

In the rugged mountain environment of Bhutan, landslides form an ever-present natural hazard. Landslide events (refer table 4) are closely linked with seasonal rain, earthquake, and flooding events.

Table 4 : List of Landslide events in Bhutan (DDM, 2014)

Year	Causes	Affected Areas	Impact/Damages
2000	Seasonal Monsoon	Thimphu, Chukha, Trashigang, Samdrupjongkhar, Mongar, Lhuentse, Pemagatshel, Samtse, Tsirang, Sarpang, Zhemgang, Wangduephodrang	Phuentsholing – Thimphu highway severely disrupted by numerous major landslides (Sorchen, Jumja, Chhukha); Highways and roads between and within districts are blocked due to landslides Most of the feeder roads were reported as blocked
21 Aug 2002	Sudden burst of sliding mud and debris	Thimphu-Tsirang highway	Loss of 2 pre-primary school children when the vehicle they were travelling in to school was buried in a sudden landslide in Tsirang.
25 April 2005	Triggered by heavy rain	Palamphu, Mongar-Lhuentse highway (mudslide)	2 buried alive, 1 injured
2 July 2006	n/a	Bemsisi, Thimphu(landslide)	A total of 7,150.9 square meters of wetland affected by the landslide.
18 Sept 2011	September 2011 Sikkim earthquake	Haa	Loss of one life due to landslides triggered by the earthquake.

Source: Extracted from the draft CBDRM training manual

## 2.2.6 Forest Fires

Bhutan is rich in forest coverage and around 72.5 per cent of the land is covered by forest but Bhutan is also prone to frequent forest fires. Most of the forest fire occurs during the dry season between November and April. The recent list of forest fires around the country refer table 5.

Table 5 : Fire Incidences in Bhutan 2016

Sl. No	Dzongkhag	No of cases	Area (Acres)	Forest type
1	Bumthang	1	4	Blue pine
2	Chukha	1	1.5	Mixed Conifer
3	Haa	3	86	Blue pine & Mixed conifer
6	Lhuentse	6	1169	Chir Pine
12	Mongar	6	3804.6	Chir Pine, Blue pine & Oak Forest
18	Paro	5	1069.56	Blue pine
23	Punakha	7	911.1	Plantation & Chir Pine
30	Samdrupjongkhar	1	45	Bamboo and broadleaved
31	Sarpang	1	11	Broadleaved
32	Thimphu	21	1902.6	Blue pine, Mixed conifer Grassland, Others
53	Trashigang	3	1644.2	Chir pine
56	Tsirang	3	58.00	Mixed Broad leaf
59	Wangdue	11	9750.94	Chir pine
70	Zhemgang	3	600	Broadleaved & Chir pine
		<b>72</b>	<b>21057.5</b>	<b>Total area Burnt</b>

## 2.2.7 Structure Fires

The June 2012, Wandguedhodrang Dzong (fortress) fire is the most recent and devastating fire disaster in the recent history of Bhutan; we lost the very important historical monument in our country. Also, the three consecutive fires in Chamkhar town in Bumthang caused huge loss to property. In 2016 there are two major fires such as Mongar town fire and Chamkhar town fire which divested huge property loss and drained government revenue. In August, FCB fire in Samdrup Jongkhar incurred 30 Million Ngultrum and Mega store for eastern Bhutan is burned into ashes.

Table 6 : List of structure fires in Bhutan

	Year	Causes	Affected areas	Impact
1	19 April 1998	Electrical short-circuit/ butter lamps	Taksang Monastery, Paro	Main structure of the monastery was damaged severely in the fire.
2	2002	-	Yangthang village, Haa	25 rural houses burnt down.
4	Oct 2010	-	Wamrong village, Trashigang	14 houses destroyed.
5	26 Oct 2010	Electrical short-circuit	Chamkhar town, Bumthang	2 live lost and 55 structures destroyed affecting 64 families.

6	18 Feb 2011	-	Chamkhar town, Bumthang	18 houses burnt down, affecting 36 families (107 individuals)
7	27 May 2011	-	Chamkhar town, Bumthang	30 houses completely burnt down, 3 houses partially damaged, affecting 56 families
8	24 June 2012	Electrical short-circuit	Wangduephodrang Dzong, Wangdue	Complete loss of the historic fortress, along with many artifacts;
9	15 Feb 2015	Candle as per news	Sarpang bazaar	More than 50 shops are completely burnt down
10	16 August 2016	Gas stove human error	Mongar Town	More than 10 Shops and More 30 Families lost properties
11	8 August 2017	Electric Short-circuit	Food Supply Mega Store S/Jongkhar	Worth more than 100 Million damaged

### 2.2.8 Pest and Disease Outbreaks

Bhutan people are susceptible to outbreaks of many diseases such as bird flu and H1N1 influenza and pest outbreaks such as Army Worms and Giant African Land Snails due to climatic conditions of Bhutan. Even though Bhutan do not experienced the severe outbreak of any diseases but Government has established a national preparedness mechanism to prevent the possible outbreak of diseases or pest.

### 2.2.9 Drought

Even though Bhutan is located in the high Himalayan with lot of water resources but being located on the steep terrain, it is difficult for the framers to get access to the perennial rivers. Therefore, they depend on the monsoon season for their paddy plantation. Most of the Bhutanese farmer depends on subsistence farming. Therefore, timely precipitation is very important for the Bhutan farmer. However, due to the extreme variations in climate and weather patterns as per the National Adaptation Programme of Action (NAPA), Bhutan also suffers from the drought. Government has implemented Climate Change and Adaptation Programs into developments in 2015. Drawn strategic plan 2015 to 2020 for five years.

## 3. Disaster Management System in Bhutan

### 3.1 Administrative System in Bhutan

As per the DM Act 2013 Clause 7 states the establishment of the National Disaster Management Authority (NDMA), as the highest decision making body on disaster management in Bhutan and Department of Disaster Management, as the secretariat to the NDMA. Therefore, the Disaster Management Institutions are formed and some will be formed soon at varies level as per the outline below:



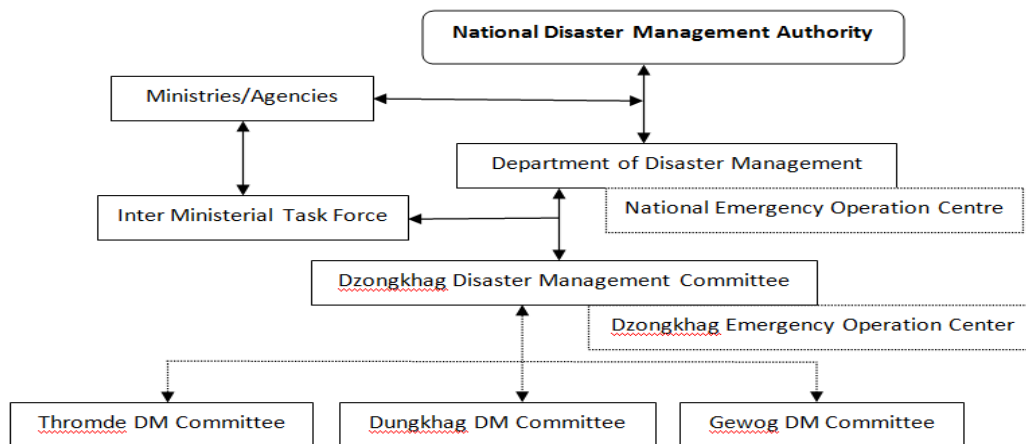


Figure 13: Outline of Disaster Management Institution in Bhutan

### 3.2 Legal System and Framework

Disaster management being very new discipline to the people of Bhutan and people of Bhutan could not think of framing the laws or guidelines for the disaster management until the 2006. Even though, Bhutan has experienced few major natural disasters in the past as per the record. The first framework of National Disaster Risk Management Framework (NDRMF) was drafted and adopted in 2006.

The 2009 Earthquake in the Eastern part of Bhutan was 1<sup>st</sup> Epoch making turning point for the Bhutan for framing the laws for the disaster management and the process of drafting of first Disaster Management Act started. Followed by the 2011 Sikkim Earthquake became like 2<sup>nd</sup> Epoch making turning point for the law maker to speed up in the drafting and approval of the DM act. Therefore, on 27<sup>th</sup> February, 2013 during its 10 session of Parliament, the first Disaster Management Act of Bhutan was enacted.

Table 7: Progress in Laws and Framework in Bhutan

Major Disaster Events		Legal System and Framework in Bhutan	
1994	Glacial Lake Outburst Flood (GLOF)		
		2006	National Disaster Risk Management Framework (NDRMF)
2009	Narang Earthquake, Eastern Bhutan (M6.1)	2007	In the process of Drafting DM Act started
		2009	Given the importance of DM Act
2011	Sikkim Earthquake (M6.9)	2013	DM Act 2013 Enacted
		2014	Disaster Management Strategic Policy Framework (DMSPF).

### 3.3 Structure of Disaster Management

#### 3.3.1 National Platform for Disaster Risk Reduction

At the national level for the platform for DRR, we have National Disaster Management Authority (NDMA) as a highest decision making body on disaster management in the country. The members comprise 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.

As per the DM Act 2013, NDMA is responsible for approving - national DM strategies, policies; the national DM and Contingency Plan; national vulnerability and hazard zonation maps; structural and non-structural measures, standards, guidelines and procedures. The NDMA is also responsible for allocation of DM related resources; directing agencies to mainstream disaster risk reduction into their development plans, policies, programmes 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; on the establishment, develop and provide training in the field of disaster management.

#### 3.3.2 National Organizations for Disaster Risk Reduction

The Department of Disaster Management (DDM) under the Ministry of Home and Cultural Affairs serve as the Secretariat and executive arm of the NDMA as per clause 59 of the DM Act 2013. The DDM is nodal National Coordinating Agency for disaster management in the country and 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 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.

As per the DM Act 2013, the Inter-Ministerial Task Force (IMTF) is constituted. 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.

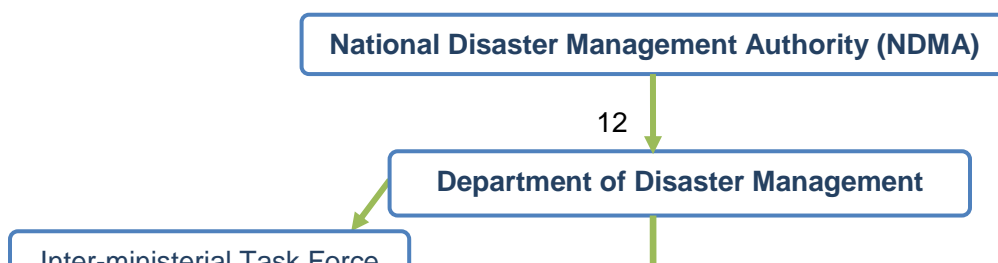


Figure 14: National Organization for DRR

### 3.3.3 Local Organizations for Disaster Risk Reduction

At the local level, as per the DM Act 2013 mandates every Dzongkhag Administration to constitute a Dzongkhag Disaster Management Committee (DDMC) under the Chairmanship of the Dzongdag. Most of the Dzongkhags has formed the DDMC as per the instruction of NDMA. As the DM Act 2013, the DDMC members comprise of as follows:

1. The Dzongda, as Chairperson;
2. A Dzongkhag Welfare Officer from the Druk Gyalpo's Office of People's Welfare, if any;
3. Chairperson of Dzongkhag Tshogdu;
4. All Gups;
5. All Thrompons/ Thromde Thuemi;
6. Superintendent of Police or Officer-In-Charge, Royal Bhutan Police;
7. Drungchen, Zhung Dratshang or Dzongkhag Rabdey;
8. Dzongkhag Disaster Management Officer as Member Secretary; and
9. Such other member as may be co-opted in accordance with the DM Act 2013.

The lowest level of the DRR organization committees: Thromde committee, Dzongkhag committee and Gewog committee. Based on the requirement in their Dzongkhag, the Chairperson has right to constitute within his/her administration boundary.

The main function of the DDMC as per the DM Act 2013 are: 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.

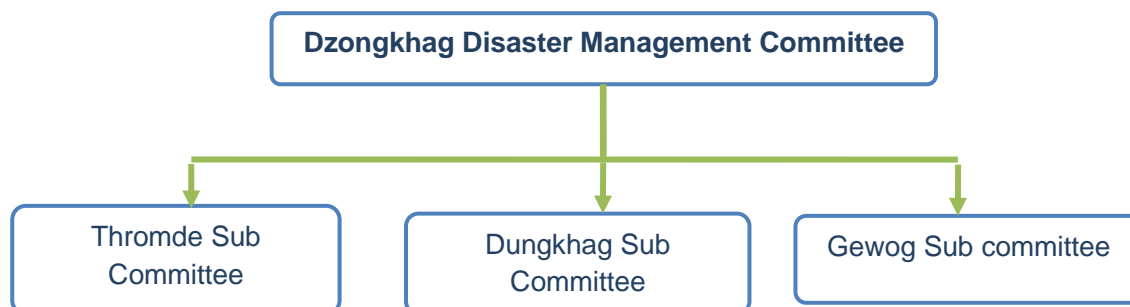


Figure 15: Local Organization for DRR

#### **4. Disaster Management Strategy, Policy and Plan**

In 2006, the Department of Disaster Management with collaboration with relevant agencies formulated the National Disaster Risk Management Framework (NDRMF), which was the first guiding principle for the policy and planning disaster activities in our country. However, due to the increase of populations and urbanization, Bhutan also faced many natural disasters in the recent years. The 2009 and 2011 Earthquakes were the epoch making turning point which lead to the fast enactment of the Disaster Management Act of Bhutan 2013.

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

- 1) Disaster Financing Guidelines 2017
- 2) Disaster Response and Coordination Process at the National and Dzongkhag level
- 3) Disaster Risk Management Strategy 2017
- 4) Disaster Management Strategic Policy Framework (DMSPF) 2014
- 5) Disaster Management Rules and Regulations
- 6) Disaster Management Planning and Contingency Guidelines
- 7) School Disaster Management Planning Guideline
- 8) Guideline on Proper Construction Practices for Non-Engineering Buildings (Stone Masonry)
- 9) National Action Plans for School Earthquake Safety
- 10) National Action Plans for Earthquake Safety of Health Facilities
- 11) Post-Earthquake Safety Assessment Guidance Document
- 12) National Recovery and Reconstruction Plan for 2009 & 2011 Earthquake
- 13) Dzongkhag Disaster Management Plan (Paro and Thimphu)

#### **5. Budget Size on National Level**

Financial Arrangement provision as per the DM Act 2013, there are four different financial arrangement mechanisms; Response and Relief Expenditure, Budget for National Disaster Management Activities, Budget for Department of Disaster Management, Recovery and Re-construction.

### 5.1 Response and Relief Expenditure

As an emergency measure to meet the expenses for response and relief operation in the Dzongkhag, the DDMC can use the fund from the annual budget of the Dzongkhag in accordance with the guideline formulated jointly by the National Disaster Management Authority and the Ministry of Finance. Later, the NDMA recommend the Ministry of Finance to authorize the use of public funds to defray expenditure incurred for response and relief operation in accordance with the Public Finance Act of Bhutan. Till Department of Disaster Management is working on the ceiling of fund, how much DDMC can use during the response and relief operations.

### 5.2 Budget for National Disaster Management Activities

This Budget is mainly for the immediate restoration of essential public infrastructure and service centres during or after the disaster. As per the DM Act 2013, there should be a separate budget head to be called the budget for National Disaster Management Activities and should receive adequate budgetary allocation. This budget should be managed and operated by the Department of Disaster Management Secretariat of National Disaster Management Authority.

### 5.3 Budget for Department of Disaster Management

This budget is a separate budget head for the Department of Disaster Management budget to run the offices and to carry out the following activities:

- a) Capacity building;
- b) Establishing and maintaining Critical Disaster Management Facility including purchase of equipment;
- c) Any other activity as may be required to strengthen the preparedness of the nation against disaster.

Table 8: Annual Budget of DDM from 2012-2018

Fiscal Year	Total Amount (Million)	Remarks
2012-2013	34.157	USD 0.57 million
2013-2014	20.56	USD 0.34 million
2014-2015	35.372	USD 0.59 million
2016-2017	50	USD 0.77 million
2017-2018	98	1.51 million

## 5.4 Recovery and Re-construction

This budget is mainly for the recovery and reconstruction aftermath of disaster. After the disaster the Dzongkhag Disaster Management Committee should submit the assessment of public assets and infrastructure within its area of responsibility at the earliest with cost estimate along with the work programme to the Department of Disaster Management for review and submission to National Disaster Management Authority for the approval. Then, the NDMA make recommendation to the Government for release of fund to the sectors concerned for the recovery and reconstruction.

The implementation of the National Recovery and Reconstruction Plan (NRRP) for the 2009 Earthquake was mostly funded through the UN agencies, donors' agencies, support and contributions from the friendly countries. The government also carried out the re-appropriations of Nu. 150.320 million within the 10<sup>th</sup> FYP budget outlay. The total estimated budget requirement for the implementation of NRRP for the 2009 earthquake was Nu. 699.117 million (USD 11.65 million) and rest being funded through contributions received in the aftermath of the disaster as shown in table 9.

Table 9: Source of Funds for NRRP 2011(2009 Earthquake)

Source of Funds	Cash	Indicative	FIC	Education	Health	Culture	Police	Agriculture	Local Governance
Government of India	250,000,000.00		2,560	33,871,854.64	31,026,000.00	93,254,519.88	51,628,879.73		27,388,799.00
Associazione Amici Del Bhutan	13,000.00		2,527						
Government of the State of Kuwait	80,949,000.00		2,528	30,165,668.08		36,990,688.65	13,589,976.98		
Government of Thailand	522,000.00		2,529						
Government of Singapore	1,411,000.00		2,533			1,400,000.00			
WHO	89,000.00								
Sponsors of Buddha Dordenma Project	10,099,000.00		2,540			10,050,000.00			
UNICEF	827,000.00		2,215						
Government of France	694,000.00								
UNESCO		1,150,000.00				1,150,000.00			
Prince Claus Fund		4,200,000.00	2,570			4,100,000.00			
Liasion Office of Denmark	27,435,328.00		2,576	27,064,499.72					
Bhutan Foundation	536,000.00		2,570			536,000.00			
Global Facility for Disaster Recovery and Re-construction (GDFRR)		23,000,000.00			23,000,000.00				
Korean Organization		586,000.00							
Reappropriation from 10th FYP				99,496,715.88	10,729,000.00			40,095,000.00	
Activities funded through the BRRP with support from UNDP/CIDA			2,566	8,614,319.69	3,264,000.00				
Activities funded through the ADB Project				87,007,683.41					
Unfunded Activities						29,000,000.00			
Australian support through UNICEF				13,269,784.56					
Government contribution to ADB supported projects				22,423,500.00					
<b>TOTAL</b>				<b>321,914,025.98</b>	<b>68,019,000.00</b>	<b>176,481,208.53</b>	<b>65,218,856.71</b>	<b>-40,095,000.00</b>	<b>27,388,799.00</b>

The total requirement for the implementation of the National Recovery and Reconstruction Plan (NRRP-2012) is Nu. 1478.43 million which includes Nu. 67.60 million for early recovery and Nu. 82.00 million for DRR components as presented in the table 10:. This is being met through re-appropriation of Nu. 515.06 million from the 10th FYP budget and the rest Nu. 963.37 million needs to be funded by the RGoB and through the contributions received in the aftermath of the disaster to assist in recovery and reconstruction.

Unfortunately, we didn't get good contributions from the international agencies for the implementation of NRRP 2012.

Table 10: Source of fund for the NRRP 2012 (2011 Earthquake)

Source of Fund/Donor	Cash		In Kind	Education	Health	Culture	RNR	Gup's Offices / Other Public Infrastructures
	Nu in Million	USD in million						
UNDP -CERF	34,884,900.00	700,500.00						
UN OCHA	2,264,954.70	49,999.00						
UNFPA			2,050 Dignity Kits					
UNICEF			100 School-in-a tent					
			20,879 CGI Sheets					
			5,000 Family Emergency Kits					4,818,000.00
DANIDA	9,159,774.00			9,159,774.00				
Re-appropriation from within 10th FYP Budget				28,350,926.00	14,950,000.00	8,097,000.00	16,336,000.00	4,818,000.00
<b>TOTAL</b>	<b>46,309,628.70</b>	<b>750,499.00</b>		<b>37,510,700.00</b>	<b>14,950,000.00</b>	<b>8,097,000.00</b>	<b>16,336,000.00</b>	<b>4,818,000.00</b>

## 6. Implementation of ICS in Bhutan

Bhutan is vulnerable to various natural disasters such as floods, earthquakes, landslides, forest fires, etc., hence the need for an effective strategy to lessen the impact of a disaster. Since disasters will continue to strike unabated with and without warning, the Nation as a whole, and the Government in particular, has to plan and prepare to respond to them effectively. The management and mitigation of the adverse consequences of these disasters will require coordinated, prompt, and effective response systems at the National as well as Dzongkhag levels. While many of the components of response activities are the same for different types of disasters, systems need to be developed considering the multi-hazard scenario for optimally utilizing available resources.

The Disaster Response and Coordination Process (DRCP) would be an essential part of this strategy and an ingredient of governance. The DRCP focuses on providing clarity about offsite coordination at the National EOC level and the constitution of an onsite response organization based on the Incident Command System. The DRCP will assist and equip various responding agencies at the National and Dzongkhag levels in organizing, responding to, and coordinating disaster responses. Much of this document is focused on multi-agency coordination and organization of onsite response teams using the DRCP.

The Disaster Response and Coordination Process (DRCP) establishes administrative structures for systematic, coordinated, and effective (NEOC) operations involving multiple national agencies and a well-organized multi-sectoral Incident Management Team. Incident Command System (ICS) principles are utilized throughout the DRCP in order to support the organization of onsite response activities through pre-established response-related functional roles, ensuring there is flexibility in adapting to responder expertise and/or sectoral jurisdiction. Implementation of the DRCP allows for greater efficiencies and more dynamic response options from the initial on-scene responders, as well as it provides for a smoother transition when additional personnel arrive from other agencies. Furthermore, drawing on principles of ICS, the National Emergency Operations Center (NEOC) transitions into the

“National Disaster Response Coordination Committee” (NDRCC) during a Type III disaster to support the onsite IMTs at the dzongkhag levels.

Much of the onsite response organization has been designed based on some principles of ICS, hence a brief background about ICS is provided. ICS is a temporary onsite management hierarchy with standardized procedures for managing incidents/disasters of any size without being hindered by jurisdictional boundaries. It is designed to enable effective and efficient incident/disaster response by integrating a combination of facilities, equipment, personnel, procedures, and communications within a common organizational structure. It is used to organize response operations for a broad spectrum of emergencies, from small to complex incidents/ disasters, both natural and manmade, as well as planned events. It is suitable for the civil administration for all types of incident/disaster response and can be used by all levels of government - National, Dzongkhag, Thromde, Dungkhag, and Gewogs, as well as private-sector and non-governmental organizations. It is normally structured to facilitate activities in five major functional areas: command, operations, planning, logistics, and finance and administration. In addition, the organization can contract or expand based on the needs of the incident/ disaster. The ICS is implemented from August 2017 after one year implemented on trial basis. The concept and idea is borrowed from US Forest Service. The Department of Disaster Management (DDM) has worked in close partnership with the Office for U.S. Foreign Assistance (OFDA) / USAID and United States Forest Service (USFS) since 2011 on implanting its own version of ICS. In partnership with the USFS (International Programs), DDM successfully conducted various training courses at the Dzongkhag and National level which included: Basic and Intermediate ICS, Integrated Planning, and All Hazards Incident Management Team trainings. There are five levels of ICS in Bhutan:

1. National Level
2. District Level
3. Municipal Level
4. Sub-District Level
5. Block Level



Fig 16: ICS Concept Diagram

Following diagram represents the classic ICS organization:

## INCIDENT COMMAND SYSTEM Organization Chart

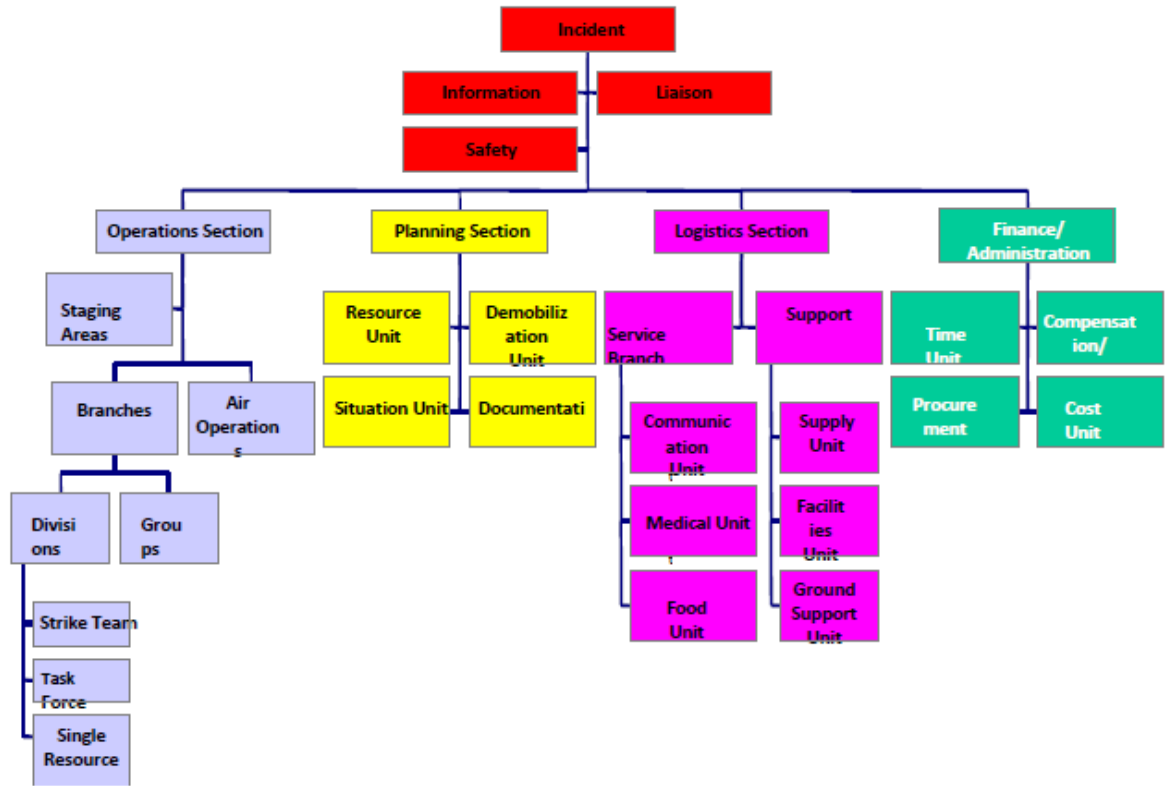


Figure 17. National Level ICS

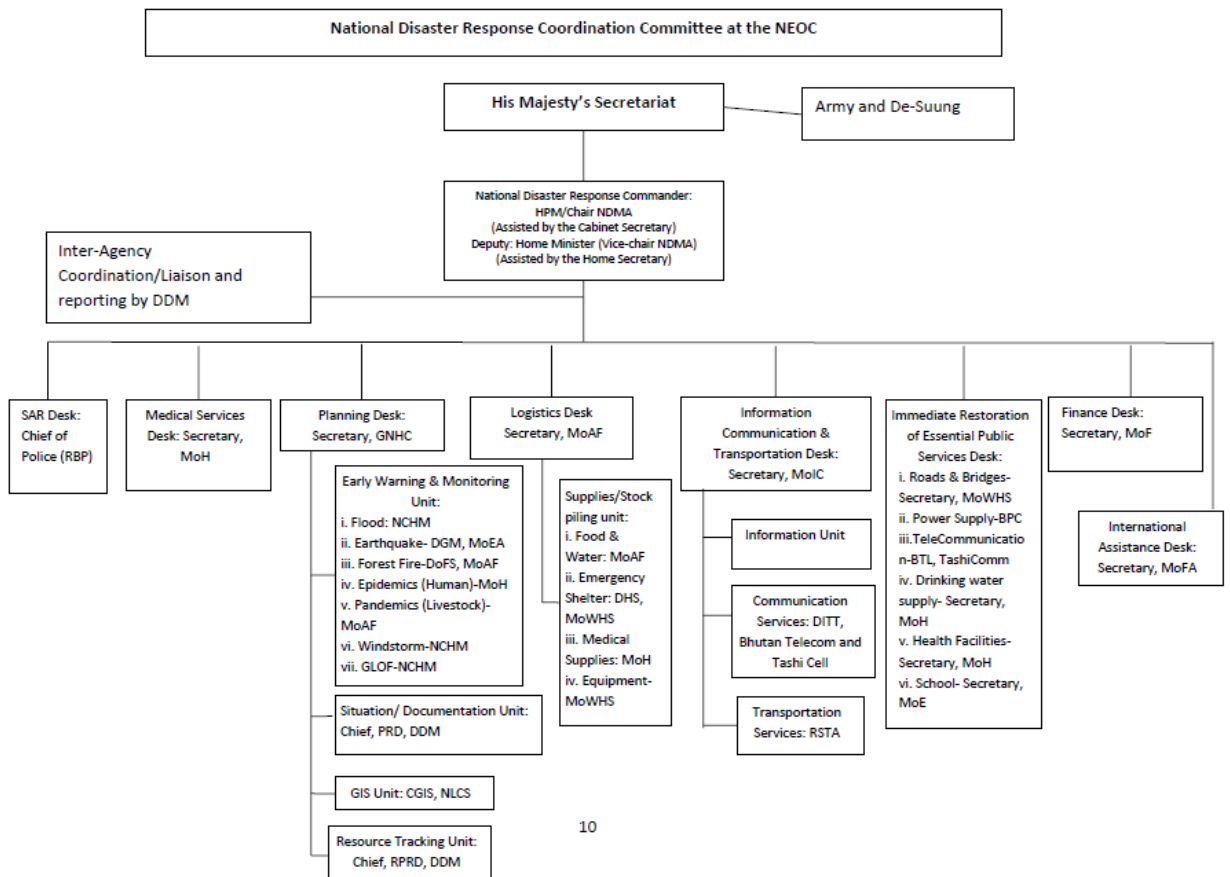


Fig. 18 ICS District Level

Onsite Incident Response Management Team at Dzongkhag Level

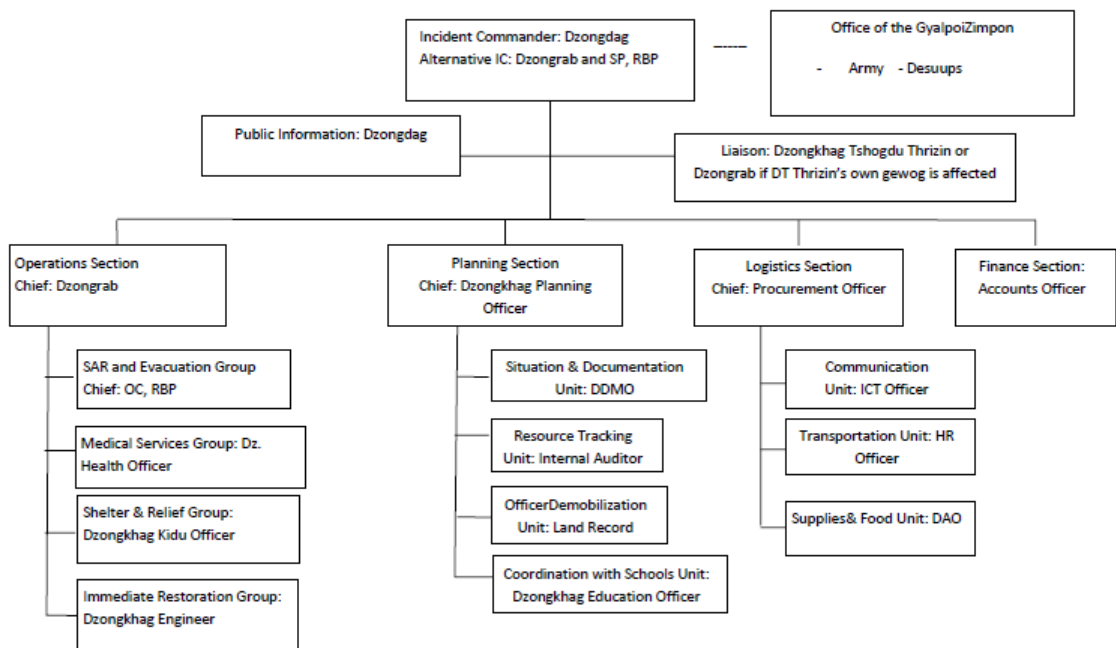


Fig. 19 ICS Sub-District Level

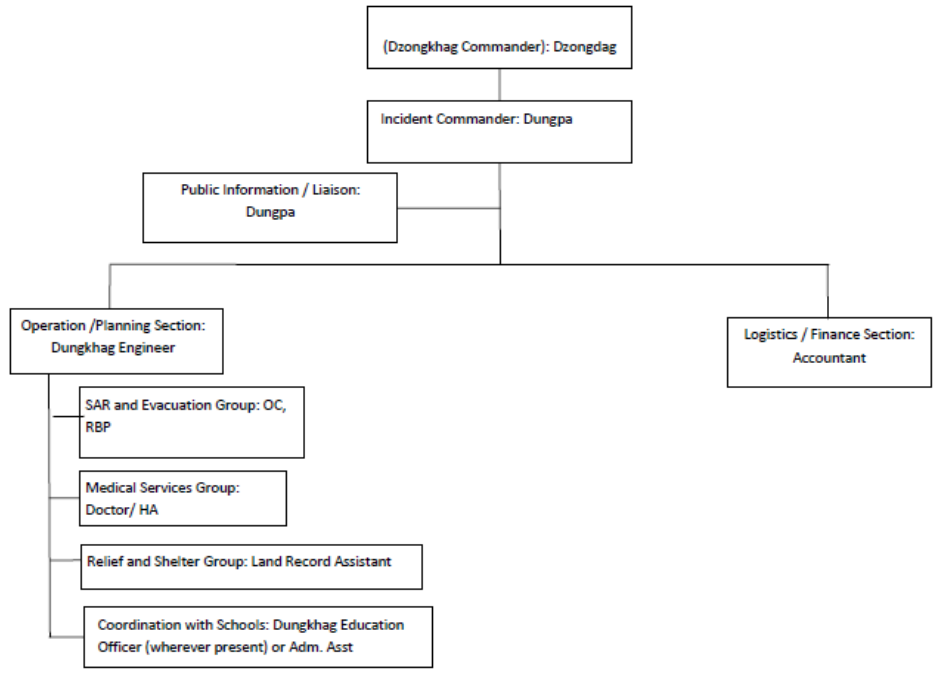


Fig. 20 ICS Block Level

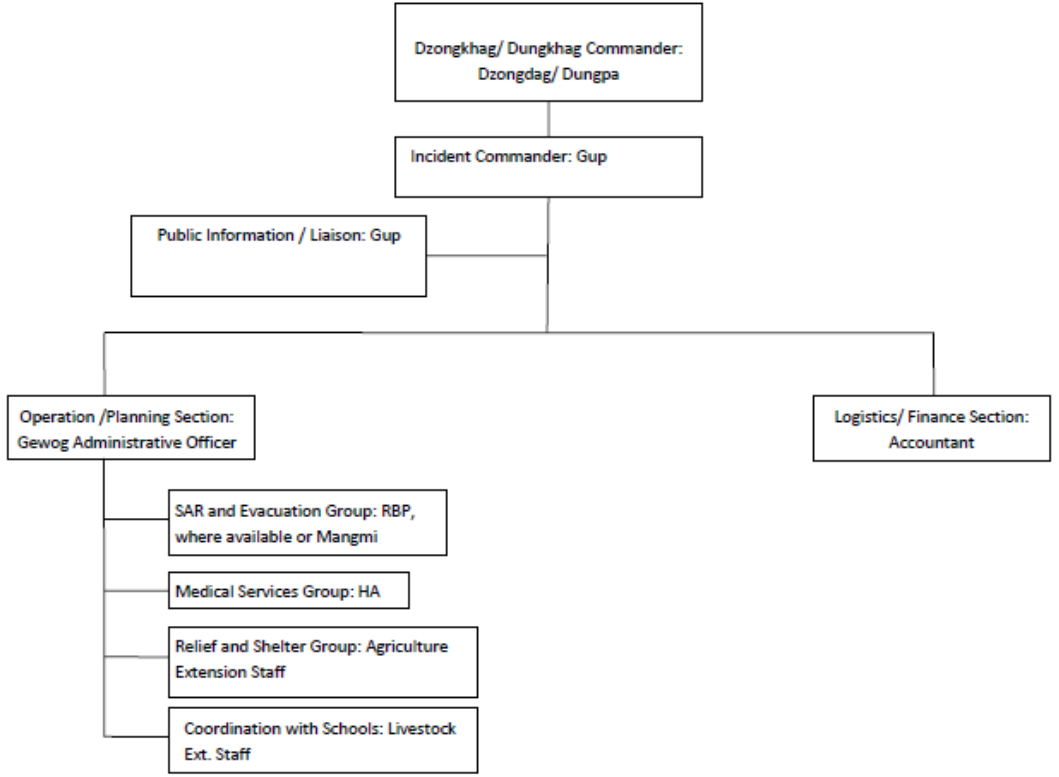
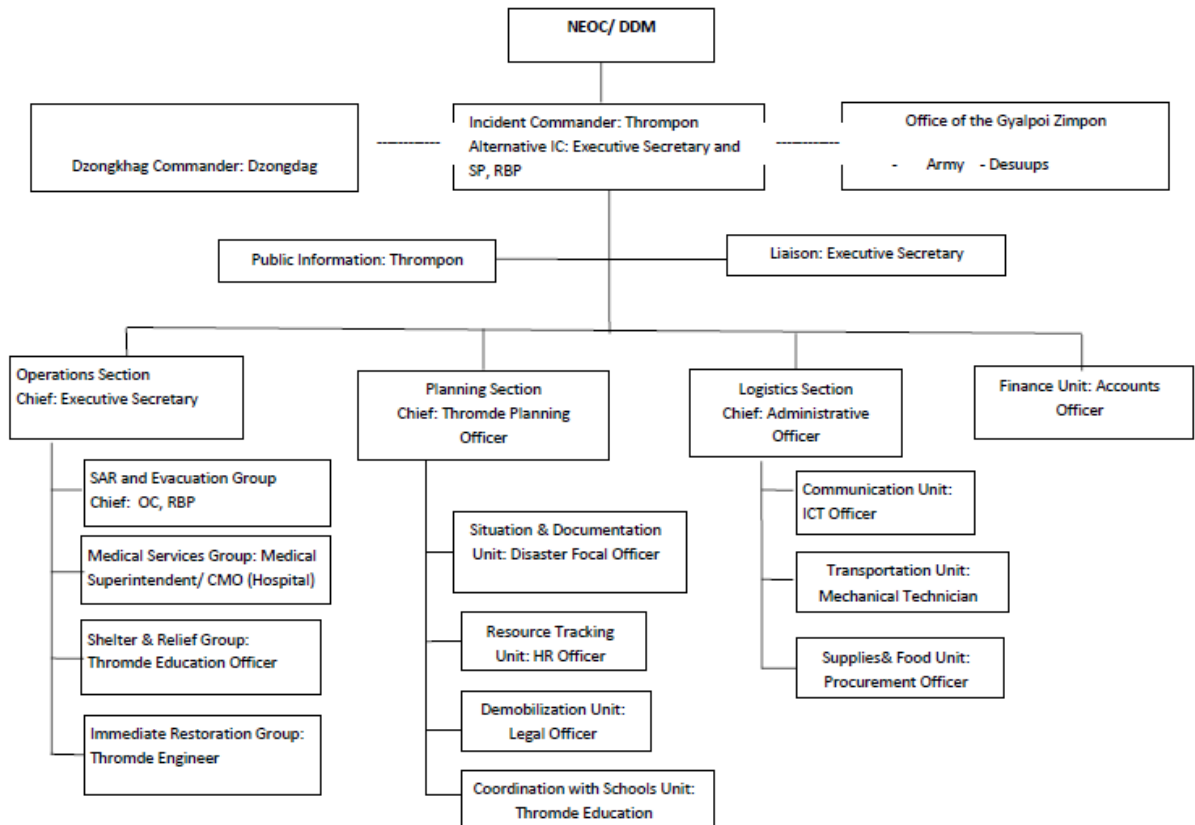


Fig 21. ICS Municipal Level

**Onsite Incident Response Management Team Structure at Thromde level (Thimphu, Phuentsholing, Gelephu and Samdrupjongkhar)**



**7. Progress of the Implementation of Hyogo Framework for Action (HFA)**

**7.1 Strategic Outcome for Goal 1**

The Department of Disaster Management under the Ministry of Home and Cultural Affairs is established in 2008 as a National Coordinating Agency for Disaster Management in the country was an important step in Bhutan to establish an institutional structure to manage disaster risks, which indicated a government commitment to disaster management in the country.

In 2006 National Disaster Risk Management Framework is formulated as the first guiding principle for the policy and planning disaster activities in our country.

In February 2013, Disaster Management Act of Bhutan 2013 was enacted in the 10<sup>th</sup> Parliament Session. The act also envisages the decentralization of authority and resources to local level.

The National Influenza Pandemic Preparedness Plan (NIPPP) for the Country was formulated to support integrated planning and preparedness for pandemic influenza across all sectors.

The Climate Change Council has been established to address the impacts of climate change, which is also responsible for mitigation and adaptation measures against adverse impacts of climate change. The National Climate Change Policy and a National Adaption Program of Action (NAPA) has been developed.

Conducted several education awareness, trainings and workshops among the local community and school children to enhance knowledge and capacities on DRR, also conducted several mainstreaming advocacy and training programs to educate on the integration of DRR into development policies and plans.

The Guidelines for Preparation of the Eleventh Five Year Plan (2013-2018), has “Improved disaster resilience and management mainstreamed” as one of the 16 National Key Result Areas and as a cross-cutting theme. NKRAs are delivered by all sectors, agencies and local governments through their programmes. The Royal Government of Bhutan’s Protocol for Policy Formulation also requires mainstreaming of cross-cutting issues, including DRR, as appropriate to the policy.

National Action Plans for Earthquake Safe School and Health Facilities to provide necessary and urgent direction to the two most vulnerable sectors.

### **7.2 Strategic Outcome for Goal 2**

National Disaster Management Authority (NDMA) is constituted as per the DM Act 2013 and chaired by Prime Minister with all government Secretaries as members, ensuring coordination and mainstreaming of DM efforts.

In the 2<sup>nd</sup> NDMA meeting, member approved the list of members for the Inter-Ministerial Task Force (IMTF) comprising of experts from various relevant line ministries and agencies responsible for providing technical guidance to DDM, District DM Committees (DDMCs) and sectors.

DDMCs in 16 Dzongkhag is constituted as per the Executive Order from NDMA for formal establishment of DDMCs across the country.

Disaster Information and Management System (DMIS) has been developed for collection/ dissemination of information for effective and efficient response.

Disaster Management Rules and Regulations formulated as per the DM Act 2013.

National Search and Rescue Team, local level SAR teams are being formed, trained and provided with basic equipment.

### **7.3 Strategic Outcome for Goal 3**

Disaster Management Contingency and Planning Guidelines formulated and one Dzongkhag (Paro) has developed the Dzongkhag Disaster Management Plan as per the DM Act 2013.

Automated Early Warning system installed along the Punatsangchhu river basin with collaboration with Department of Hydro-Met Services and educated affected communities on risks, risk reduction strategies. Regular drills are conducted along Punatsangchhu river basin.

The water level of potential dangerous Glacial Lake known as Thorthormi Lake located above the head water of Punatsangchhu River has been reduced by 5 meters reducing the risk of overflowing and lake outburst.

National Search and Rescue Team comprising 20 members is established and became member of the International Search and Rescue Group (INSARAG).

Bhutan Disaster Assessment (BDA) Tools and Standard Operating Procedures (SOPs) for post disaster needs assessment developed.

## 8. Recent Major Projects on Disaster Risk Reduction

Table 11: List of recent major project on DRR in Bhutan

Sl#	Name of the Project	Duration	Amount (Million)	Funding	Implementing agencies	Status
1	PHRD Grant for Improving Resilience to Seismic Risk	2013-2017	US\$ 1.2855	Government of Japan under World Bank as administrator	DDM, DoC, DES & DGM	On-going
2	Addressing the Risks of Climate-induced Disaster through Enhanced National and Local Capacity for Effective Actions	2014-2017	US\$ 54.54	UNDP	DDM, GNHC, MoEA, MoWHS, MoHCA, MoAF, Phuentsholing Thromde, Mongar Municipality & Tarayana Foundation	On-going
3	DipECHO-VII project on "School Based Disaster Preparedness"	2013-2015		DIPECHO through Save the Children	DDM, DSE	Completed
4	Institutional Strengthening and Setting up of GLOF Early Warning and Rainstorm Flood Forecasting in Mangdechhu and Chhamkharchhu Basins	2014-2015	US\$ 0.07	Mangdechhu Hydroelectric Project Authority (MHPA)	DDM	Completed
5	Response and Recovery Preparedness in Bhutan	2014-2016	US\$0.26	UNDP & UNOOSA	DDM	Completed
6	Improving Disaster Management Capacity in the Kingdom of Bhutan;	2012-2014	US\$ 0.40	World Bank	DDM	Completed
7	Bhutan Recovery and Reconstruction project	2009-2011		UNDP-BCPR with support from CIDA	DDM	Completed
8	National Action Plan for School and Hospital Earthquake Safety			GFDRR	DDM, MoH, MoE	completed
9	Climatic Risk management through	Jan 2014-	US\$ 0.3	UNDP	DDM, DES	Completed

	Enhanced national, local and community-level resistance	Dec.2014				
10	Glacial Lake Outburst Floods (GLOF) Project	2012		ADRC	DDM, MoE	Completed
11	National Recovery and Reconstruction Plan 2009	2009-2013	Please refer table 9			completed
12	National Recovery and Reconstruction Plan 2011	2011-2016	Please refer table 10			Completed

### 9. Asian Disaster Reduction Center Counterpart

Bhutan joined as the member of ADRC in 2007 and the Department of Disaster Management under Ministry of Home and Cultural Affairs, Royal Government of Bhutan is designated as the counterpart.

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