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- ❖ Hazards in Bhutan
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Introduction: Bhutan



Culture and Tradition







Ministry of Home & Cultural Affairs
Royal Government of Bhutan
Tashichho Dzong, Thimphu
<http://www.mohca.gov.bt>



Department of Disaster Management

Overview of Disaster Management System

EARTH



FIRE



WATER



AIR





HAZARDS IN BHUTAN

1. Earthquakes
2. Glacial Lake Outburst Floods (GLOF)
3. Floods/Flash floods
4. Landslides
5. Forest/Structural fires
6. Windstorms
7. Thunderstorms/ Hailstorms/Droughts
- Artificial Dam formation
8. Epidemics, Pests & Diseases

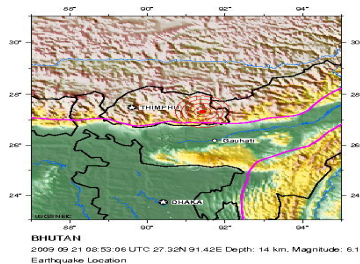


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EARTHQUAKE

High risk

- ❖ Seismic Zone IV or V
- ❖ High likelihood of a major Earthquake

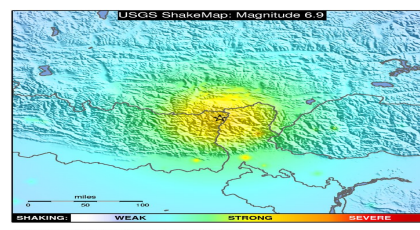


21st September, 2009 Mongar Earthquake

- **Magnitude: 6.1 (10 km)**
- **Time: 2:53 PM**
- **12 People killed**

18th September, 2011 (Sikkim Earthquake)

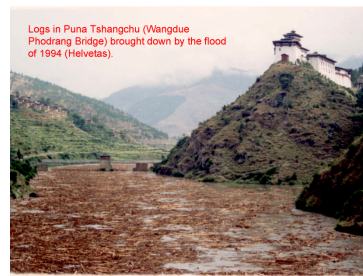
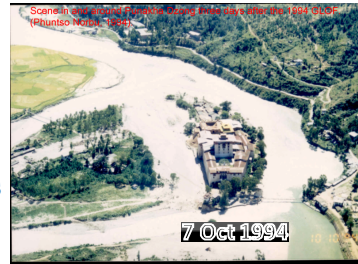
- **Magnitude : 6.9 (19.7 km)**
- **Time: 6:41 PM**



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GLACIAL LAKE OUTBURST FLOOD

- **677** Glaciers & **2,794** Glacier Lakes
- **25** glacier lakes potentially dangerous
- 21 outburst cases in Bhutan (SATREPS Project, 2012)
- 17 events between 19th century and the 1970s
- 4 cases of outburst in the last 40 years



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GLACIAL LAKE OUTBURST FLOOD

Lemthang Tsho: Before GLOF



Source: Google photo: Sebastian Kammer, May 2015

Lemthang Tsho: After GLOF



28th June 2015
Lemthang GLOF, Laya

Floods/Flash Floods

- ❖ **Recurrent Event**
- ❖ **Eastern & Southern Regions are most vulnerable**

Past events

- ❑ **Phuentsholing & Pasakha – Year 2000**
- ❑ **Eastern Bhutan – Year 2004 (9 people lost lives)**
- ❑ **Cyclone Aila – Year 2009 flood (12 People lost lives)**
- ❑ **July 2016 (Phuentsholing & Sarpang)**



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II. Loss and Damage (Cyclone Aila)

• **12 lives lost**

- Govt. Infrastructure – Nu. 544 M
- Farm and feeder roads – Nu. 47 M
- Agriculture property – Nu. 7.5 M
- Bridges – Nu. 56 M
- Drinking water/ Irrigation – Nu. 45 M
- Livestock – Nu. 15 M
- Private Properties – Nu. 7 M

- **Total – Nu. 722 Million**





Artificial Dam Formation



Tshati chhu artificial lake (33 million m³),
above Autsho, Lhuentse



Lake burst (Kuri chhu Dam)

Landslides

- ❖ Masses of rock, earth, or debris moving down a slope, may be very small or very large, can move at **very high speed**.
 - ❖ Associated with heavy rainfall, tend to worsen the effects of flooding that often accompanies these events.
 - ❖ In areas burnt by forest fires, a lesser amount of precipitation may initiate landslides.
- **Other triggers:** Earthquakes, poor land management
- Eastern & southern region- vulnerable
 - Example: Ossay & Rewtala

Roadblock by Landslide



The Takti roadblock is probably the biggest on the highway in recent years

Landslides



Jumja landslide



Moshi, Wamrong landslide

FIRES ON FOREST & HUMAN SETTLEMENT

Forest fires

- ❖ Annual event
- ❖ Majority of fire events are caused by humans



Fires on Human Settlement

- ❑ Unsafe habits
 - electrical wiring
 - temporary housing
- ❑ Use of wood



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Fires on Forest



Forest fire above Trashigang town

Fire on Human Settlement



Structural fire at Yangthang, Haa (Feb 6,2002)

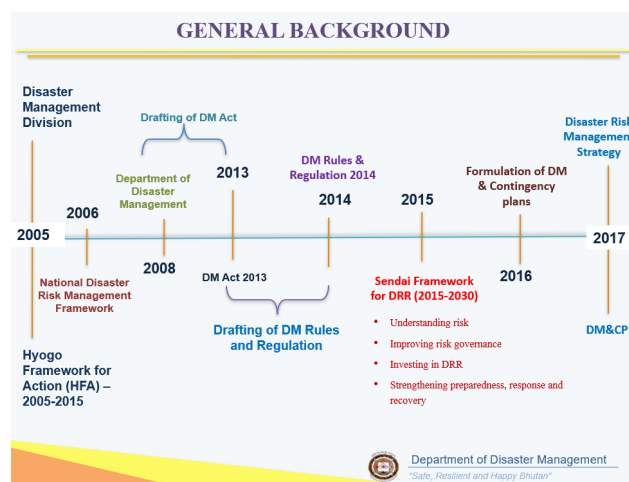


Other hazards

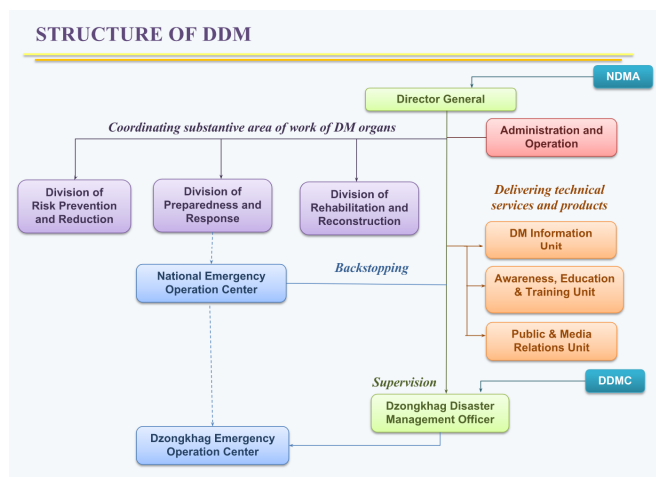
- ❖ Windstorms/ Thunderstorms/ Hailstorms/Droughts
- ❖ Epidemics, Pests & Diseases



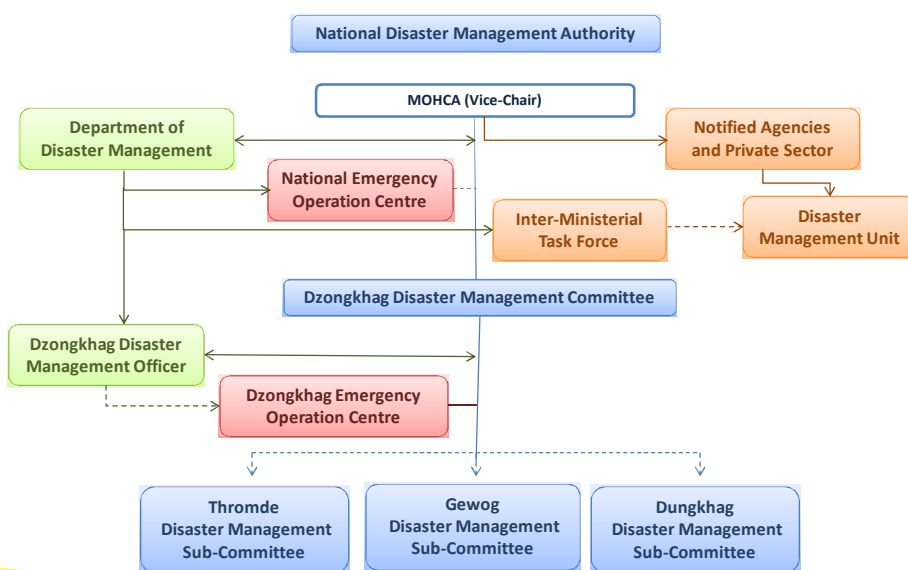
Department of Disaster Management



Organogram of DDM



DISASTER MANAGEMENT SYSTEM (DM ACT 2013)



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Institutional Provisions

As per the Disaster Management Act 2013

Composition

- Prime Minister (ex Officio Chair)
- Home Minister
- Finance Minister
- Secretaries
- Gyalpoi Zimpon
- Head, NECS
- President, BCCI
- Head, DDM
- Others as may be co-opted according to DM Act

**National Disaster
Management Authority
(NDMA)**



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Roles & Responsibilities: NDMA

- ❖ **Approve** Disaster Management (DM) strategies, policies, plans, guidelines, procedures.
- ❖ **Allocate** DM related funds.
- ❖ Direct agencies to **mainstream DRR** into policies, plans and programmes.
- ❖ **Implement** the DM Act.
- ❖ Ensure formation of **Inter-Ministerial Task Force**.

Institutional Provisions

Inter-Ministerial Task Force (IMTF)

❖ *Comprised of technical experts from relevant agencies.*

Responsibilities

- Review hazard zonation & vulnerability map and structural & non-structural measures.
- Review disaster risk reduction and disaster management activities.
- Review national standard, guideline and standard operating procedure for disaster management.
- Provide necessary technical assistance in the preparation of Disaster Management & contingency Plan, where necessary.
- Advise relevant agency in setting up critical Disaster Management Facilities.



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Institutional Provisions

DDMC constitution

- Dzongda as Chairperson
- Dzongrab as Vice Chair
- Dzongkhag Kidu Officer
- Chairperson, Dzongkhag Tshogdu
- All Gups
- Thrompon/Thromde Thuemi
- Superintendent, RBP
- Drungchen, Zhung Dratshag /Rabdey
- Dzongkhag Disaster Management Officer (DDMO)
- Others as may be co-opted as per DM Act

Dzongkhag Disaster Management Committee (DDMC)



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Roles & Responsibilities: DDMC

- ✓ *Prepare and implement DM and Contingency Plans.*
- ✓ Ensure establishment and functioning of ***Critical DM facilities.***
- ✓ Ensure ***mainstreaming of DRR*** into local development plans & programmes.
- ✓ ***Ensure compliance of structural and non-structural measures.***
- ✓ Ensure ***communication*** of hazard/disaster events to DDM and NDMA.
- ✓ ***Ensure assessment, reporting, education, awareness and capacity building.***

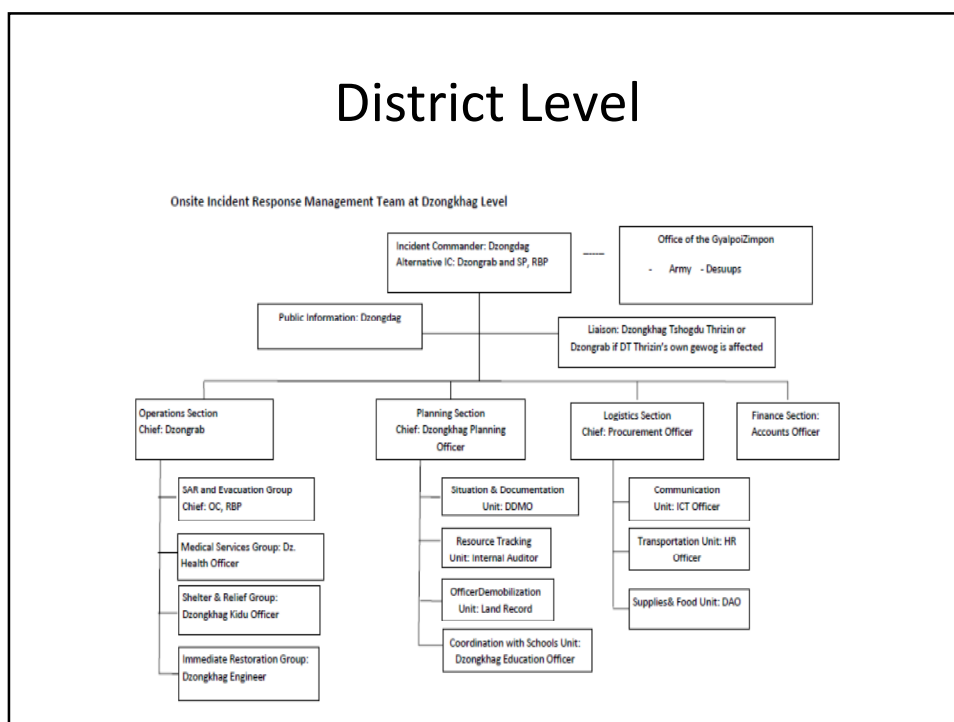
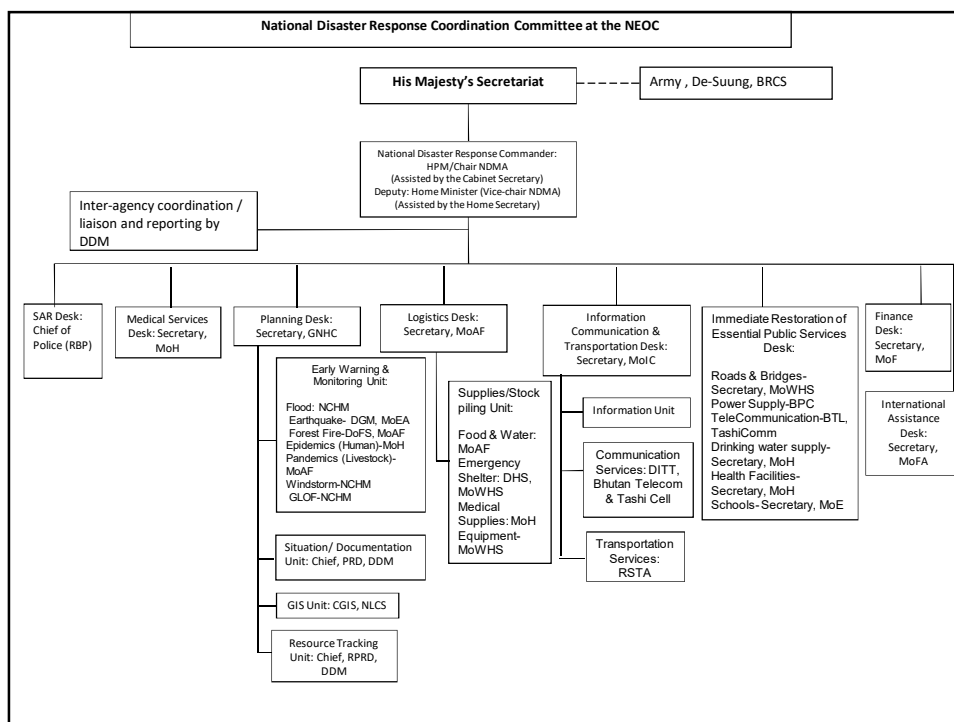
Roles & Responsibilities of Sectors/Agencies

- ❖ Chapter 6, Section 66 of DM Act 2013; “Every agency including the private sector notified by the National Disaster Management Authority shall institute a ***Disaster Management Unit*** in its organization”.
- ❖ Section 67; An agency notified by the National Disaster Management Authority shall;
 - Prepare, implement, review & update Disaster Management and Contingency Plan in accordance with the guideline formulated under this Act;
 - Put in place a plan that would reasonably ensure continuity of critical services in the event of disaster;

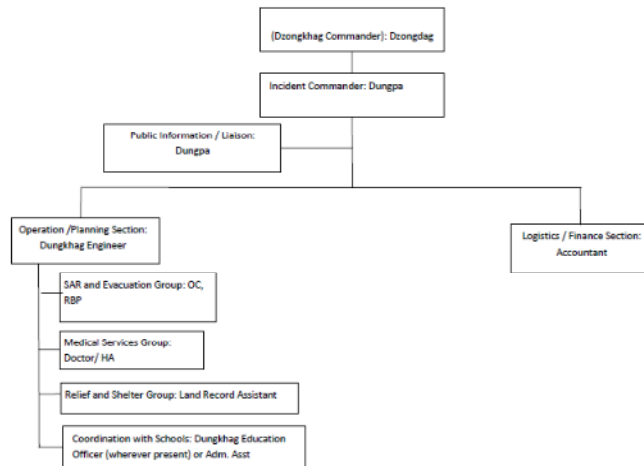
- **Develop hazard zonation and vulnerability map** including structural and non-structural measures.
- Ensure compliance of approved hazard zonation and vulnerability map.
- Ensure compliance and monitor implementation of structural and non-structural measures.
- Ensure the establishment, functioning and maintenance of **Critical Disaster Management Facilities**.
- Provide **assistance** to Dzongkhag Disaster Management committee, as and when required.
- Perform such other function as may be prescribed under this Act or any law in force or as directed by the National Disaster Management Authority.

Incident Command System

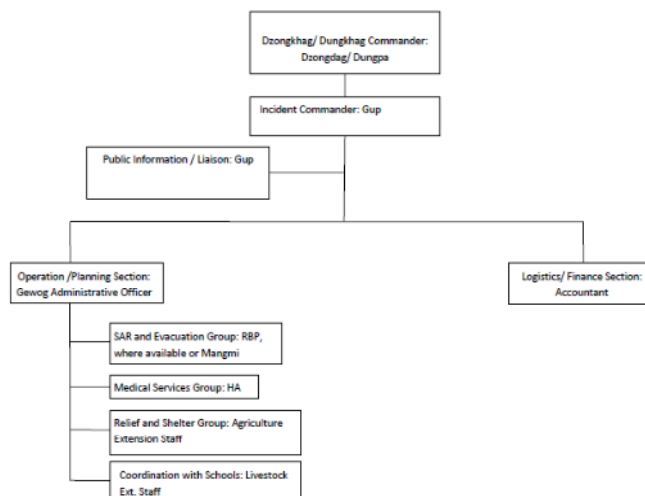
- National Level
- Dzongkhag Level (District)
- Dungkhag Level (Sub-District)
- Gewog Level (Block)
- Municipal Level



Sub District Level

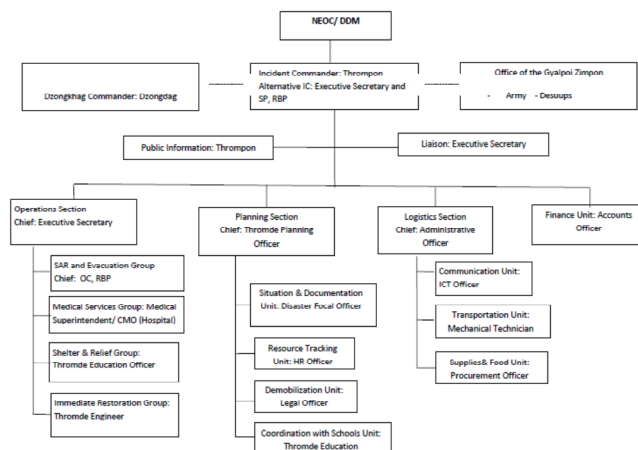


Block Level



Municipal Level

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



Existing stockpiles at Phuentsholing, Gelephu & Trashigang

Sl. No.	Description of the items	Total	Remarks
1	Tent; light weight, rectangular, 42m2 Box A (1 of 2), Box (2 of 2)	6 boxes	
2	First Aid kit A	3	
3	Water tank collapsible, 5000l, w/dist.kit	1	
4	Basic family water kit for 10 families	20	
5	Squatting plates	16	
6	Winterised tent	21/19	



SAR Team



Classification of Disaster *Type I, II & III*

A disaster shall be classified as **Type I**, if it;

- a. Affects a **Thromde(s) or Gewog(s)** or any part thereof,
- b. Can be managed with available resources of the Thromde/Gewog.

A disaster shall be classified as **Type II**, if it;

- a. Affects a **Dzongkhag** as whole or in part or more than one Dzongkhag,
- b. Can be managed with available resources of the Dzongkhag(s).

A disaster shall be classified as **Type III**, if it;

- a. It affects the **Nation** as a whole or in part,
- b. Severity and magnitude is so great that it is beyond available resources of the affected Dzongkhag(s).

Financial Arrangement as per the DM Act 2013

- Budget for **Prevention, Mitigation and Preparedness**: to be mainstreamed into Annual & Fiver Year Plans of the Sectors/Dzongkhags.
- The DM Act 2013 provides DDMCs with the authority to meet expenses for **response & relief operations** from their annual budget.
 - ❖ Guidelines already formulated jointly with the MoF.
- For the purpose of **recovery and reconstruction**, the Act specifies DDMCs to carry out damage assessments of public assets & infrastructure and submit assessment and cost estimates to DDM for review and onward submission to NDMA.



UNDERLYING VULNERABILITIES

- ☐ Poor/unsafe construction practices
- ☐ Rapid and unplanned urbanization
- ☐ Socio-economic factors
- ☐ Remote settlement and fragile road networks
- ☐ Inadequate level of awareness
- ☐ Low levels of preparedness and response capacities
- ☐ Vulnerability of key facilities (Schools, hospitals, communication facilities, other critical infrastructures)
- ☐ Inadequate of risk transfer mechanisms (insurance)
- ☐ Environmental degradation



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CHALLENGES

- Increasing risks
- Low institutional and technical capacities
- Not all Dzongkhags/Sectors/Thromdes have Disaster Management and Contingency Plans in place/Simulation Exercise conducted.
- Insufficient mainstreaming of DRR and climate change
- Insufficient multi-sectoral coordination
- Lack of capacity and coordination to develop multi-hazard atlas
- Inadequate budget for recovery and re-construction



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Future Priorities

- ✓ **Capacity building of DDMCs/ DDMOs**
- ✓ **National/ Sector/ Dzongkhag DM and Contingency Plans**
- ✓ **National SAR Training Centre/Urban SAR capacities-
manpower and equipment**
- ✓ **EOCs in all 20 Dzongkhags and emergency communication**
- ✓ **Multi Hazard Atlas**
- ✓ **Incident Command System**



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Research Plan

Title: Comparative Study on District DM Contingency Plan
of Dagana and Japan

Objective:

- 1.To study Disaster Management system of Japan and how
the DRR is included in the District DM and Contingency
plan
2. To learn how Local government of Japan Implementing
the Local plan and Community Response

KADRNCHE

ARIGATO GOZAIMASU