

## **Disclaimer**

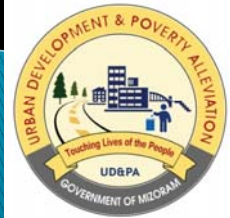
This report was compiled by an ADRC visiting researcher (VR) from ADRC member countries.

The views expressed in the report do not necessarily reflect the views of the ADRC. The boundaries and names shown and the designations used on the maps in the report also do not imply official endorsement or acceptance by the ADRC.

# Final Presentation on Research Report under ADRC, FY 2015B

Study on Disaster Management with special  
focus on landslide and sediment related  
disasters

By: Andrew Lalhruaia,  
Deputy Director, UD&PA Deptt.  
Govt. of Mizoram, India

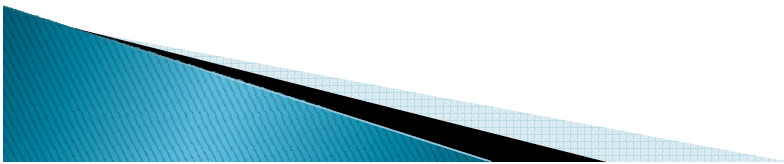


## Contents of the presentation

- ▶ DM in general
- ▶ DM in India
- ▶ DM in Japan
- ▶ Landslide in General
- ▶ Landslide and Sediment related disasters in Japan
- ▶ Landslide in India
- ▶ Important sites visited during research
- ▶ Observations and findings during research
- ▶ Thought for the day
- ▶ Most important.....

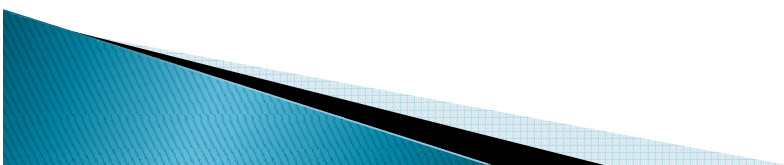
# Meaning and Origin of Disaster

- ▶ Disaster is a calamitous events that seriously disrupt the functioning of a community.....causes human, material, economic losses.....
- ▶ Greek– das(bad) and aster(star)
- ▶ French– desaster
- ▶ Spanish– desastro

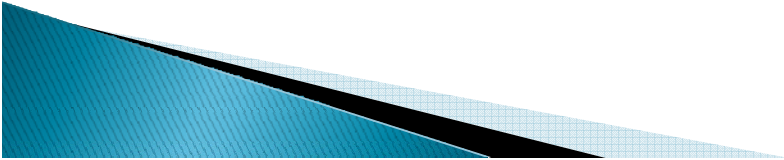


## Few truth About Disaster

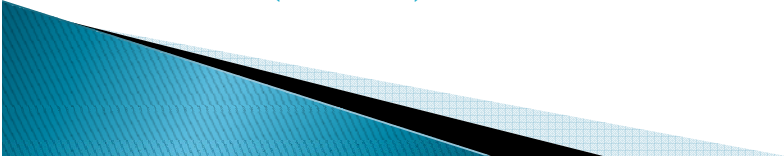
- ▶ No same disaster but similarity always is human suffering and material losses.....
- ▶ Till today there is still a thinking that disaster is an accident or event that con not be anticipated or reduced.....
- ▶ Management of disaster is not a single unit work but requires collective efforts....
- ▶ It will be good that if there is a set aside resources for disaster always.....



## Cont.....

- ▶ The best time to review and learn the disaster response is while the events are fresh in the minds of those affected.....
  - ▶ For some disaster, 'Prevention plan' can be so effective. Eg. Seismic proof in building regu..
  - ▶ If there is no human action before many of our today's disaster would have not happen or lesser impact.....
  - ▶ Development of community base planning is the best strategy to mitigate disaster.
- 

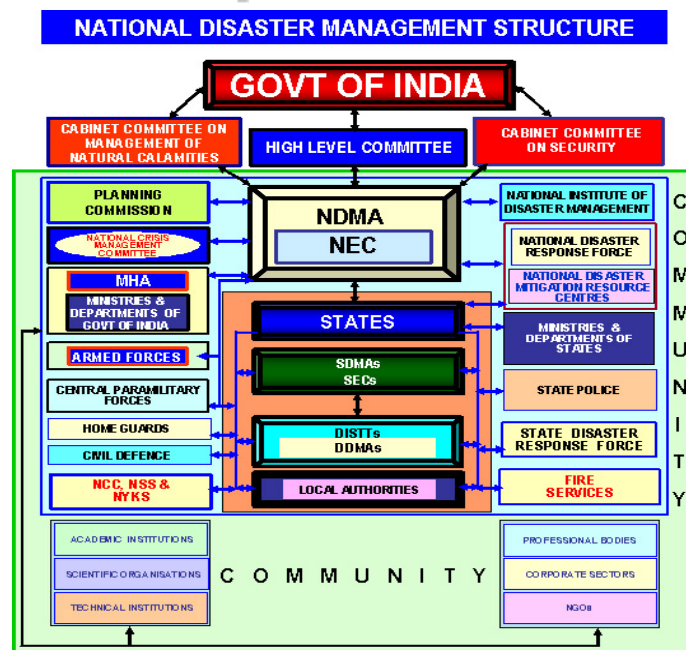
## Highlight of India's DM

- ▶ Disaster Management Act 2005
  - ▶ National Disaster management Authority(NDMA) under the chairmanship of Prime Minister.
  - ▶ Nodal Ministry for DM is Home Ministry
  - ▶ State disaster management Authority(SDMA), DDMA, local Authorities, village level etc...
  - ▶ National Disaster management Plan is not yet approve by the Authority
  - ▶ 10 Battalions of National Disaster Response Force(NDRF)
- 

# Nodal Agency for Disaster including EW

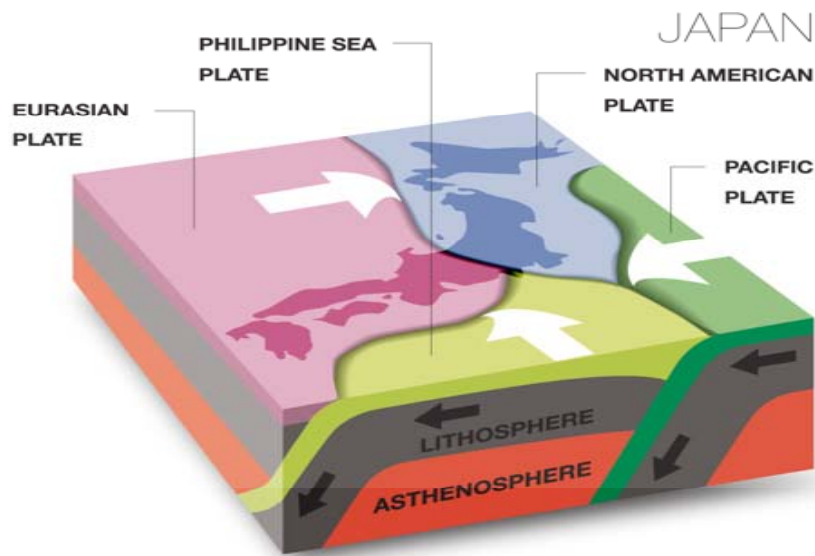
- ▶ Landslide– Geological Survey of India(GSI)
- ▶ Avalanches– Snow and Avalanche Study Establishment(SASE)
- ▶ Tsunami– Indian National Center for Oceanic information Service(INCOIS)
- ▶ Flood– Central Water Commission(CWC)
- ▶ Cyclone– Indian Meteorological Department
- ▶ Heat and cold wave– Indian Meteorological Department(IMD)
- ▶ Earthquake– Monitoring seismic activity by IMD

## Set up of DM



- Notes: 1. This diagram reflects interactive linkages for synergised management of disasters and not a hierarchical structure.  
 2. Backward and forward linkages, especially at the functional level, are with a view to optimise efficiency.  
 3. Participation of the Community is a crucial factor.

# Highlight of Japan's DM



## Basic Act

### Disaster Countermeasures Basic Act 1961

**Central Disaster Management Council chaired by the Prime Minister**

National Coordinating Body with all relevant Ministers & Japanese Red Cross, Public Broadcasting, Semi-Public Sectors

**Annual Gov't Official Report on Disaster Countermeasures**

The Cabinet must officially report the disaster countermeasures to the National Diet

**Formulation of "National Basic Disaster Management Plan for Disaster Prevention"**

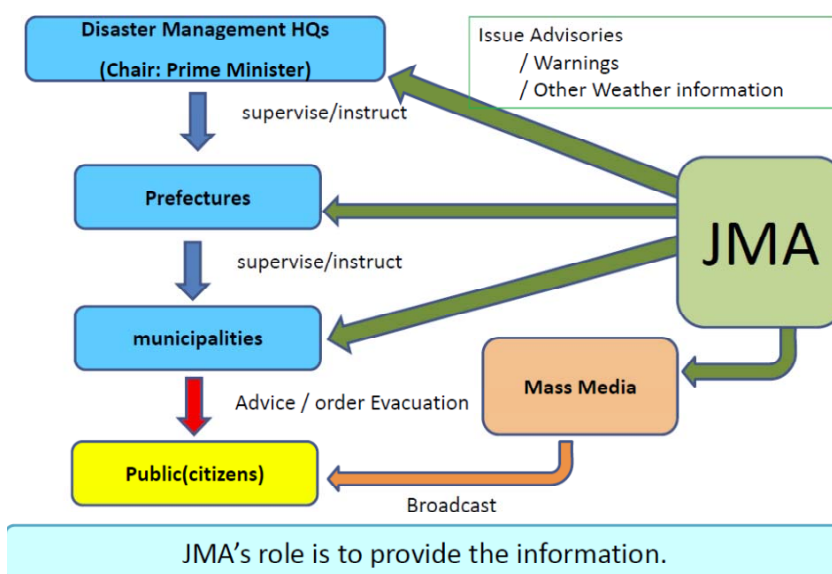
The Disaster Management Operation Plan (Sectoral)  
The Local Disaster Management Plan

# Legal Framework for DM in Japan

- ▶ Japan has a practice of learning from disaster and this is reflected in her laws, plan and policies.
- ▶ There are 7 basic Acts.
- ▶ 18 disaster prevention and preparedness legislations.
- ▶ 3 disaster emergency response legislation.
- ▶ 23 disaster recovery, reconstruction and financial measures act.

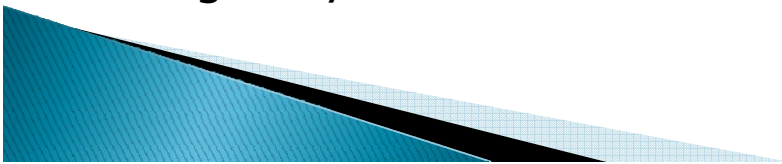
## Role of JMA

### Disaster Management



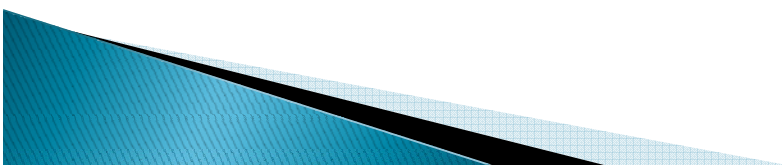
# Landslide in general

- ▶ Landslide can be defined as, ' Geological phenomenon in which there is a ground movement such as slope failure, debris movement and rock and earth down a slope.
- ▶ Types- Earth flow, Mudflow, debris flow and fall etc.
- ▶ The main reason is the failure of materials forming the hills or slopes are driven by the force of gravity.



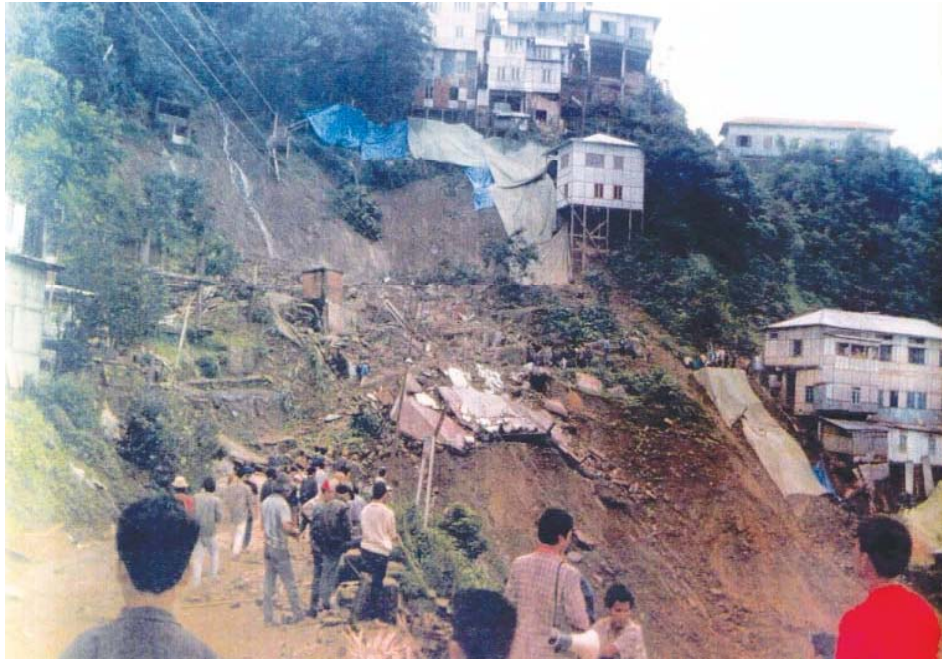
## Causes of landslide

- ▶ Landslide can be triggered by natural and human action causes.
- ▶ The strength of a soil or geology can be a factor of landslide.
- ▶ Rain water can cause erosion and giving more chance to sliding.
- ▶ Cutting of hillside, clearing of land for agriculture and construction etc. are human actions that can cause landslide.





# Sample Picture of landside



## Landslide and Sediment related disaster in Japan

- ▶ As around 70% of the geographical area of Japan is hills and mountains, there is high possibility of landside and debris flow.
- ▶ The principles of mountain and river control was developed during Edo period(1603–1868) which leads to the starts of ‘Sabo Work’.
- ▶ Sabo means sediment control.
- ▶ The first Sunodome for protection of sediment run off was built in around 1697.

# Dodo river Sunodome built in 1773



## Laws for prevention of various Sediment related disasters

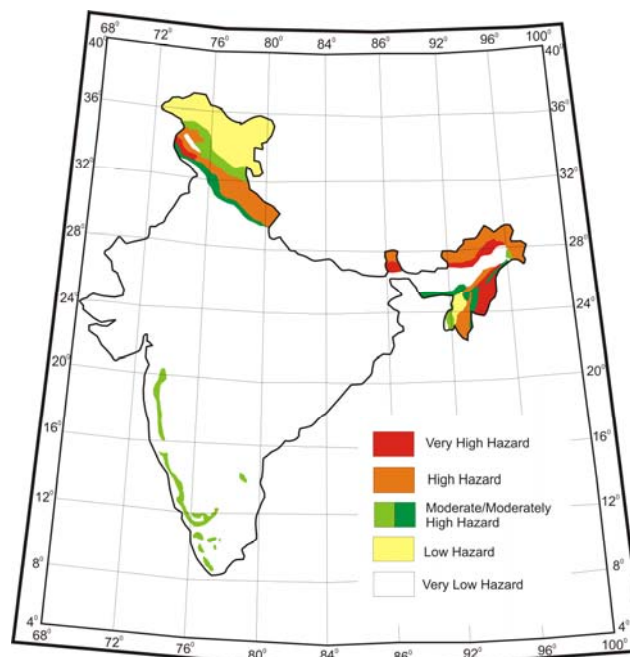
- ▶ Structural Measures:
  1. Steep slope law
  2. Landslide prevention law
  3. Sabo law
  
- ▶ Non- structural Measures:

Law concerning the Promotion of sediment related disaster prevention  
(Warning/evacuation and restriction on new development etc.)

# Landslide in India

- ▶ About 12.6% (0.42 million sq. km) of the total areas is prone to landslide in India.
- ▶ Geological Survey of India (GSI) is the Nodal Department for landslide in India.

## Map showing Landslide Prone areas in India



# Guidelines and Codes for Landslide in India

- ▶ National DM guidelines– Management of landslide and snow avalanches, 2009.
- ▶ Bureau of Indian Standard(BIS) developed:
  - ▶ 1. IS:14496. preparation of LHZ map in hill
  - ▶ 2. IS:14458. Guidelines for R/W in Hilly region
  - ▶ 3. IS:14460. Guidelines for landslide control.
  - ▶ 4. IS:14804. Guidelines for residential building in hilly regions.
  - ▶ 5. National building code 2005

## Most Important Sites visited during Research



Explanation on seismic design, DRI, Kobe



Fault line and Displacement at Nojima

# GEJE ( Tohoku Earthquake)



Tsunami wall

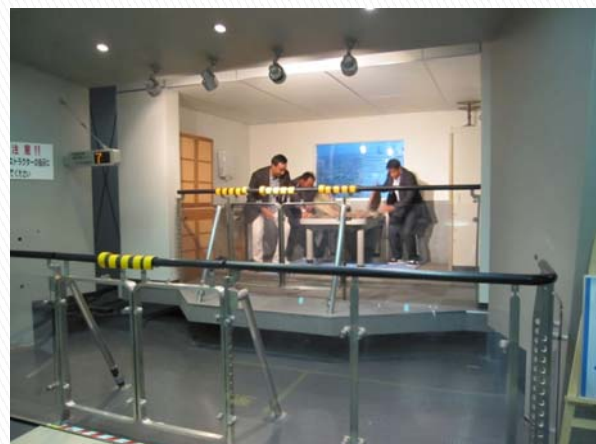


Damage due to Tsunami

# Tokyo Visit

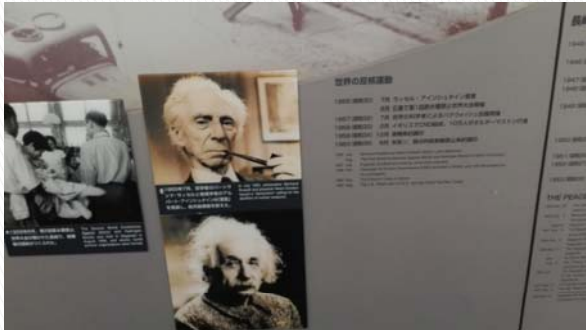


Operation room for PM and Cabinet etc.(Tokyo Rinkai..)



Honjo Life safety Learning Center(EQ. simulation)

# Atomic bomb museum at Nagasaki



Scientist initiatives for nuclear disarmament



Effect of bomb(radiation)

# Mt. Unzen Fugen active volcano

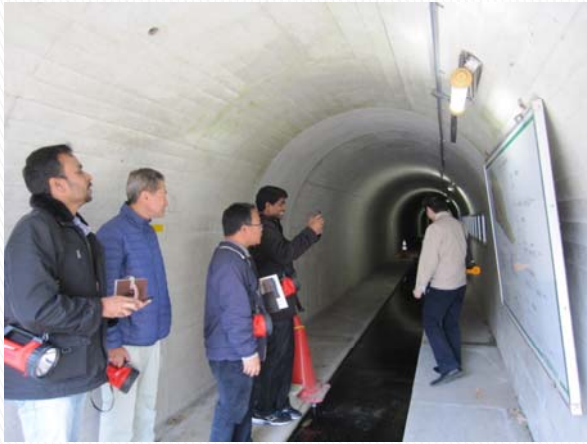


Sabo dam to protect the lava flow



Damage house due to pyroclastic flow

# Kamenose Landslide mitigation measures



Underground drainage tunnel



Engineer's explaining the measures taken

# Mt. Rokko Sabo Works



Landslide prevention by anchoring and netting



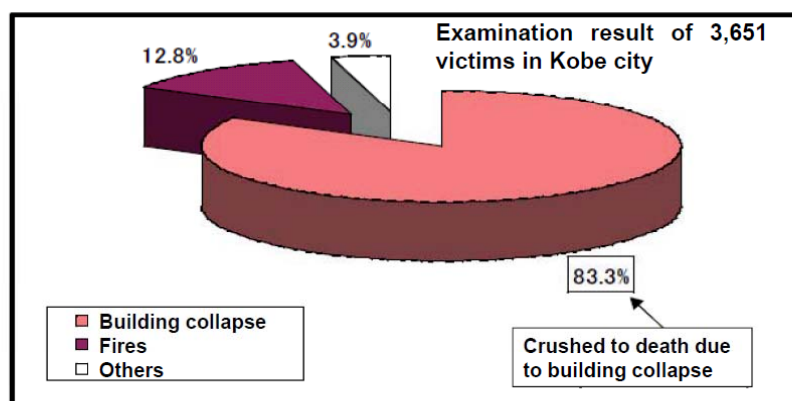
On-going Sabo dam construction

# Major Points of Observation and Findings

- ▶ The way we faced problems in India and Japan on Landslide is bit different. India mainly due to cut slope and Japan due to sediment run off.
- ▶ The effectiveness of the introduction of New seismic codes is seen in GHAE on housing damage comparison.
- ▶ Structural measures effectiveness can be seen clearly from Mt. Rokko Sabo works and Kamenose landslide mitigation works etc.

## Importance of EQ resistance Design

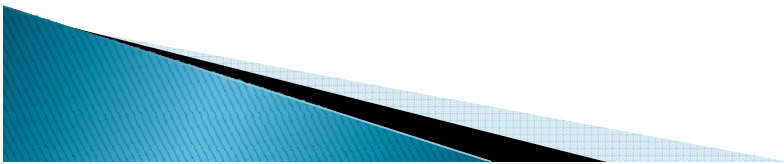
- More than 80% of the victims in Kobe city were killed by building collapse





## Cont...

- ▶ Disaster can occur with a low probability but with a high impact from the GEJE experience.
- ▶ The preventives measures taken by Japanese Government really deserve appreciation. Structural measures like Tsunami wall, Tokyo Rinkai, Mikki Hyogo etc. and non- structural measures like enactment of laws, drills, platform opened for the handicap etc. are amazing.....



## Thought for the Day.....

- ▶ There are so many ways other nations could copy and learn from Japanese disaster experienced and approaches.....
- ▶ In return Japanese can learn the settlement in mountains and hills from other nations/ communities.....
- ▶ Structural measures can not be smaller than non-structural measures in disaster prevention, mitigation, preparedness.....

