adpc
Asian Disaster Preparedness Center
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Project on "Seismic Hazard & Vulnerability Assessment in Dhaka, Chittagong & Sylhet city areas, Bangladesh"

By

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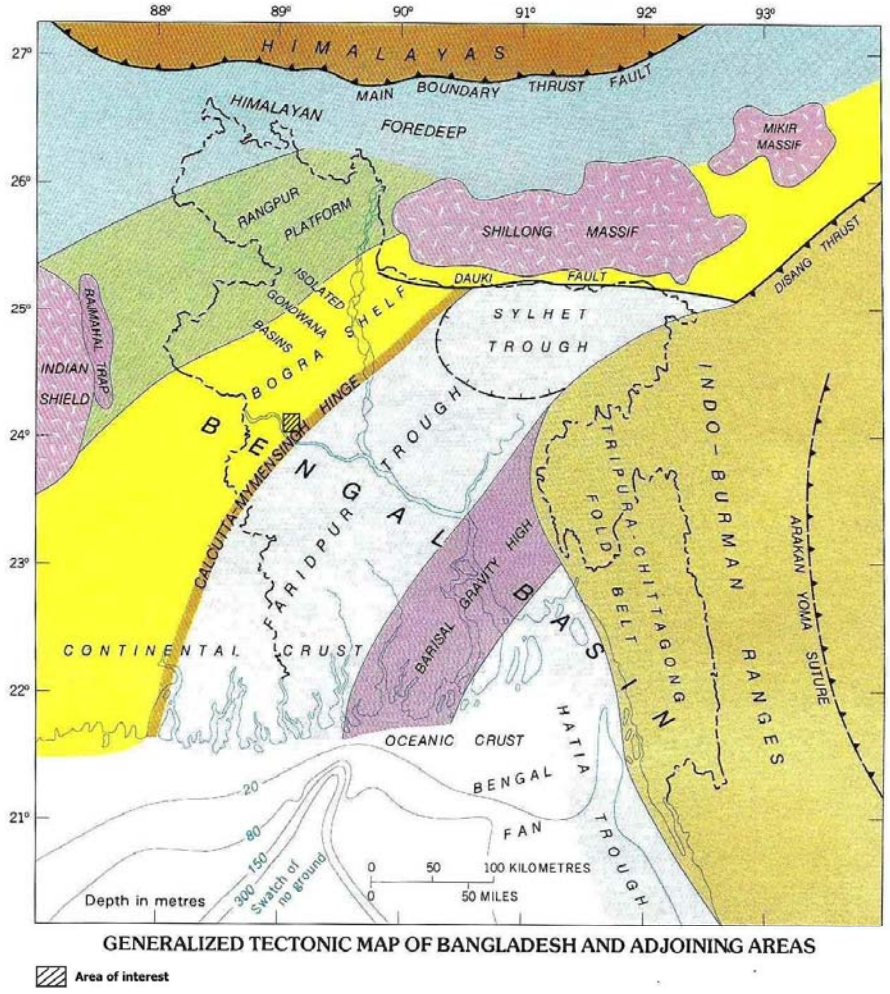
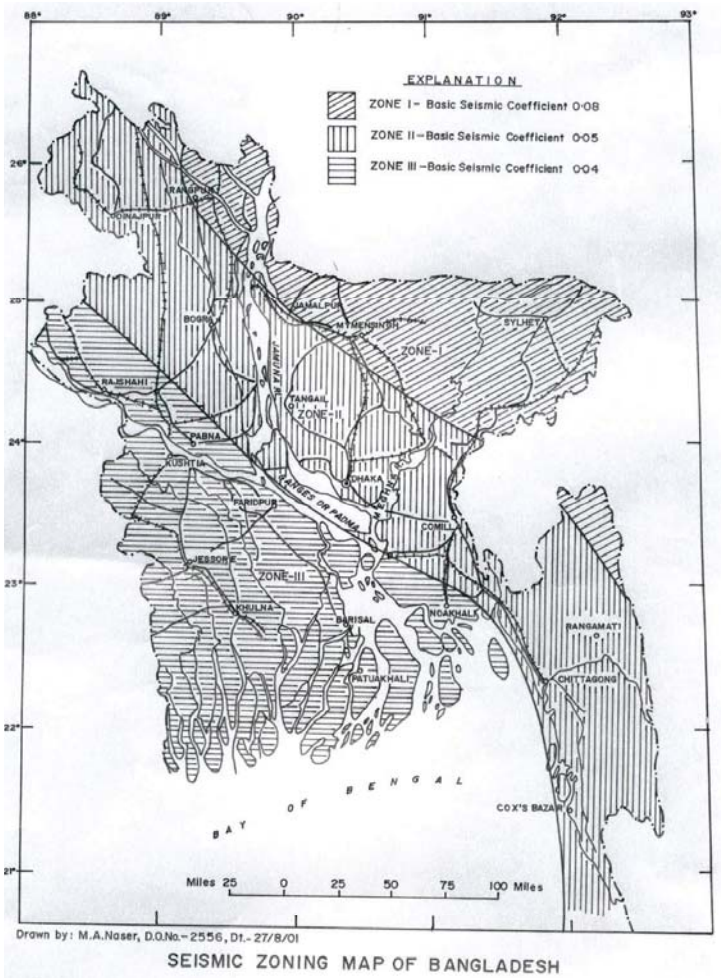
(Geologist)

Tectonic & Seismic zoning map of Bangladesh



GENERALIZED TECTONIC MAP OF BANGLADESH AND ADJOINING AREAS

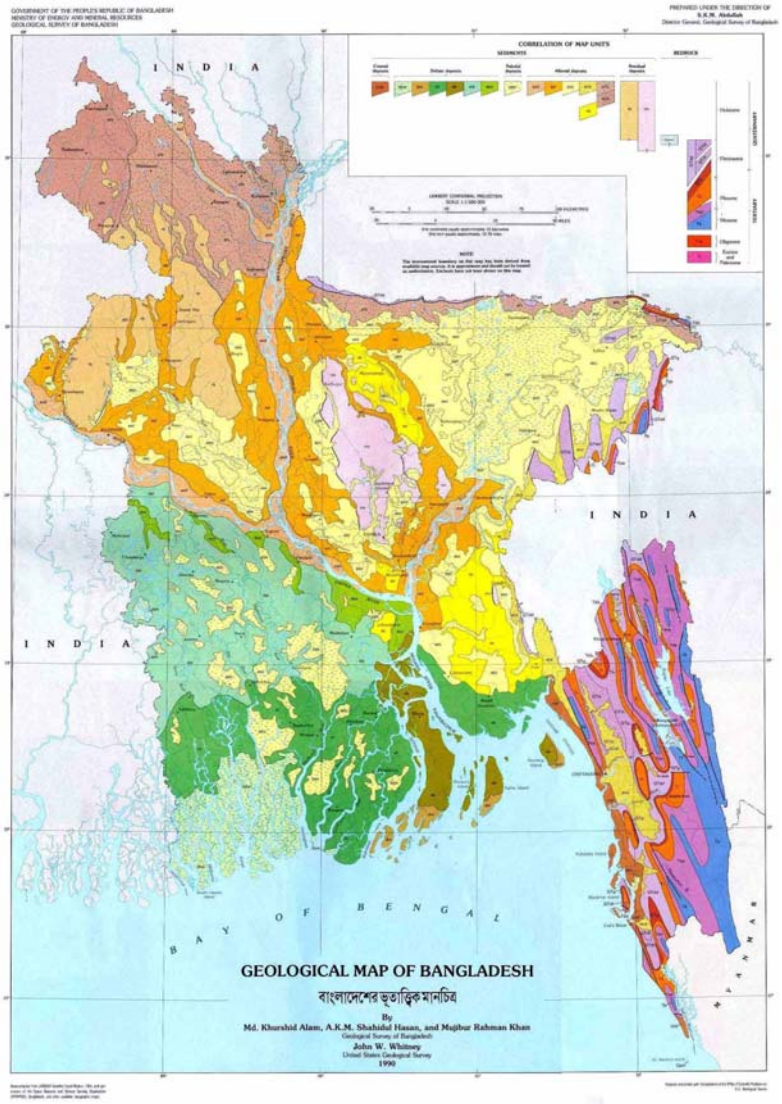
Area of interest



Drawn by: M.A.Naser, D.O.No.-2556, Dt.- 27/8/01

SEISMIC ZONING MAP OF BANGLADESH

Geological map of Bangladesh



Dhaka City

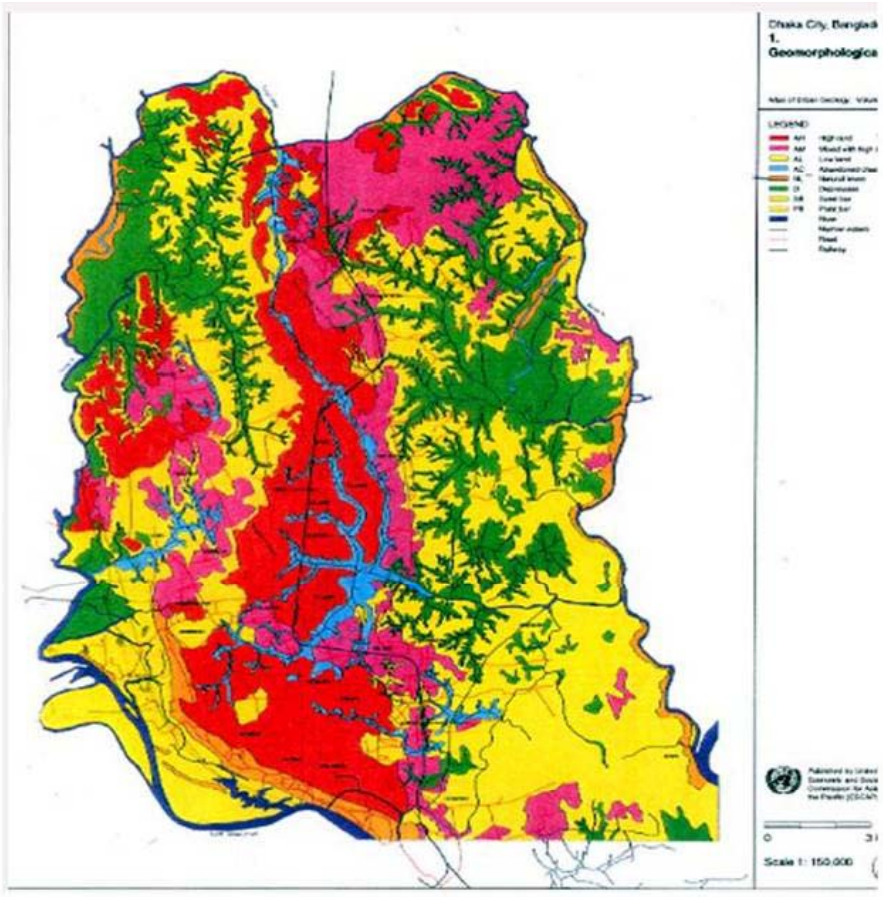
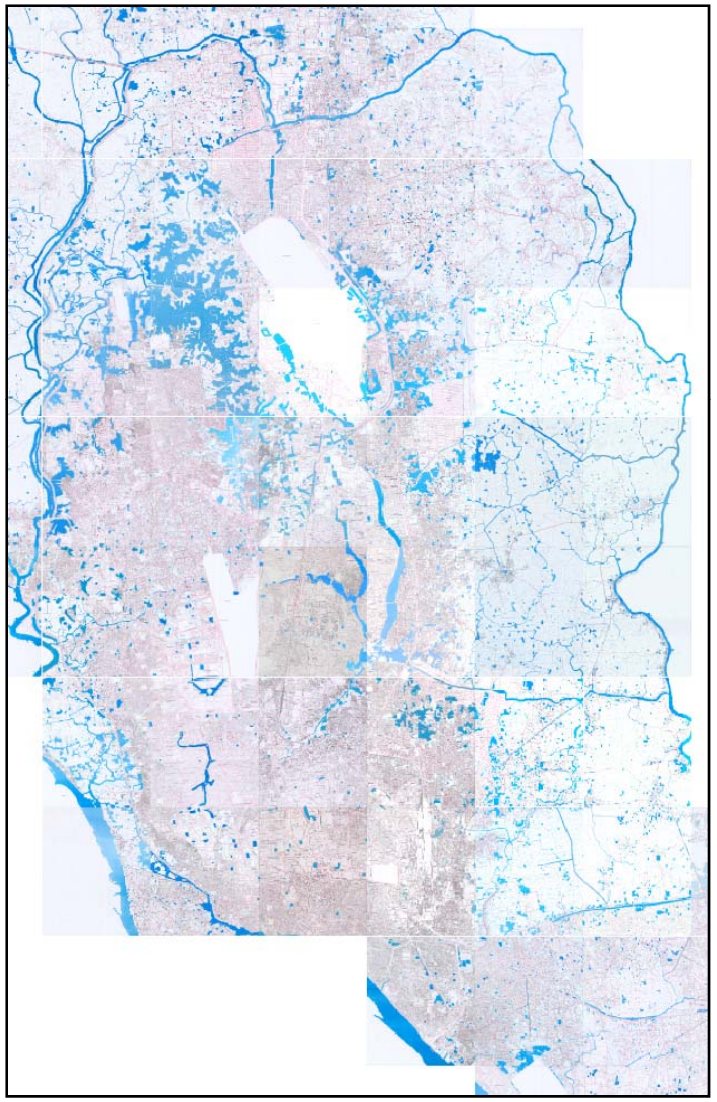
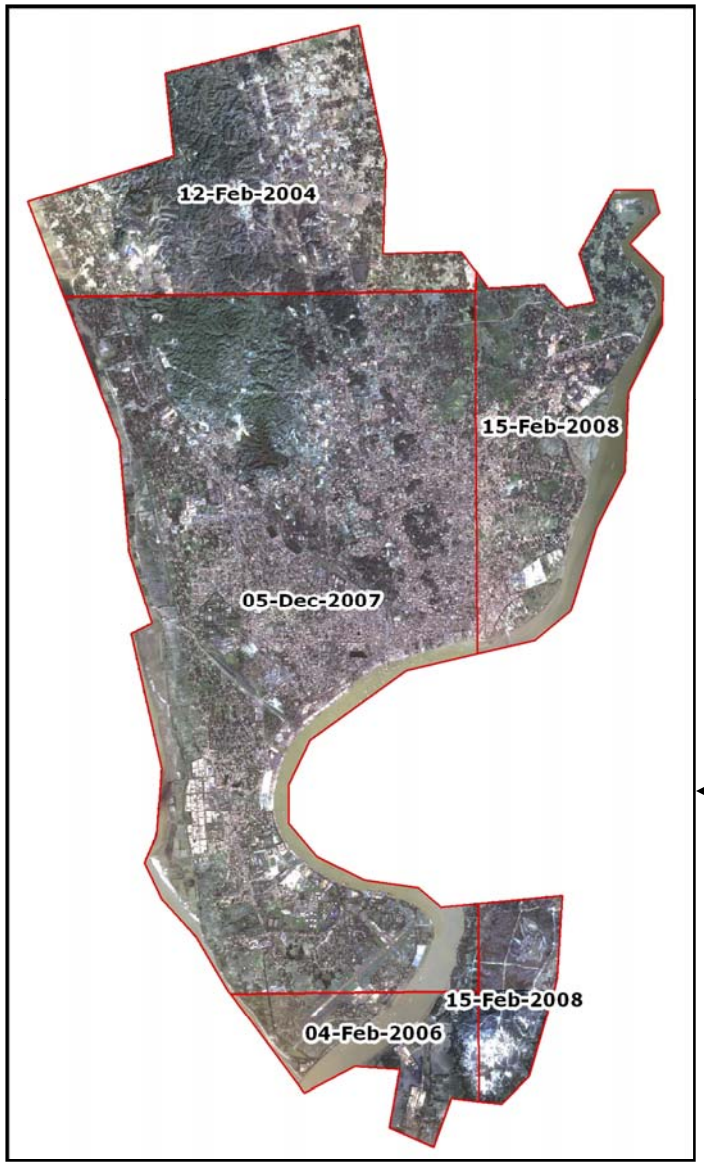


Fig: 5. Geomorphological map of Dhaka City

source: Atlus of Urban Geology Vol.11



Quick view of QB image: Chittagong & Sylhet City



Chittagong

Sylhet

Major historical EQs in and around Bangladesh

Date	Name	Epicenter	Magnitude	Comment
11th October 1737	Kolkata	22.60N, 88.40E,	X (in MM) >7 M	India's deadliest earthquake.
January10, 1869	Kachar	Jaintia Hills 25.00 N , 93.00 E	7.5 Depth 50 km.	Sylhet Town. area of 650,000 square miles.
July 14, 1885	The Bengal Earthquake	Bogra Fault 24.00 N, 90.00 E	7.0	damage within a 100 km radius of the epicenter. an area of 6,00,000 square kilometers.
June 12, **1897**	The Great Indian Earthquake	Shillong Plateau 26.00N, 91.00E	8.7	Dhaka-Kolkata.
July 8, 1918	Mymensingh	24.50 N, 91.00 E	7.4 12 -14 km	damage in a 100-kilometer radius of the epicenter
July 3, 1934	Dhubri	24.50 N, 91.00 E	7.1	Rangpur experienced severe tremor
January15, 1934	Bihar-Nepal	Darbhanga 26.50N, 86.50E	8.3	the Ganges Basin;
August 15, 1950	Assam	Arunachal Pradesh	8.5	Felt throughout Bangladesh
23rd October 1943	Dergaon Assam	26.80 N , 94.00 E	7.05	Felt throughout Bangladesh

Recent EQs in and around Bangladesh (NEIC, USGS)

Date	Name	Epicenter	Magnitude	Comment
May 8, 1997	Indo-Bangla border	Lat 24.89 Long 92.25 34 km depth	6 Mb	Felt from Chittagong to Rangpur, also in Sylhet and Meghalaya, India.
November 21, 1997	Chittagong Indo-Bangladesh Border	Lat 22.21 Long 92.83 57 km depth	6 Mb	felt throughout Bangladesh
July 22, 1999	Moheshkhali Island	Lat 21.47 Long 91.90; depth10 km	5.2 Mb	
31st December 1999	Indo-Bangladesh Border Region	21.43N, 91.76E Near Sonadia	Mb - 4.3	triggered a tidal surge that reached heights of 4 feet.
4th January 2000	Bungtlang (Tripura), India	Epicenter: 22.13N, 92.77E	Mb - 4.6	Southern Bangladesh epicenters about 150 km from Chittagong.
19th December 2001	Kaliakoir, Dhaka	23.70 N 90.40 E (IMD)	M 4.2 IMD	Strong tremors (MM V-VI) in Dhaka City,
20th June 2002	Rajshahi	25.80N 88.86E (NEIC)	ML 4.6	Shook buildings for 39 seconds in Bogra and Syedpur.
25th March 2003	Bhutan	27.260N 89.240E (NEIC)	M 5.1	Though the epicenter was in Bhutan
27th July 2003	Barkal-Rangamati	22.85 N 92.31 E Depth–10 km	M 5.6	

ADPC project **Components** under Comprehensive Disaster Management Program **(CDMP)** of Bangladesh

- **Seismic Hazard & Vulnerability Assessment of Dhaka, Chittagong and Sylhet City Corporation Areas**
- **Contingency Planning for earthquake hazard**
- **Training, Advocacy and Awareness with regards to earthquake and tsunami hazards**
- **Support for a Disaster Management Information Network (DMIN)**

Project Implementation Partners of ADPC

- **OYO International Corporation, Japan**
- **Asian Institute of Technology (AIT), Thailand**
- **National Society for Earthquake Technology (NSET), Nepal**
- **Dhaka University**
- **Chittagong University of Engineering Technology (CUET)**
- **Shahjalal University of Science and Technology Sylhet**

Component: Seismic Hazard & Vulnerability Assessment

Seismic Hazard Assessment:

- Report on Scenario Earthquake
- Setting of fault model
- EQ vulnerability map for each city
- Study on sub surface soil properties
- Engineering geological maps and reports

Vulnerability & Risk Assessment:

- Development of GIS inventory of Building footprints and Lifelines
- Assessment of Physical Vulnerability of Buildings and Lifeline Infrastructure
- Production of vulnerability maps & reports
- Loss Estimation study report for the city corporation area

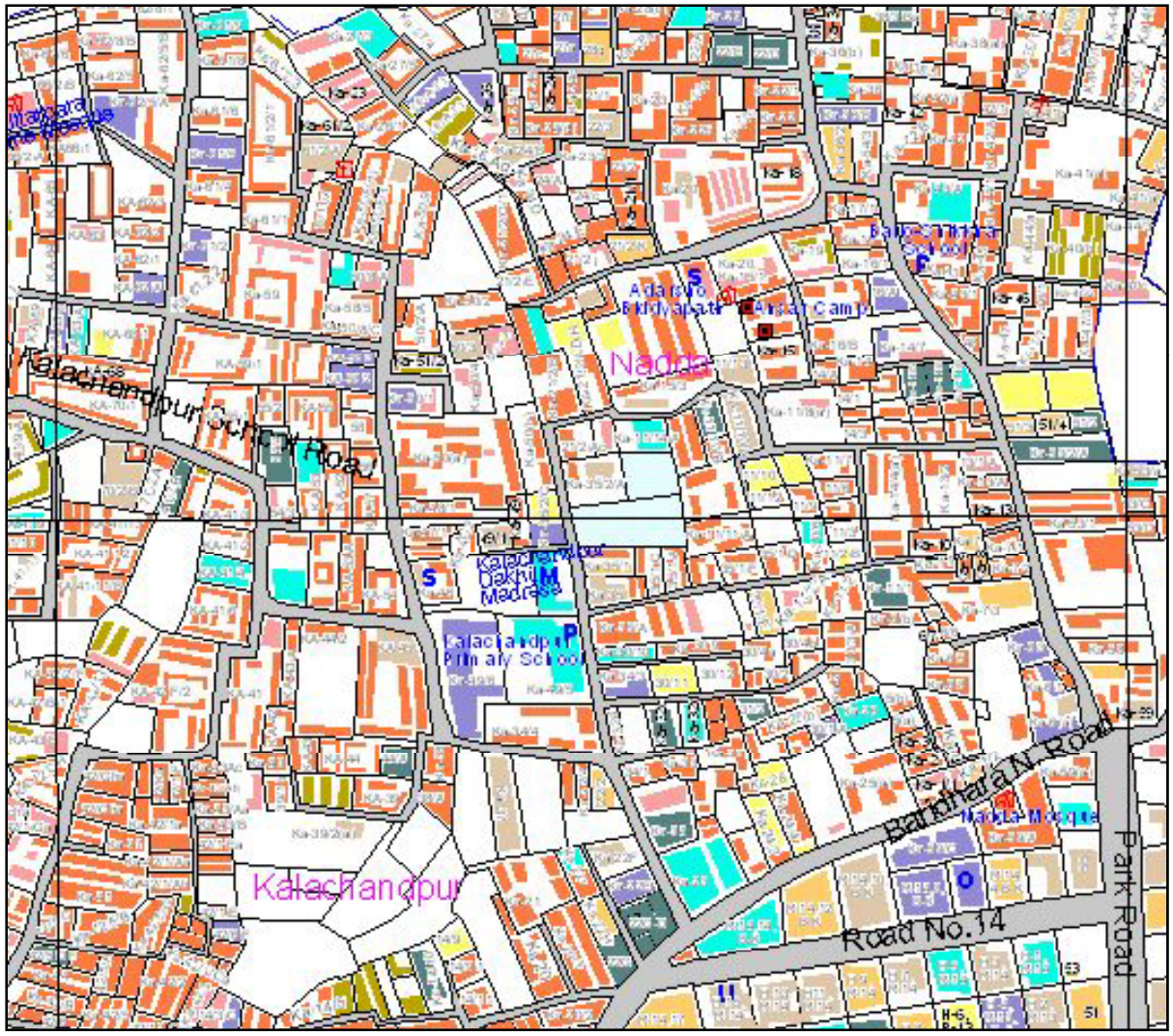
Geological & Geophysical investigations

- Boring for Geological & Geo-technical data collection
- H/V (single) micro-tremor measurements
- Multi channel analysis of surface wave (MASW)
- Shear wave velocity data by
  - PS logging
  - Shallow seismic survey
  - Small Scale Array Micro-tremor measurements (SSMM)
- Liquefaction analysis
- Active fault study
- EQ catalog etc.

Vulnerability & Risk Assessment

- 3 stage building survey (sampling from different classes)
- Structural analysis of buildings (class dependent)
- Occupation type analysis
- Day/night inhabitant data
- Life line (gas, water, electricity, telephone etc.) data
- Building footprint, road network data etc.

Vulnerability Assessment :
Building footprints, road network etc.



Component: Contingency Planning

A good contingency plan ensures better preparedness for any emergency that may occur, even one that is very different from the scenario in the plan

- It is a **process** rather than just the production of a document.
- is a **consensus-building** process

WHY CONTINGENCY PLAN?

facilitate ***rapid emergency response*** by allowing planners, in advance to:

- **Consider the likely consequences** of an emergency before it occurs
- **Identify the key resources**, both human and physical, which may be available for emergency
- **Identify the critical areas** for immediate action
- Build and train the **emergency response team** in advance
- Define **general policies and approach** to the emergency in advance
- Include actions designed to **prevent an emergency** as well as **limit its consequences**

Main responses in a CONTINGENCY PLAN

- Search and Rescue
- Health and Medical Service
- Request for External assistance for search and rescue
- Law Enforcement & Security
- Emergency Shelter & Mass Care
- Fire-fighting/Rescue
- Communications
- Damage Assessment etc.

Component: Training, Advocacy and Awareness Building

- Develop guidebook & conduct training for decision makers, planners and relevant professionals
- Guidebook & Training for safety and evacuation training
- Aware and educate **religious leaders** against earthquake danger
- Preparation of manual & training for **masons & bar binders**

Training & Advocacy

- Documentary to develop awareness of earthquake hazard & vulnerability
- Production & dissemination of poster and leaflet on earthquake vulnerability reduction measures

Soil sample collection for geo-technical investigation

Shallow seismic data collection

Micro-tremor data collection

Field work for active fault study

Active fault study

PS logging (down hole test) for shear wave velocity

Geophysical survey for Surface wave

Component: Support for a Disaster Management Information Network (DMIN)

- **Status of existing links** for information dissemination between source and community level
- **Review options for strengthening** existing links and filling gaps where appropriate
- Carry out **“mock drills”** for rapid onset “emergency” hazards
- Undertake **post-event audits to assess information flow** between warning source
- **Design and test** appropriate information network(s) to priority hazard types