End of Course Project

Critical Assessment of India’s Current National Disaster Management System in the Context of December 26, 2004 Tsunami Disaster

1. Background Information of India

Size
Area = 3.28 million square km.
India being seventh largest country of the world, India’s total area accounts for about 2.4 per cent of the total geographical area of the world.

Physical Features
The physical features of India can be grouped under the following physiographic divisions:
(i) The Himalayan Mountains   (ii) The Northern Plains   (iii) The Peninsular Plateau
(iv) The Indian Desert   (v) The Coastal Plains   (vi) The Islands

Drainage
The drainage systems of India are mainly controlled by the broad relief features of the subcontinent. Accordingly, the Indian rivers are divided into two major groups:
• The Himalayan Rivers; and
• The Peninsular Rivers.

Climate
The climate of India is described as the ‘monsoon’ type. This type of climate is found mainly in the south and the Southeast Asia. Despite an overall unity in the general pattern, there are perceptible regional variations in climatic conditions within the country.

Population
India’s population as on March 2001 stood at 1,028 million, which account for 16.7 per cent of the world’s population. The 2001 Census data reveals that Uttar Pradesh with a population size of 166 million people is the most populous state of India. Uttar Pradesh accounts for about 16 per cent of the country’s population. On the other hand, the Himalayan state Sikkim has a population of just about 0.5 million and Lakshadweep has only 60 thousand people. The population density of India in the year 2001 was 324 persons per sq km. Densities vary from 904 persons per sq km in West Bengal to only 13 persons per sq km in Arunachal Pradesh.

Other Economic Characteristics
Total GDP (PPP) - US$ 3.3 trillion
GDP per capita (PPP US$) - 2892
Growth of GDP – 2.3% (2005-06)
GR 8.1% (2005-06)
Per Capita Income – Rs. 10306 (2001)
Contribution to GDP  Workforce Engaged
Agriculture 23%  60%
Industry 26%  16%
Services 51%  24%

Vulnerability to Natural Disasters
India can be roughly divided into five Natural Disaster Potential Zones:
(1) Northern Mountain region: - Strong snow – storms leading to landslides and strong cold waves. This zone is also prone to earthquakes.
(2) Indo-Gangetic Plains: - Floods in the various rivers and their tributaries, bringing havoc to the millions of people who have made their homes on the banks of these rivers.
(3) Deccan Plateau: -Whenever there is a shortage of rainfall during monsoon, this area faces drought.
(4) The western Desert: - Often face the problem of drought which culminates in an acute drinking water shortage.
(5) Coastal Areas: - In all the seven states which share the sea front, that is Gujrat, Maharashtra, Kerala, Tamil Nadu, Orissa, A.P. and West Bengal, there is problem of sea erosion, cyclones and tidal waves and Tsunamis.

Besides this, the entire Northern part of the Indian continent from Hindukush to Eastern Himalayas lie in the earthquake prone belt of violent subterranean volcanic activity.

Major Earthquakes in India, 1988-2001

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 21, 1988</td>
<td>Bihar-Nepal Border</td>
<td>6.4</td>
</tr>
<tr>
<td>October 20, 1991</td>
<td>Uttarkashi, Uttar Pradesh</td>
<td>6.6</td>
</tr>
<tr>
<td>September 30, 1993</td>
<td>Latur-Osmanabad, Maharashtra</td>
<td>6.3</td>
</tr>
<tr>
<td>May 22, 1997</td>
<td>Jabal Pur, Mdhya Pradesh</td>
<td>6.0</td>
</tr>
<tr>
<td>March 29, 1999</td>
<td>Chamoli, Uttar Pradesh</td>
<td>6.9</td>
</tr>
<tr>
<td>January 26, 2001</td>
<td>Bhuj, Gujrat</td>
<td>7.7</td>
</tr>
</tbody>
</table>

Annual Damage due to Heavy Rains, Landslide and Floods

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Year</th>
<th>Districts affected</th>
<th>Villages affected (No.)</th>
<th>Population affected (lakhs)</th>
<th>Crop Area affected (lakh Ha.)</th>
<th>Houses Damaged (no.)</th>
<th>Human Life loss (no.)</th>
<th>Cattle loss (no.)</th>
<th>Estimated value of loss to houses (Rs. in crore)</th>
<th>Estimated value of public properties (Rs. in crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1999</td>
<td>202</td>
<td>33,158</td>
<td>328.12</td>
<td>8.45</td>
<td>884,823</td>
<td>1,375</td>
<td>3,861</td>
<td>0.72</td>
<td>-</td>
</tr>
</tbody>
</table>
### Damage due to Cyclone in Orissa in October ’2000

<table>
<thead>
<tr>
<th>Date of occurrence</th>
<th>Total no of districts</th>
<th>Districts affected</th>
<th>Villages affected (No)</th>
<th>Population affected (Lakh)</th>
<th>Crop Area affected (Lakh Ha)</th>
<th>Houses Damaged (no.)</th>
<th>Human life loss (no.)</th>
<th>Cattle loss (no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17-18.10.99</td>
<td>30</td>
<td>4</td>
<td>5,181</td>
<td>37.47</td>
<td>1.58</td>
<td>331,580</td>
<td>199</td>
<td>10.578</td>
</tr>
<tr>
<td>29-30.10.99</td>
<td>30</td>
<td>12</td>
<td>14,643</td>
<td>129,22</td>
<td>18.43</td>
<td>1,828,532</td>
<td>9,887</td>
<td>444,531</td>
</tr>
</tbody>
</table>

**Source:** Annual Reports, Natural Disaster Management Division, Ministry of Agriculture

### Losses due to Droughts: 1999-2001

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Year</th>
<th>Districts affected</th>
<th>Villages affected (No.)</th>
<th>Population affected (Lakh)</th>
<th>Damage to crops area (Lakh Ha)</th>
<th>Estimated values of damaged crops (Rs. crore)</th>
<th>Cattle population affected (in lakh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1999</td>
<td>125</td>
<td>-</td>
<td>369.88</td>
<td>134.22</td>
<td>5.44</td>
<td>345.56</td>
</tr>
<tr>
<td>2</td>
<td>2000</td>
<td>110</td>
<td>54,883</td>
<td>378.14</td>
<td>367.00</td>
<td>371.87</td>
<td>541.67</td>
</tr>
<tr>
<td>3</td>
<td>2001</td>
<td>103</td>
<td>22,255</td>
<td>88.19</td>
<td>67.44</td>
<td>NA</td>
<td>34.28</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>338</td>
<td>77,138</td>
<td>836.21</td>
<td>568.66</td>
<td>378.31</td>
<td>921.55</td>
</tr>
</tbody>
</table>

**Source:** Annual Reports, Natural Disaster Management Division, Ministry of Agriculture

### 2. The Indian Ocean of Tsunami of Dec. 26, 2004

On 26th Dec. 2004 Earthquake of magnitude 9.3 off north Sumatra coast generated devastating Tsunami (Harbour + Wave) waves affecting several countries in South East Asia. In India, Andaman & Nicobar Island, Tamilnadu, Pondichery, Andhra, Kerala were affected and about 12400 people losse their lives & 700 injured. It is a series of shallow water waves, having wavelength of $\geq 100$ km. in the deep sea; the Tsunamis may not observable at aall but as it reaches the shallow coast.

**IMPACT OF TSUNAMI:** Mainly two type of impact

A) Environmental Impact of Tsunami

B) Ecological Impact of Tsunami

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Aftershock activity, which continued, has reduced gradually and there has been no aftershock of 6.0 and above magnitude on Richter scale after 9th January 2005. In spite of structural damages in different coastal locations, the loss of human lives, missing of many people, loss of biodiversity in continental shelves as well as in several islands and contamination of fresh water were the main impacts of this disaster. This not only threatened the tourism industry of the coasts and islands but also affected the self regulating local economies of the poor inhabitants of the coastal areas, who are mainly dependent on fishing and other agricultural activities. The most serious impacts were on those who lost the bread earners of their family and also those who lost their livelihood due to loss of their fishing boats.

The Indian Ocean Tsunami of Dec. 26th, 2004

Source:

3. National Disaster Management System
   Present or Existing System (Proactive Continuum Approach)

The earlier existing mechanism was based on post-disaster relief and rehabilitation. The changed policy/approach mandates a priority to full disaster aspects of mitigation, prevention and preparedness and new institutional and policy mechanisms are being put in place to address the policy change. The High Power Committee on Disaster Management which was set up in August, 1999 and submitted its report in October, 2001, had inter alia recommended that a separate Department of Disaster Management be set up in the Government of India. It was, however, felt that conventional Ministries/Departments have drawback of not being flexible enough specially in terms of the sanction procedures. The organization at the Apex level will have to be multi-

2 http://www.ndmindia.nic.in/Tsunami2004/sitrep35.htm
disciplinary with experts covering a large number of branches. The National Emergency Management Authority has, therefore, been proposed as a combined secretariat/Directorate structure – a structure which will be an integral part of the government and, therefore, will work with the full authority of the Government while, at the same time, retaining the flexibility of a field organization.

On the bases of above mentioned recommendations, Disaster Management Bill was introduced in the Parliament of India in May 2005. On 23rd Dec. 2005 this bill got assent of president and became a law called ‘Disaster Management Act, 2005’. This act provides the framework of new mechanism to be set up. On the bases of this act Government of India constituted the National Disaster Management Authority constituted as under:

i) The Prime Minister of India Chairperson
ii) General N.C.Vij Vice Chairperson
PVSM, UYSM, A VSM (Retd)
iii) Shri K.M.Singh Member
iv) Shri M.Shashidhar Reddy, MLA Member
v) Lt. Gen. (Retd.) J.R.Bhardwaj Member
PVSM, AVSM, VSM, PHS
vi) Dr. Mohan Kanda Member
vii) Shri N. Vinod Chandra Menon Member

Mechanisms for compensating Disaster Victims for their Losses (Risk Transfer):
The two main windows presently open for meeting such expenditures are the Calamity Relief Fund (CRF) and National Calamity Contingency Fund (NCCF). The Calamity Relief Fund is used for meeting the expenditure for providing immediate relief to the victims of cyclone, drought, earthquake, fire, flood and hailstorm. Expenditure on restoration of damaged capital works should ordinarily be met from the normal budgetary heads, except when it is to be incurred as part of providing immediate relief, such as restoration of drinking water sources or provision of shelters etc., or restoration of communication links for facilitating relief operations. The amount of annual contribution to the CRF of each State for each of the financial years 2000-01 to 2004-05 is as indicated by the Finance Commission. Of the total contribution indicated, the Government of India contributes 75 per cent of the total yearly allocation in the form of a non-plan grant, and the balance amount is contributed by the State Government concerned. A total of Rs. 11,007.59 crore was provided for the Calamity Relief Fund from 2000-05.

Pursuant to the recommendations of the Eleventh Finance Commission, apart from the CRF, a National Calamity Contingency Fund (NCCF) Scheme came into force with effect from the financial year 2000-01. The assistance from NCCF is available only for
immediate relief and rehabilitation. Any reconstruction of assets or restoration of damaged capital should be financed through re-allocation of Plan funds. Government of India has a long history of using funds from the Plan for mitigating natural disasters. Funds are provided under Plan schemes i.e., various schemes of Government of India, such as for drinking water, employment generation, inputs for agriculture and flood control measures etc. There are also facilities for rescheduling short-term loans taken for agriculture purposes upon certification by the District/State administration. At the occurrence of a calamity of great magnitude, funds flow from donors, both local and international, for relief and rehabilitation, and in few cases for long-term preparedness/ preventive measures. Funds for the latter purposes are also available from multilateral funding agencies such as the World Bank. These form part of the State Plan.

There are also a number of important ongoing schemes that specifically help reduce disaster vulnerability. Some of these are: Integrated Wasteland Development Programme (IWDP), Drought Prone Area Programme (DPAP), Desert Development Programme (DDP), Flood Control Programmes, National Afforestation & Ecodevelopment Programme (NA&ED), Accelerated Rural Water Supply Programme (ARWSP), Crop Insurance, Sampurn Grameen Rozgar Yojana (SGRY), Food for Work etc.

An important recommendation of the High Power Committee (HPC) on Disaster Management in 2001 was that at least 10 per cent of plan funds at the national, state and district levels be earmarked and apportioned for schemes which specifically address areas such as prevention, reduction, preparedness and mitigation of disasters. The Eleventh Finance Commission too paid detailed attention to the issue of disaster management and, in its chapter on calamity relief, came out with a number of recommendations, of which the following have a direct bearing on the Plan:

(a) Expenditure on restoration of infrastructure and other capital assets, except those that are intrinsically connected with relief operations and connectivity with the affected area and population, should be met from the plan funds on priority basis.

(b) Medium and long-term measures be devised by the concerned Ministries of the Government of India, the State Governments and the Planning Commission to reduce, and if possible, eliminate, the occurrences of these calamities by undertaking developmental works.

(c) The Planning Commission, in consultation with the State Governments and concerned Ministries, should be able to identify works of a capital nature to prevent the recurrence of specific calamities. These works may be funded under the Plan.

In spite of this the financial provisions made under Disaster Management Act, 2005 are also going under implementation.

Role of Corporate Sector or Public – Private Partnership:
Recognizing the importance of integrating the corporate sector and their nodal organizations in Disaster prevention, mitigation and preparedness agenda, the National Disaster Management Framework drawn up by Ministry of Home Affairs, Government of India envisages “involvement of corporate sector in awareness generation and
disaster preparedness and mitigation planning.” The corporates in every country have always played a major role in post-disaster relief, rehabilitation and reconstruction efforts in the affected regions. In India, the contribution of the corporate sector has been notable especially in the aftermath of the devastating super-cyclone in Orissa in 1999 and the Bhuj earthquake (Gujarat) in 2001. The industrial and corporate organizations like the Confederation of Indian Industry (CII), the Federation of Indian Chambers of Commerce and Industry (FICCI), the PHD Chambers of Commerce and Industry and other industry and area-specific manufacturers and traders associations have been in the forefront of providing much-needed succor to the affected populace for ameliorating their sufferings. The Confederation of Indian Industry (CII) was the first industry organization to constitute a Disaster Management Committee in May 2001 as part of its corporate set-up to advise and assist its member industries in initiating disaster risk reduction steps to insulate industrial establishments, infrastructure and processes from the vagaries and damaging potential of natural and man-made (industrial/technological) disasters. CII has established an Environment Management Division (EMD) involved in research and propagation of environmentally sound industrial systems and processes. In response to Tsunami the CII set up “Tsunami Relief Fund” and has activated helpline offices in Delhi, Chennai and Hyderabad. It has also set up an Outreach Inc. office in Virginia, USA to mobilize resources. Working in tandem with the Framework developed by the Ministry of Home Affairs envisioning strengthening and development of capacities at all levels for holistic disaster risk management and sustainable development, the Confederation of Indian Industry (CII) has up scaled the scope of its association with the national disaster management agenda and has emerged as the flag-bearer of initiatives for integrating the same into the functioning of the corporate sector. Extending its support in the area of disaster management since 1999 especially in disaster response, rehabilitation and reconstruction, CII has partnered with the Government initiatives and development organizations like the United Nations Development Programme (UNDP) for effective implementation of disaster risk reduction activities and has been regularly organizing summits and symposiums to promote the same. The “Public-Private-People (PPP) Partnership for Natural Disaster Risk Management” is the off-shoot of these initiatives. The joint work plan evolved with the Ministry of Home Affairs primarily entails association of CII in the entire gamut of issues connected with integrating disaster management concerns in the developmental efforts of the private sector. The broad identified themes are –

# Awareness Generation
# Training
# Mock Drills
# Development of on-site and off-site Disaster Management Plans
# Preparation of Inventory Resources, for ex: India Disaster Resource Network(IDRN)
# Sensitization Programmes
# Organization of annual event

4. Strengths and Weakness of the National Disaster Management System:
**Strength:**

"The Indian naval forces mobilised with impressive speed, providing relief to Sri Lanka within the first 12 hours of the disaster. Relief operations were fully underway in Lanka and the Maldives by tsunami day three (December 28)," the South Asia Monitor, a newsletter published by the Centre for Strategic and International Studies, a Washington-based think tank said. The Indian armed forces were the first to reach Sri Lanka and the Maldives after the tsunami struck, it said, adding pictures of the Indian navy in relief operations in Galle, the hard-hit southern port, made a strong positive impression in the region.³

Two Chennai-based NGOs have held counselling with tsunami affected people in 33 hamlets in Villupuram district in Tamil Nadu. The groups also organised sports and cultural events to divert the attention of the people who were disturbed by the natural calamity, Fathima Vasanth of Madras School of Social Works and A Lawrence, of Rural Education and Action for Liberation told reporters.

These are one of the many examples of Federal Disaster Management System of India which responded actively in the wake of December 26, 2004 Tsunami disaster. In major strength of the Indian system in with this disaster Seemed to be following two:

# Armed Forces
# Local Administration
# Risk Transfer Mechanism (Financial Capability)

Armed forces responded very quickly to the situation and on the bases of available information they evacuated people from even several remotely situated islands through aircrafts. Not only this, but Indian Navy also helped in the rescue and relief operation to the neighboring countries.

Local Administration of the costal districts of India responded quite effectively for the rescue and relief work. Efforts were made with the help of NGOs to solve the problems of drinking water, food and shelter.

Due to existing risk transfer mechanism like Calamity Relief Fund (CRF) and PM Relief Fund, India neither required getting in to the debt trap, nor did it require foreign aid for the post disaster measures.

**Weakness:**

The major weaknesses which appeared during the disaster are:

# Lack of coordination among the executives
# Lack of appropriate warning system

As media reported that first information of the disaster was received by the former S&T minister rather than existing S&T minister. This was the biggest loophole appeared in the coordination among the government machinery and many more lives could have been saved.

Tsunami is least probability event in India. As such, there were no codal provisions of Tsunami warning in India as yet though there is good seismological network in India to record any earthquake within the country and its neighborhood. Therefore due to lack of

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³ [http://www.nidm.net/disaster_updates-pdf/n3-9-2-05.pdf](http://www.nidm.net/disaster_updates-pdf/n3-9-2-05.pdf)

⁴ Ibid.
proper Tsunami Warning System in Indian Ocean timely rescue and evacuation became almost impossible and hazard converted into the disaster.

**5. Recommendations for Improvement:**
Since coastal areas are prone to many types of hazards, and occurrence of more than one hazards can not be avoided from these areas. Therefore we need a ‘**Multi – Hazard Mitigation Approach**’ in such areas to mitigate the future impact of this types of disasters. This includes following:

- # Multi – Hazard Risk Assessment and Risk Analysis.
- # Hazard mapping (Macrozonation as well as Microzonation through GIS).
- # General Measures for all types of hazards.
- # Specific Measures for specific hazards (Tsunami hazard map, Retrofitting etc.).
- # Efficient early warning (Tsunami or Cyclone) and communication system with setting up of VSATs in Lifeline Structures at Divisional and Sub-Divisional Levels and availability of satellite phones at the grassroot levels.
- # Public awareness and hazard campaign (Posters, Street plays, Demonstration etc.) with special focus on community preparedness measures.
- # Training programmes (for planners, bureaucrats and the inhabitants of the risk region).
- # Appropriate Techno – Legal Regime (Structural and Regulatory Framework)
- # Mock drills to check the efficiency of coordination mechanism among the government machinery at different levels

**REFERENCES**

http://vle.worldbank.org/gdln-scripts/dlmanage.exe

http://www.nidm.net/index.htm

http://www.nidm.net/disaster_updates2005.asp

http://www.imd.ernet.in

http://www.isro.org

http://www.ndmindia.nic.in
