

**NAME OF THE PARTICIPANT:** Dr. Rajkumar Chingkhei

**GROUP:** C

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## END COURSE PROJECT

### **1) INDIA: Background Information**

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**1.1 Size:** 32, 87,263 sq km

**1.2 Population:** 1027015247 (2001 census)

**1.3 Climate:** In broad sense India has a tropical monsoon climate. According to the Köppen classification system India has six climatic zones viz. Alpine, Humid subtropical, Tropical wet and dry, Tropical wet, Semi-arid and Arid (source: Wikipedia). The country also experiences four seasons namely (a) winter (December-February), (b) summer (March-June), (c) south-west monsoon season (June-September), and (d) post monsoon season (October- November).

**1.4 Geographical Facts:** India lies entirely in the Northern Hemisphere and occupies a major portion of the south Asian subcontinent. It extends between 8° 4' and 37° 6' North latitudes, and 68°7' and 97°25' East longitudes. It is bounded by the Great Himalayas in the north, the Bay of Bengal in the east, the Arabian Sea in the west, and the Indian Ocean to the south. The neighboring countries include Afghanistan and Pakistan to the north-west; China, Bhutan and Nepal to the north; Myanmar to the east; and Bangladesh to the east of West Bengal and Sri Lanka in the south which is separated by a narrow channel of sea, formed by Palk Strait and the Gulf of Mannar. Geographically, the mainland of the Indian peninsula is divided into four major regions viz. the great mountain zone, plains of the Ganga and the Indus, the desert region, and the southern peninsula. The coastline of India measures about 7,516.6 km encompassing the mainland and the three islands.

**1.5 Economic and Social Characteristics:** In the last 60 years of independence, India's economy has been improving gradually. With a GDP of US \$1.25 trillion (2008), when measured in USD exchange rate terms, it is the twelve largest in the world economy (source: Economic Times India). In terms of purchasing power parity (PPP), which is estimated to be 5.21 trillion in 2008 (nominal is \$1.250 trillion), it is the third largest. India' economy is the second fastest growing major economy in the world, with a GDP growth rate of 9.4% for the fiscal year 2006–2007(source: "India's GDP expanded at fastest pace in 18 years", Market Watch, May 31, 2007). However, India's huge population results in a per capita income of \$4,542 at PPP and \$1,089 at nominal as per revised 2007 estimate (source: IMF & CIA). In spite of its fast economic growth India is still classified as a low-income economy by the World Bank (source: India climbs up the income ladder & World Bank Country Classification Groups, July 2006 data).

The percentage contribution of various sectors to India's economy against the GDP is agriculture (19.9%), industry (19.3%), and services (60.7%) as per 2006 estimates (source: CIA 2007). During the last few years the overall India's balance of payments has been positive, largely due to increased foreign direct investment (FDI) and deposits from non-resident Indians that has made India's foreign currency reserves stood at \$285 billion in 2008. FDI inflows into India reached a record US\$19.5bn in fiscal year 2006/07 (April-March), according to the government's Secretariat for Industrial Assistance. This was more than double the total of US\$7.8bn in the previous fiscal year. Between April and September 2007, FDI inflows were US\$8.2bn (source: The Economist). Declining interest rates and reduced borrowings decreased India's debt service ratio to 4.5% in 2007 (source: Indiainfoline). The total amount exported during the financial year 2006-2007 stands at \$125 billion while the import stands at \$187.9 billion f.o.b. as per 2006 estimates (source: CIA 2007).

Though level of urbanization in India is considered to be low with only 28% of population living in urban areas as per 2001 census, it still shows an increasing trend of urbanization. Number of urban agglomeration /town has grown from 3768 in 1991 to 5161 in 2001. Number of total population has increased from 84.43 crores in 1991 to 102.7 crores in 2001 whereas number of population residing in urban areas has increased from 21.71 crores in 1991 to 28.53 crore in 2001 (Pranati Datta 2006). By 2011 the population size of India is estimated to be 117.89 crores with 32% urban population.

**1.6 Vulnerabilities to natural disasters:** India, by virtue of its location, geographical set up and climatic conditions, is vulnerable to almost all kind of natural hazards which eventually lead to disasters. The main hazards of India include floods, droughts, earthquakes, volcanic eruptions, land slides, forest fire, strong/severe winds, tsunami which frequently lead to a disaster causing loss of lives and properties (Table 1). According to the Bureau of Indian Standards (BIS) and NDM, about 59% of India's landmass is susceptible to earthquakes of various intensities, about 8% of total area, especially the east coast, are vulnerable to cyclones, and 68% land is susceptible to drought, 4 Crore hectare land mass is susceptible to floods and the sub-Himalayan / western Ghat is vulnerable to landslides (source: Tenth Five Year Plan 2002-2007, NDM division, MHA, GoI).

**Table 1: Damage due to Natural Disasters in India**

Year	People affected (Lakh)	Houses & buildings, partially or totally damaged	Amount of property damage/loss (Rs Crore)
1995	543.5	2,088,355	40.73
1996	549.9	2,376,693	50.43
1997	443.8	1,103,549	N.A
1998	521.7	1,563,405	0.72
1999	501.7	3,104,064	1020.97
2000	594.34	2,736,355	800.00
2001	788.19	846,878	12000

**Source:** Annual Reports, NDM Division, Ministry of Agriculture

## **2) The Great Indian Ocean Tsunami- A Brief Description**

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**2.1 Year of Occurrence:** 26<sup>th</sup> December 2004

**2.2 Type of Disaster:** Tsunami

**2.3 Severity of Disaster:** Very high, large scale devastation

**2.4 Losses and Damages:** Some of the direct impacts of the Great Indian Ocean Tsunami of 2004 include loss of lives, loss of infrastructures, loss of properties and environmental degradation etc whereas one of the worst indirect impacts was the deteriorated psychological status of the victims. It was officially reported that about 12,405 (estimated=18,045) were killed, 900 injured, 5,640 persons missing who are feared to be dead, about 6, 47, 599 were displaced, and about 3, 80,000 were made refugees. One of the most tragic casualties took place in Car Nicobar Island where 111 Indian Air Force personnel and their family members were completely washed away when the wave hit their air base, which was reported to have been severely damaged. The affected coastal area especially in the islands also suffered a blow in the infrastructures like shipping, telecommunication, power supply etc. It is estimated that an amount of Rs. 304 crores will be required to restore the damages to the shipping sector and about Rs. 150 crore to restore the power supply infrastructure in the Islands (NDM MoH, <http://www.ndmindia.nic.in/Tsunami2004/ministry.htm>). Besides, the tsunami has also badly affected the natural ecosystems like mangroves, coral reefs, forests, coastal wetlands, vegetation, sand dunes and rock formations, animal and plant biodiversity and groundwater etc. The soil and freshwater supplies/sources like wells were also contaminated by saltwater that makes these resources not fit for use. Further, the spread of solid and liquid waste and industrial chemicals, water pollution etc has also deteriorated the environmental condition of the region.

**2.5 Impact on national economy:** Though the nation's GDP was not affected the local economy was badly affected by the disaster. The disaster had significant impact on the affected states' local economy. The tourism, fishery and related livelihood in coastal communities of these states and union territory were badly affected largely due to fear psychosis and partly because of infrastructure damage.

**2.6 Reliance on External Assistance:** Nil.

**2.7 Disaster Management Operation:** As soon as the tsunami strikes the Indian coast, it was the local people to initiate the informal management of the disaster. Later on the concerned ministries/agencies started their response activities without much delay. The relief, response and rehabilitation measures was coordinated by The Ministry of Home Affairs (MHA) which was the nodal Ministry with the affected States/ UTs, the Central Ministries/Departments providing emergency support including the Ministry of Defence and Armed Forces and the other States, CBOs and NGOs. The Ministry was also coordinating the mobilization of resources and their dispatches and other logistics. Several personnel of Central Para Military Forces including specialists' teams from CISF and ITBP who are also Medical First Responders were deployed for search and rescue operation, road clearance, disposal of dead bodies, sanitation activities. In order to assist the disaster management Rs. 250 crore to Tamil Nadu, Rs. 100

crore each to AP and Kerala have been provided from National Calamity Contingency Fund (NCCF). Separately Rs. 35 crore to Pondicherry and Rs. 200 crore to Andaman & Nicobar Islands has been given.

Humanitarian assistance, cleanup, temporary repairs, restoration of services, and damage assessment were performed on top priority to prevent secondary impacts of disaster like disease outbreak due to the deaths, improper sanitation etc. Intermediate relief camps were built and minimum facilities like safe drinking water, proper sanitary, good food etc were provided through different agencies including the local people and the community organizations.

**2.8 Mitigation measures undertaken:** In order to minimize the losses in the future various mitigation measures has been taken up at various levels. Risk Identification has been done and accordingly children, weak, females, disable/handicaps, old section of people are identified as high risk and vulnerable group. Relocation of these high risk people to safer sites has been planned. Risk Transfer mechanism has been strengthen through insurance, loan, compensations, ex gratia, Relief fund etc. Besides India has now joined the 54 participating nations in Global Earth Observation System of Systems (GEOSS), an international effort led by the USA, Japan, South Africa, and the European Commission.

At present the National Tsunami Early Warning System in the Indian Ocean has been established at INCOIS, Hyderabad by the ministry of Earth Sciences (MoES) at the cost of Rs 125 crore in collaboration with Department of Science and Technology (DST), Department of Space (DOS), Council of Scientific and Industrial Research (CSIR) (Source: GIS Development January 2008, Vol 12 Issue 1). The National Tsunami Early Warning System was dedicated to the nation by the Minister of Earth Sciences Shri Kapil Sibal in October 2007.

**2.9 NGOs, CBOs, corporate sector participation in the disaster recovery and rehabilitation:** Various corporate, NGOs, CBOs including local people, civil society and media etc played a very significant role during the recovery and rehabilitation phase of the disaster. Huge amount of relief funds were raised through the Indian Prime Minister's National Relief Fund, The Hindu Relief Fund - India's National newspaper, Tamil Nadu Chief Minister's Public Relief Fund, NDTV's trust fund etc, to provide for immediate relief to disaster victims. Besides International organizations like WHO, UNICEF, UNESCO, RED CROSS acted immediately by providing financial aid as well as certain basic requirement items like, safe drinking water, proper sanitary facilities, good food, medical assistance etc. UNDP has estimated that corporate sector in India has contributed about \$8 million worth of cash donations, food and medicines and emergency relief supplies.

**2.10 Reconstruction:** The government has compensated the victims of tsunami through ex gratia, schemes and loans to bring back to their normalcy. In the mainland coastal areas some fisheries equipments have also been distributed through public distribution system. In Nicobar Islands construction of houses had been started and is almost at the end. Reconstruction of damaged critical

infrastructure in the affected areas is started, budget and macroeconomic management issues are addressed, and revitalization of affected sectors begun; tourism and agriculture are also managed. Ministry of Rural Development has already released the Central share of allocation of funds under Indira Awaas Yojana (IAY) for the year 2004-05 to the States of Andhra Pradesh (Rs. 85.43 crore), Kerala (Rs. 27.29 crore), Tamil Nadu (Rs. 48.41 crore), A& N Islands (Rs. 3.53 crore) and Pondicherry (Rs. 1.08 crore) for reconstruction/ construction of damaged houses in the affected areas. Likewise restoration of communication facilities, normal power and repairing of road network has been done by the concerned ministry and the department along with the local agencies.

### **2.11 Lessons learnt:**

1. India is highly vulnerable to tsunami and we should be prepared to tackle the disaster anytime with more efficiency through effective capacity building and response mechanism.
2. Conflicting objectives during post disaster phase need to be managed through transparency, awareness campaigns and popularization (e.g. Car Nicobar islands).
3. Post-disaster reconstruction is more complex than emergency relief and requires relevant human resources and skills to support integrated management of coastal areas and social processes including Land ownership.
4. Proper Fund Management: Tsunami relief involves huge amount of money and unfortunately due to lack of proper management in terms of accountability, transparency and overall tracking mechanism, the fund is misuse.
5. Health response was not satisfactory and quite slow which has led to secondary outbreak of diseases though care has been taken.
6. Trained volunteer will enhance the overall response mechanism.

## **3) National Disaster Management System(NDMS)**

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**3.1 Basic Characteristics:** Fortunately or unfortunately India is highly vulnerable to almost all kinds of natural disasters. The super cyclone in Orissa in October, 1999 and the Bhuj earthquake in Gujarat in January, 2001 marked a turning point to the India's system of disaster management. Some of the characteristics of the NDMS are mentioned below (source: Tenth Five Year Plan 2002-2007, NDM division, MHA, Gol).

- (a) The NDMS has good and strong institutional and policy mechanisms for carrying out response, relief and rehabilitation. The policy also mandates a priority to pre-disaster aspects of mitigation, prevention and preparedness.
- (b) The NDMS has strong legal and techno-legal framework.
- (c) Incorporation of mitigation and prevention as essential components of the development strategy.

- (d) Good Funding mechanism
- (e) NDMS has Specific schemes for addressing mitigation of different disasters like earthquake, flood, cyclone, landslides etc.
- (f) Preparedness measures: The NDMS has extended preparedness mechanism through Specialist Response Teams, Search and Rescue Teams in States, Regional Response Centres, Health Preparedness, Hospital Preparedness and Emergency Health Management in Medical Education, Incident Command System, Emergency Support Function Plans, India Disaster Resource Network, Emergency Operation Centres, National Emergency Operation Centre, National Emergency Communication Network, Development of a GIS-based National Database for Disaster Management, Strengthening of Fire Services, Strengthening of Civil Defence, Proper Handling of Hazardous Materials.
- (g) Capacity building: Various capacity building programmes has been taken up at national, state and local levels especially for earthquake, flood, cyclone and landslides.
- (h) Human Resource Development has been taken up through activities like Awareness generation, Disaster Awareness in School Curriculum, Information, Education and Communication, setting up of NDM cells in Administrative Training Institutes.
- (i) NDMS has recognized the importance of community participation disaster management.

**3.2 Organizational Structure:** The Organizational structure of NDMS is an integrated system consisting of National, State, District and Sub-District administrative bodies. Presently the state government, with financial and logistic support from the central government, is responsible for undertaking rescue, relief and rehabilitation measures in the event of natural disasters. However, the Ministry of Home Affairs is the nodal Ministry for coordination of relief and response and overall natural disaster management. Various authorities and committees at different level are given below.

*National level:* National Disaster Management Authority (NDMA), National Advisory Committee (NAC), National Executive Committee (NEC) and National Executive Sub-committee (NES) to workout with the policy and execution of the plans, National Institute of Disaster Management NIDM, National Disaster Response Force (NDRF).

*State Level:* State Disaster Management Authority (SDMA), State Advisory Committee (SAC), State Executive Committee (SEC), State Executive Sub-committee (SES).

*District Level:* District Disaster Management Authority (DDMA), District Advisory Committee (DAC), Local authorities including NGOs

### **3.3 Existing legislation:**

*Disaster Management Act 2005:* Indian system of Natural Disaster Management has a strong legal binding through this Act providing adequate powers for authorities coordinating mitigation, preparedness and response as well as for mitigation/prevention measures required to be undertaken. Every state has been advised to enact this Act.

*Disaster Management Code:* This code will enhance in preparation of disaster management and mitigation plans as well as elements of preparedness apart from response and relief. In this regard every state government has been advised to convert their Relief Codes into Disaster Management Codes using the drafted a Model Disaster Management Code developed by a Committee constituted under the Executive Director, National institute of Disaster Management.

**3.4 Policies:** A National policy on disaster management has been drafted. The policy proposes to integrate disaster mitigation into development planning. The policies envisage informing all spheres of Central Government activity and shall enjoin upon all existing sectoral policies. The policy aimed to minimize the loss of lives and social, private and community assets because of natural or man-made disasters and contribute to sustainable development and better standards of living for all, more specifically for the poor and vulnerable section by ensuring that the developments gains are not lost through natural calamities/ disaster.

**3.5 Strategies:** A multi-pronged disaster management strategy is followed by the NDMS. The overall national strategy has been shifted from the traditional relief and rehabilitation to mitigation and accordingly plan and policy has been formulated. The institutional mechanism has been focused on setting up of Nodal agency for disaster management at the national level with appropriate systems, creation of State Departments of Disaster Management, setting up State Disaster Management Authorities to tackle various issues of disaster management. Disaster mitigation/prevention has been mainstreamed in the development processes through schemes developed by the Ministries / Department of govt. of India / State Governments /UT Administration. Formulation and compliance of Techno-legal regime, Land-use Planning and Zoning regulations, Plan schemes for vulnerability reduction and preparedness in this regard has been made mandatory to minimize the impact of disaster. The legal policy will be strengthened by including disaster management LIST – III of concurrent list of VII to the constitution. Further, State Disaster Management Acts, National Policy on Disaster Management, State Disaster Management Codes has to be developed. On the other hand Preparedness and Response strategy has been focused on setting up of National Emergency Response Force/Specialist Response teams and Specialized Response Teams at State level. The Disaster management strategy also focused on setting up of National Network Of Emergency Operation Centers [NNEOCs] which comprises of Emergency Operations Centre [EOC] at National level, State level EOC, District level EOC, Putting Incident Command System in Place, Emergency Support Function Plan, India Disaster Resource Network, Communication linkages which will be functional even in post-disaster, Regional Response Centres, Training in response for CPMFs and State Police Forces, State Disaster Management Plans, District Disaster Management Plans, Block Disaster Management Plans, Community based mitigation, preparedness and response plans. The NDMS strategy also includes setting up of Early Warning Systems for various disasters with warning protocols to monitor, track, and model hazards. Another very important part of NDMS strategy is human resource development & capacity building through Training for services /cadres/

agencies involved in mitigation, preparedness or response; Training of IAS/IPS, State Administrative Service Officers/State Police, Engineers/Architects, Health Professionals, Youth organization, Masons, inclusion of Disaster management in School curriculum, National mass media campaign for awareness generation, involvement of NGOs/CBOs in awareness generation and community participation in disaster preparedness and mitigation planning, involvement of Corporate sectors in awareness generation and disaster preparedness and mitigation planning, Inter-state arrangements for sharing of resources during emergencies and lessons learnt. Yet another important part of the strategy is Research and Knowledge Management. Institutionalizing knowledge and lessons learnt in the process of working on the national roadmap, Developing national disasters database, Promoting research in national, state and regional institutions in the areas of disaster risk reduction.

### 3.6 Distribution of Power, Responsibilities and Liabilities:

The Indian NDMS has a well defined distribution of power, responsibilities and liabilities at National, State and District levels. As mentioned earlier, at national level, The Ministry of Home Affairs is the nodal Ministry for coordination of relief and response and overall natural disaster management. Ministries responsible for various disasters are given in the table 2.

Table 2: Ministries Responsible for Various Categories of Disasters

<b>Disaster</b>	<b>Ministry</b>
Natural Disasters Management (other than Drought)	Ministry of Home Affairs
Drought Relief	Ministry of Agriculture
Air Accidents	Ministry of Civil Aviation
Railway Accidents	Ministry of Railways
Chemical Disasters	Ministry of Environment & Forests
Biological Disasters	Ministry of Health
Nuclear Disasters	Department of Atomic Energy

Source: Tenth Five Year Plan 2002-2007, NDM division, MHA, Gol

At National level the decision-making and standing bodies of NDM comprises of i) Union Cabinet, headed by the Prime Minister, ii) Empowered Group of Ministers, headed by the Deputy Prime Minister, iii) National Crisis Management Committee (NCMC), under the chairmanship of the Cabinet Secretary, iv) Crisis Management Group (CMG) under the chairmanship of the Central Relief Commissioner comprising senior officers from the various Ministries and other concerned Departments which reviews contingency plans, measures required for dealing with a natural disaster, and co-ordinates the activities of the Central Ministries and the State Governments in relation to disaster preparedness response and relief and v) Technical Organizations provides specific technical support to coordination of disaster response and management functions. The state has the maximum responsibility to manage with the disaster support with supplementation of physical and financial resources from the center. In the state The Chief Secretary of the State is the head of State Level Committee (SLC) which is in charge of the overall relief operations in the State. The Relief Commissioners of the State function under the overall direction and control of the

SLC. In many states, Secretary, Department of Revenue, is also in-charge of relief. The district Collector/ District Magistrate/Deputy Commissioner executes/ implements all the plans and activities of the government which includes day-to-day management of relief. Besides, the local bodies like Panchayati Raj also has been recognized as effective instruments in tackling disasters through early warning system, relief distribution, providing shelter to the victims, medical assistance etc. Further, other bodies like the police and para-military forces, civil defence and home-guards, fire services, ex-servicemen, nongovernment organisations (NGOs), public and private sector enterprises, media and HAM operators also share big responsibilities at various level of disaster management.

## **4) Strengths and Weaknesses of NDMS**

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### **4.1 Strengths:**

*Structural Organization:* The NDMS has a strong organization structure comprising of various stakeholders with shares responsibility and liabilities under proper legislation. During the tsunami all the ministries, departments at national, state and local levels were active in performing their responsible duties.

*Response Mechanism:* With existing NDMS the tsunami during December 2004 could be responded without much delay. The Ministry of Home Affairs, by virtue of its position has initiated the relief and rehabilitation activities with the support from other ministries without much delay. For example in many affected area especially the Nicobar Island ,basic operations like rescue, humanitarian activities, and proper sanitation programme could have been done with the help of the Defence ministry under the coordination of MHA.

*Funding Mechanism:* The NDMS has financial arrange for disaster management in two forms viz. Calamity Relief Fund (CRF) and National Calamity Contingency Fund (NCCF). During the tsunami these funds had been utilized to meet the requirements of the relief and rehabilitation activities.

### **4.2 Weaknesses:**

*Awareness & Preparedness:* The NDMS does not have proper policy for Tsunami and moreover people are also not well aware of it. Due lack of awareness among the people many lives and properties were lost. An interesting incident occurred in Car Nicobar Island where many people were killed only because they could not release what was coming in front of them. It was told that when the first wave hit the island, people started running out of there home but as the wave recedes they thought that it was over but only to face a massive second wave of tsunami that killed them all.

*Weak Coordination:* During the relief operation due to lack of good coordination among the various levels of stakeholders there was delay in supply of relief material to the affected areas especially to the Island.

*Centralization of Funds:* The present system of NDMS provides fund through central government. This has certain draw backs during disaster management especially during disaster phase. During the tsunami the state and UTs has to

wait for the green signal from the concerned central government agency for the fund to be released. This really hampers the reconstruction and rehabilitation programme of the affected areas.

## **5) Recommendations for Improvement**

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Successful disaster management lies at how far we are able to understand the disaster and its possible outcome. In this regard the following few points are suggested.

*Power Decentralization:* Due to lots of strata in the institutional arrangement, there is lots of official file work which hamper the proper and timely response/function during disasters especially the financial assistance for relief and rehabilitation. A proper financial mechanism needs to be established at the state level also so that when disaster like tsunami comes the government should be ready to respond immediately without waiting for financial assistance from the center.

*Capacity building:* We should be ready to face the disaster like tsunami in the future through capacity building programmes like awareness, training, inclusion of disaster management in the school curriculum, and regular drill will truly enhance the disaster management in the region.

*Risk transfer mechanism:* Risk transfer mechanism needs to be improved in terms of higher values as it has been reported in *Specialty Practice Briefing by Guy Carpenter in Issue 1*.

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